# UIC
# REVIEW OF INTELLECTUAL PROPERTY LAW

JUDICIAL ERRORS: FAKE IMAGING AND THE MODERN LAW OF EVIDENCE

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ABSTRACT

The evidence was conclusive: The owner of a gallery held photographs of the stolen bronze statue; the digital records of the alarm system showed that the system had been disconnected at 03:16; a moment later, the digital video showed a masked figure quickly traverse the corridor into the exhibition hall – and the bludgeoned guard filled in the missing details. The court held no doubt. It ordered the insurance company to pay the insurance proceeds to the gallery owner. There was only one flaw in the outcome of the proceeding, one that escaped everyone's notice: There was no bronze statue. It had never existed. In fact, no robbery had occurred. All of the electronic evidence was forged, but it was flawless. No one would have guessed that the image was computer-generated; that the system records had been carefully doctored; and that the video had been edited using a sophisticated algorithm. The guard, who had been bribed to lie, lent an air of authenticity to the evidence. The trial could have gone no other way.

This study intends to shine a spotlight on the difficulty described by the above case. In doing so, the study will delve into the evidentiary dilemmas that are gradually increasing as technology develops, relating to the possibility, and relative ease, of fabricating images that can pass as authentic evidence, and that the human eye cannot distinguish from the genuine article. This article will explore the current legal situation, and in particular, the unique characteristics of Israeli law (and the State of Israel in general), which suffers from an overload of legal proceedings as a

result of an abundance of lawyers and a shortage of judges and law enforcement officers, in light of the legal challenges associated with the COVID-19 pandemic.[1]

**In the first section**, we will present the current situation related to technology, including the practical ease of forging images in the modern era. This technological review will examine the past situation, the developments that have bridged this gap, and particularly how easy it is today to submit an image that appears authentic despite being completely fabricated.

**In the second section**, we will present the current situation concerning evidence law. We will review classical evidence law, which champions the doctrine of accepting the "best evidence" exclusively; and compare this to modern evidence laws, which seek to persevere through the Information Age by championing the accrual of as wide an expanse of evidence as possible.

**The third section** will examine the inherent difficulty presented by the ease of forging images, as seen through the lens of the probative rules of modern evidence law, and how this issue is likely to be exacerbated by the cognitive biases to which courts may be susceptible that relate to digital evidence.

**The fourth section** will examine the unique characteristics of Israeli law, and, effectively, any adversarial legal system suffering from an overload of legal proceedings and illustrate the current state of overload plaguing the State of Israel, as well as other legal systems.

**The fifth section** will propose a solution to the problem based on the existing law and case law, and illustrate how this solution may mitigate concerns of the potential for defrauding the courts, while at the same time incentivizing the relevant parties to conduct themselves more prudently.



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[1] *See* David Rabi, *Law in the Coronavirus Era: Without a Legislative Solution, Courts are Expected to be Overrun*, MAARIV (October 14, 2020), www.maariv.co.il/news/law/Article-795531 .

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I. FAKE IMAGING

Given the increased use of the internet, and specifically social media, our major connection to events happening in the world is the visual content and evidence obtained through these platforms.[2] Visual inputs have a much stronger effect, leave a stronger impression and raise more intense perception than any other human sense.[3] Thus, visual media serves as the most convincing source of evidence, especially compared to audio or written sources. This underscores the importance of ensuring the reliability of visual media, particularly when consumed en masse by the general public. Unfortunately, the ever-growing advancements in the fields of computer imaging and graphics have made image tampering and forgery both highly accessible and persuasive, rendering it basically impossible for the naked eye to detect in an image or video.[4] This has enabled the rise of fake news, by allowing the casual editing of political speeches, forging visual data that may serve as evidence in court cases, and many more examples, any one of which might have disastrous consequences if not detected. Therefore, detecting forgery in visual media is vital. Due to the difficulty in visually detecting tampering and forgery in visual media, computational tools based on computer vision and artificial intelligence (AI) have been recruited.

For many years, classical methods of image and video forgery involved manually editing the data or using basic image processing tools such as image color manipulation and image filtering. In 2012, a new revolutionary approach to computation was presented,[5] which changed the field of digital forgery and its detection. The revolutionary data driven machine learning approaches based on Artificial Neural Networks (ANN) are not only capable of detecting image forgery at a higher level than ever before; they have redefined image forgery itself. Rather than tampering with existing images, the most advanced forgery techniques are engaged in synthesizing non-existing images using specialized neural networks, Generative Adversarial Networks (GANs). Since then, neural networks, specifically GANs,[5] are the major threat presented in visual data forgery. Image forgery and its detection, similar to cyber security attacks and defenses, form a continuous cat-and-mouse game. Attacks (forgery) rely on understanding the mechanisms of defenses used (forgery detection), and attempting to fool them. Once successfully breached, an update of the defenses usually follows, until a new type of attack is met, and so on and so forth. Numerous new methods of image forgery

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[2] E.g., television news and social media sites dedicated to visual data (Instagram, SnapChat, YouTube, etc.).

[3] Fabian Hutmacher, *Why Is There So Much More Research on Vision Than on Any Other Sensory Modality?*, FRONTIERS IN PSYCHOL. (Oct. 10, 2019), https://www.frontiersin.org/articles/10.3389/fpsyg.2019.02246/full; DAVID E. KATZ, THE WORLD OF TOUCH (Hillsdale, NJ: Erlbaum); Alberto Gallace & Charles Spence, *The Cognitive and Neural Correlates of Tactile Memory*, 135 PSYCHOL. BULL. 380, 380–406 (2009).

[4] *See* e.g., Generative Adversarial Networks, *infra,* § B(1).

[5] Ian Goodfellow et al., *Generative Adversarial Nets. Advances in Neural Information Processing Systems*, 27 NEURIPS 1 (2014); *See* Ian Goodfellow et al., *Generative Adversarial Networks*, 63 COMM. OF THE ACM, 139, 139–44 (2020).

are created every year, followed by papers presenting methods to detect these forgeries. It is a never-ending battle.

In this article we provide an overview of digital forgery of visual media (images and videos), from classical methods used in low-cost image editing software such as Photoshop, Lightroom (both developed by Adobe)[6] and others, to more revolutionary techniques based on Machine Learning (ML) and algorithms within the field of Artificial Intelligence (AI). Additionally, we will discuss counter methods to detect forgeries and tampering of visual data.

In this section, we divide digital image forgery and its detection into two parts. The first part describes classical image forgery and detection, both the active and the passive approaches. The second part introduces modern image forgery and its detection, i.e., the AI-based image forgery and detection, which are mostly data driven approaches. We illustrate the revolution of neural networks and show that today, rather than tampering with existing images, the most advanced forgery techniques synthesize non-existing images using GANs.

### A. Classical Image Forgery and its Detection

Prior to the machine learning revolution in 2012, algorithms for image tampering relied on image processing algorithms, which in turn rely on mathematical algorithms. These could have been implemented using computer programs or manually, via image and video processing apps (e.g., Photoshop etc.). This fact is important because once a mathematical operation is understood, it is more easily inverted, meaning that its effect in an image could be detected to some degree.

Image forgery is divided into two categories:[7] active algorithms and passive algorithms. Active approaches refer to algorithms implemented at the time of image acquisition, while passive approaches refer to manipulations of an image after acquisition, with no prior knowledge about the source camera pipeline.



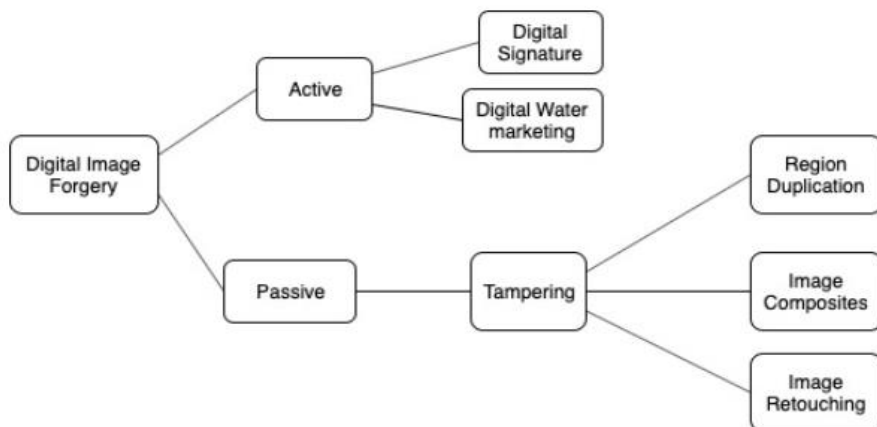Figure 1: Digital Image Forgery Categories[8]

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[6] *See* ADOBE, https://www.adobe.com/ (last visited Nov. 24, 2021).

[7] Ananga Thapaliya et al., DIGITAL IMAGE FORGERY 2 (2020), http://ceur-ws.org/Vol-2525/ITTCS-19_paper_36.pdf

[8] *Id.* at 3.

### 1. Digital Signatures (Active Forgery)

The image acquisition process within cameras always leaves an unintentional trace in the resulting image due to image noise, radial distortion, vignetting, chromatic aberration, and other interferences.[9] Since cameras differ in their pipelines, hardware, and designs, these traces differ among different camera models. These traces are termed the signature and can be used as an identifier of the source camera which captured the image. Additionally, corruption, inconsistency, or multiplicity of the signature within an image can indicate image tampering and forgery, making these a basis for forgery detection.[10]

### 2. Digital Watermarking (Active Forgery)

Another form of image signature is actively introduced into the image. During the acquisition of an image, the camera creates a hidden message inside the image, called a watermark [11] The watermark often encodes information about the source camera, ownership, copyright information and more. The watermark can later be tested as a form of forgery detection. The success of forgery in this case depends on the ability of the tampering to maintain the integrity of the watermark.

### 3. Copy-Move Forgery (Passive Forgery)

Passive forgery refers to image tampering after the image has been acquired. The most common form of forgery is copying and pasting parts within the same image. Forgery detection of this nature has been widely researched, and a variety of approaches have been suggested among which are the block-based methods[12] and key point-based methods.[13]

In block-based techniques, the image or video is divided into square regions or blocks and features representing the data in each block are extracted. Then, blocks with similar features are sought. Since image statistics are such that every block should be distinct, two or more blocks that are found to be very similar are a strong indication of copy-paste forgery. Key point-based methods work on the image as a whole. Local key features of the image are extracted, such as corners and edges using various extraction methods such as SIFT[14], SURF,[15] and others. Comparison is then performed between extracted features and, as in the

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[9] Kai San Choi, Edmund Y. Lam, & K. K. Y. Wong, *Automatic Source Camera Identification Using the Intrinsic Lens Radial Distortion*, 14 OPTICS EXPRESS 11551, 11551–65 (2006); Siwei Lyu, *Estimating Vignetting Function From a Single Image for Image Authentication*, 2010 12TH ACM WORKSHOP ON MULTIMEDIA AND SEC. 3; Micah K. Johnson & Hany Farid, *Exposing Digital Forgeries Through Chromatic Aberration*, 2006 8TH ACM WORKSHOP ON MULTIMEDIA AND SEC. 48.

[10] Noa Privman-Horesh, Azmi Haider, & Hagit Hel-Or, *Forgery Detection in 3D-Sensor Images*, 2018 IEEE/CVF INT'L CONF. ON COMPUTER VISION AND PATTERN RECOG.WORKSHOPS 1642, 1643–46. https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8575367&tag=1.

[11] INGEMAR COX, ET. AL., DIGITAL WATERMARKING AND STEGANOGRAPHY (Morgan Kaufmann Publishers Inc., 2d ed. 2007).

[12] *E.g.*, *Id.* at 6, 27.

[13] *E.g.*, *Id.* at 28, 32.

[14] David G. Lowe, *Distinctive Image Features from Scale-Invariant Keypoints*, 1 INT'L J. COMP. VISION 1, 2 (2004).

[15] Herbert Bay, Tinne Tuytelaars, & Luc Van Gool, *SURF: Speeded Up Robust Features*, 2006 EUR. CONF. ON COMPUTER VISION 404 (2006).

block-based method, features found to be very similar are a strong indication of copy-paste forgery.[16]

An example of a forged image using copy-paste is shown in Figure 2 (the image appeared in The New York Times in July 2008).[17] The copied regions are clearly seen.



Figure 2: The marked areas are repetitions, copied and pasted.[18]

### 4. Image Splicing (Passive Forgery)

Image splicing is the composition of an image from two (or more) images. Methods for detecting this kind of forgery must identify the tampering without access to the source images that created the forgery. Thus, these methods must determine forgery by discovering inconsistencies between different regions of the image. A survey[19] examining the popular methods of image splicing detection divides the methods into several categories. Pixel-based methods test for continuity across adjacent pixels in the image to determine if an unnatural edge has been created by the splicing. Camera-based methods exploit the camera's inherent information, such as noise and the camera's color filter arrays, to determine if there are different camera signatures in different parts of the image. Format-based methods rely on the fact that cameras use different compression parameters that leave artifacts in the image. Inconsistencies in these traces across different regions in the image may indicate splice forgery. Noise-based methods test noise statistics within regions of the image, to find inconsistencies. Unique parameters-based methods test image regions for consistency of image parameters such as blurriness, resolution, change in tone, etc. The survey also describes the different techniques of forgery detection of spliced images and discusses their merits and demerits. An example of a spliced image is shown in Figure 3. The image on the right below is the composition of the left image, as background, and a crop of the middle image as foreground.

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[16] Hailing Huang, Weiqiang Guo & Yu Zhang, *Detection of Copy-Move Forgery in Digital Images Using SIFT Algorithm*, 2008 IEEE PAC.-ASIA WORKSHOP ON COMPUTATIONAL INTELLIG. AND INDUS. APPLIC. 272, 272–74 (2008).

[17] Badal Soni et al., *CMFD: A Detailed Review of Block Based and Key Feature-Based Techniques in Image Copy-Move Forgery Detection*, 12 IET IMAGE PROCESSING 167 (2017).

[18] Mike Nizza & Patrick J. Lyons, *In an Iranian Image, a Missile Too Many*, N. Y. TIMES: THE LEDE (July 10, 2008, 9:16 AM), https://thelede.blogs.nytimes.com/2008/07/10/in-an-iranian-image-a-missile-too-many/?scp=1&sq=iran%20missile%20photo%20the%20lede&st=cse.

[19] Jinwei Wang & Yangyang Li, *Splicing Image and Its Localization: A Survey*, 1 J. INFO. HIDING AND PRIVACY PROT. 77 (2019).

Figure 3: Right image is a spliced image using the left image as background and part of the middle image as foreground.[20]

## 5. Image Retouching (Passive Forgery)

Image retouching is the most popular type of image forgery used in photo editing software.[21] It involves applying filters to regions in an image to make it more visually appealing, such as blurring or removing blemishes, color changing, light enhancement, warping, noise cleaning, and many other edits. Figure 4 shows an example. The original image is on the left and the retouched image is on the right.[22] Although some might not consider this as forgery per se, it is nonetheless image tampering.

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[20] Pius Lee, *Full Sphynx Profile Pyramid Giza Egypt*, ADOBE STOCK IMAGES, https://stock.adobe.com/images/Full-Sphynx-Profile-Pyramid-Giza-Egypt/41629831?as_campaign=TinEye&as_content=tineye_match&epi1=41629831&tduid=0d82 6898d24040ee8f3b792b75f670f6&as_channel=affiliate&as_campclass=redirect&as_source=arva to (last visited Mar. 21, 2022); Peggy Marco, *Photographer Taking Photos Camera Reporter Man*, PIXABAY (Jan. 8, 2016), https://pixabay.com/photos/photographer-taking-photos-camera-1124760/; Author created the picture in the bottom row through splicing the two pictures from the two aforementioned sources in this note.

[21] For example using Photoshop, Lightroom, Skylum Luminar and many other programs.

[22] FLICKR, https://www.flickr.com/photos/prairiekittin/5179916951 (last visited Nov. 24, 2021).

Figure 4: Left image is the original. Right image is the retouched image.[23]

*B. Modern Forgery: AI-Based Image Forgery and Detection*

In the previous section we reviewed forgery methods (and their detection) that were popular until the introduction of the revolutionary Machine Learning approaches in 2012. The classic methods implemented forgery by using standard image processing operations and filters, or by manually manipulating the image. To determine whether an image is forged or not, careful computations must be performed to extract relevant image features. Typically, these computations require some knowledge (or a good guess) of the parameters used to create the forgery. This may be very challenging, especially when complicated image manipulations have been performed. The introduction of novel machine-learning algorithms allows users to develop techniques that generate filters or operations which automatically detect forgery based on many examples of forged and original images.

Machine Learning (ML) is a class of algorithms that are developed based on examples. Rather than writing a program based on a set of rules (e.g., if you find a watermark in an image, test its integrity, and if it is not whole, output that the image has been tampered with), the ML algorithms are programs whose parameters are tuned by feeding them many examples of inputs and their expected outputs. For example, the inputs may be images and their associated output a label: "original" or "forged." The goal of ML, and specifically Artificial Neural Networks (ANN), is to create a program, often termed a model or network, that is based on a sequence of tunable filters being applied to the input (image).

The filter parameters are tuned according to the dataset of input-output pairs. The process of repeatedly changing the parameters in the model is called the training process. In each step, an input image is given to the model, the current filters are applied to it, and an output is produced by the model. This output is compared to the desired output as defined by the input-output pair, and a loss score is computed as the difference between the desired output and that produced by the model. Based on the loss score, the filters of the model are tuned, i.e., the model's parameters are changed to increase the similarity between the model's output and

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[23] *Id.*

the desired one. In the ideal case, after going through the entire training data, the loss will be close to zero. This process is termed Model Training (or ANN Training). This type of learning is called Supervised Learning.[24]

Following training, the model (ANN) can now be used to process new data. Given a new input (image), the model produces an appropriate output, even if the input was never before seen by the model.

This data driven learning approach became popular in 2012 when AlexNet[25] won the ImageNet Large-Scale Visual Recognition Challenge (ILSVRC) of classifying images to one of twenty-two thousand classes.[26]

There are many variations to ANNs, including their architecture (the size of the input, number of layers, number and size of filters, size of output and more), the type of input-output used, and the computations performed within the ANN. Thus, the ANN has been developed to deal with many tasks ranging from image classification,[27] image captioning,[28] image enhancement,[29] and many more applications, even beyond the realm of visual data.

Forgery detection has also advanced using ML and ANN models. These models were trained on datasets of original and forged images, and the output is binary – the image is real or forged (fake). The accuracy of these models trumps classical methods by far when considering the visual result. The human eye is unable to detect forgeries that state-of-the-art learning models are able to detect.[30]

*1. Generative Adversarial Networks*

Forgery and fake data were originally defined as any change or tampering in the data, compared to its state immediately following its acquisition. That is, data manipulation was performed on existing source data that had previously been acquired. However, in 2014, a paper describing a new type of learning model called Generative Adversarial Network (GAN) completely redefined forgery. These models have the ability to create new, previously non-existent images and videos of scenes, people, and objects – data which has no source of acquisition.[31] Computer graphics have long been able to synthesize objects and scenes; however, never with the simplicity and at the unbelievably high quality of these GANs. Figure 5 shows examples of fake images created using an ANN model:[32]

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[24] Vladamir Naeteki, *An Overview of the Supervised Machine Learning Methods*, 2017 HORIZONS SCI. J. 51, 55–57, https://tinyurl.com/58449k8j.

[25] Alex Krizhevsky, Ilya Sutskever, & Geoffrey E. Hinton, *ImageNet Classification with Deep Convolutional Neural Networks*, 60 COMM. OF THE ACM 84, 84–90 (2017).

[26] *See* IMAGENET, https://www.image-net.org/ (last visited Nov. 24, 2021).

[27] Waseem Rawat & Zenghui Wang, *Deep Convolutional Neural Networks for Image Classification: A Comprehensive Review*, 29 NEURAL COMPUTATION 2352, 2352–2449 (2017).

[28] Simao Herdade, Armin Kappeler, Kofi Boakye, & Joao Soares, *Image Captioning: Transforming Objects into Words*, 32 NEURIPS 1, 1–3 (2019)

[29] R. Alaguselvi & Kalpana Murugan*, Image Enhancement Using Convolutional Neural Networks*, 2019 IEEE CONF. ON CLEAN ENERGY AND ENERGY EFFIC. ELECTR. CIR. FOR SUSTAINABLE DEV., https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9167741.

[30] *See* WHICH FACE IS REAL, https://www.whichfaceisreal.com (last visited Nov. 24, 2021).

[31] *See* Goodfellow, *supra* note 5.

[32] *See* Andrew Brock, Jeff Donahue, & Karen Simonyan, *Large scale GAN Training for High Fidelity Natural Image Synthesis*, 2019 INT'L CONF. LEARNING REPRES. 1.

Figure 5: Synthesized (fake) images created using a model.[33]

One of the major achievements of these algorithms is the synthesis of high-quality face images that are impossible to distinguish from real images using the naked eye. Figure 6 demonstrates several examples of fake faces of people that do not exist, created using another GAN model.[34]



Figure 6: Face images of people who do not exist.[35]

*2. How Does a GAN Work?*

Above, we described the standard methods of training supervised-learning models.[36] A GAN is a type of ANN where two supervised models are trained concurrently. To understand how they help each other learn, we use the artist and critic analogy: One model is an artist. It receives an input of a random image (an image with random values; consider this a blank canvas with no painting). Its job is to learn how to turn this canvas into a realistic painting. The second model is the critic, it has the knowledge of what realistic paintings are supposed to look like. The critic model receives the painting that the artist model created and puts out a binary decision indicating if the input is a realistic painting (real) or artist drawn (fake). Feedback from the critic (namely, your painting was found to be non-

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[33] *Id.*

[34] *See* THIS PERSON DOES NOT EXIST, https://www.thispersondoesnotexist.com/ (last visited Nov. 24, 2021).

[35] *Id.*

[36] *See* Modern Forgery: AI-based Image Forgery and Detection, *supra* § B.

realistic, i.e., fake) helps the artist change the way it paints so that the painting becomes more realistic. On the other hand, as the artist improves, the critic also improves and becomes more precise in its ability to distinguish real from fake. The training process continues until the critic can no longer distinguish between artist-generated paintings and real paintings. The critic (known as the "discriminator") is a classifying model trained on a dataset of real and fake images. The artist (known as the "generator") is an image manipulation model, with its input image being a random image (in practice–a random number).

Thus, in the face generation example[37] (Figure 5), the generator learns what makes a face image look real. It learns features such as the texture of the skin, the shape and position of the eyes, nose, and mouth. The trained GAN model, after convergence, can then be used to generate novel images. The generator network of the model receives a random image and manipulates the pixels to form a face image in accordance with what it learned during training. Because the discriminator challenged the generator constantly during training, it learned to form the face features with great accuracy. Since the input to the GAN is a random image which is transformed to a face image, if the random image is changed, a different face is generated.

Note that GANs, unlike conventional learning models, do not require a paired input-output image dataset in the training. This eliminates the effort of creating a dataset of reference images, which can be expensive and inaccurate.

GANs are capable of great realistic learning. Numerous studies have been published using GANs for different generating tasks. GANS are also capable of manipulating images by changing hair style, expression, pose, adding glasses or beards, and changing the age of subjects. Figure 6 shows examples of image manipulation (hair style) from text input.[38]
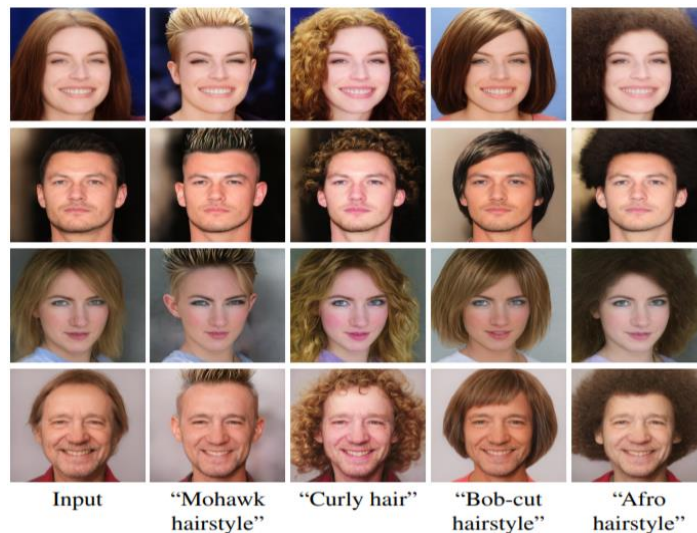


Figure 7: Changing hairstyle using GANs.[39]

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[37] *See* THIS PERSON DOES NOT EXIST, *supra* note 34.**Error! Hyperlink reference not valid.**
[38] Or Patashnik et al, *Styleclip: Text-Driven Manipulation of Stylegan Imagery*, 2021 IEEE/CVF INT'L CONF. COMPUTER VISION 2085, 2089.
[39] *Id.*

*3. Deep Fake: Video Mirroring*

One of the most advanced GANs in the context of visual forgery is coined the "Deepfake," in which the model mirrors the motions, expressions, poses, and audio of a source person to a target person. This task had been researched in the past, but due to its difficulty, the output quality was never convincing, and it was very easy to spot fake videos. The introduction of Deepfake poses a major threat to detecting fake videos. CNN wrote an article about the Pentagon's race against Deepfake videos.[40] Numerous videos of highly realistic fake videos of American presidents and other famous personas can be found on social media and on YouTube[41]

*C. Digital Image and Video Forgery–Summary*

Whether classical or data-driven forgery methods, numerous studies are being published every year. New algorithms, learning models, and GANs are being introduced to forge visual data, as well as studies attempting to detect forgeries. This is a game of cat-and-mouse, with no end to be expected. The best strategy for addressing forgeries is to create a set of tools for forgery detection based on the known forgery algorithms and to continuously update this set. The need for these tools is undeniable, as the human eye is no longer able to distinguish real from fake data. It is also important to note that even state-of-the-art forgery detection algorithms do not perform with 100% success. Much like a polygraph test, or any other tool of detection used today, there are always false classifications.

## II. LAW OF EVIDENCE IN THE DIGITAL AGE

This chapter, which will deal mainly (as the heading indicates) with modern evidence law,[42] is divided into two parts. The first part outlines the prevailing trends in evidence law generally, with a specific focus on the Israeli law.[43] The second part of the chapter reviews these trends with emphasis placed on their place in the digital age, i.e., how to handle and use digital evidence and how to best utilize scientific and digital evidence.

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[40] *See* Donni O'Sulligan, *When Seeing is No Longer Believing: Inside Pentagon's Race Against Deepfake Videos*, CNN, https://edition.cnn.com/interactive/2019/01/business/pentagons-race-against-deepfakes/ (last visited Nov. 24, 2021).

[41] *E.g.*, Diep Nep, *This is Not Morgan Freeman–A Deepfake Singularity*, YOUTUBE (Jul. 7, 2021), https://www.youtube.com/watch?v=oxXpB9pSETo.

[42] The initial inspiration for this expression is credited to Prof. Gabriel Halevy. *See* GABRIEL HALLEVY, EVIDENCE LAW THEORY 151–158 (2011) (although the expression has been used in earlier case law as well). *See also* CrimA 6147/92 State of Israel v. Cohen, 48(1) HCP 62 (Date) (Isr.) (Wherein her Hon. Justice Dorner states in para. 9 to her verdict that: "Modern evidence law tends to minimize restraints on judicial discretion over technical rules, and are founded on the principle of free evaluation.").

[43] We should note that Israeli evidence law is largely consistent with evidence laws of England and the U.S., which is in turn consistent with Israeli law being founded in the Anglo-American legal tradition. This being the case, it stands to reason that this review of the Israeli law will shed some light on the same issues presented under those legal systems, at least to some extent.

### A. Trends in the Modern Law of Evidence

As noted above, we are in the "modern age" of evidence law. This period has ushered in two primary trends, which, without regard to their purpose and essence, pose a grave threat both to fact-finding and to the fundamental rationale of Israeli evidence law: the fair investigation of truth[44] in view of the unyielding march of technological progress. We will present these trends below.

The first trend involves the transition from "admissibility" to "weight." The Israeli model (whose sources and founding rationale stem from Anglo-American evidence law)[45] initially adopted strict, formalistic rules of admissibility of evidence. Over time, the Israeli model has shifted towards the more flexible regime of probative weight assignment.

Prof. Barak's words apply here, as he outlined:[46]

> Even the procedural law–criminal and civil alike–is characterized by an informal perspective. For instance, the rules of probative weight of evidence have transplanted the rules of admissibility; the court seeks to enter the lobby, and not wait in the corridor, with the aim of spurring the deliberation to uncover the truth. To the same extent, a fault in the proceeding that does not amount to a miscarriage of justice is not grounds for a mistrial.
>
> We should note that this trend of affording the court a wide berth of discretion is found in other jurisdictions as well,[47] and is not

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[44] This is consistent with the material basis for Israeli evidence law, which adopts the deontological approach to evidence law–i.e., the fair investigation of the truth. This approach, which promotes a dual commitment to the principle of convicting the guilty and that of acquitting the innocent, and the difficulties inherent therein have been discussed by Menashe previously. *See* Doron Menashe & Limor Riza, *Probative Incentive for Inducing Cooperation Between Suspects and the Prosecution*, 25 BAR-ILAN L. STUD. LEGAL REVS. 845, 859–61 (2009) (Isr.); Doron Menashe & Eyal Gruner, *Should Judges Convict Based on Their Speculations of Guilt?*, 36 BUFF. ENVTL. L.J. 129, 129 (2019).

[45] This is because of the British mandate that ruled the region prior to the establishment of the State of Israel. For more on the connection between the English and Israeli legal systems *see* Assaf Likhovski, *Between Mandate and State: Re-thinking the Periodization of Israeli Legal History*, 19 J. ISR.. HIST. 39 (1998) (Isr.).

[46] Aharon Barak, *The Israeli Legal System, Tradition and Culture*, 40 HAPRAKLIT 197, 208 (1992) (Isr.), *translated in* EUROPEAN LEGAL TRADITIONS AND ISRAEL (M. Rabello ed. 1994).

[47] It's worth noting that the other branches of law are less formalistic and more liberally interpreted. Several years after Additional hearing CrimA 23/85 State of Israel v. Tubul, 42(4) HCP 309 (1988) (Isr.), the Constitutional Revolution transpired, granting the court wide discretion with regard to judicial oversight on the basis of the limitations clause. *See* CA 6821/93 United Bank Mizrahi Ltd. v. Migdal Commune, 49(4) HCP 221 (1995) (Isr.). Justice Barak's ruling in the *Bank Mizrahi* case is identical to the comments conveyed in his article. *See* Barak, *supra* note 39. Whereby the court "seeks to enter the lobby, and not wait in the corridor." *Id.* From this point forward, even in instances where the state has acted by power of law, the court may still "enter the lobby" by applying the tests of reasonability and proportionality set forth in this ruling. Similarly, even in the event that evidence is not strictly admissible ("legal"), the court can "enter the lobby" and examine the question of its probative weight. *See* MENACHEM MAUTNER, THE DECLINE OF FORMALISM AND THE RISE OF VALUES IN ISRAELI LAW 503 (1993). This applies equally to constitutional and administrative fields of law, with emphasis on the tests of reasonability and

unique to the Israeli system. International law in its entirety[48] has similarly adopted so-called "over-relaxed admissibility rules."[49]

The second trend (though it can, in essence, be posed as a corollary of the primary trend) is the "abandonment" of the best evidence doctrine, as expressed through the case law that has changed the known position of the Supreme Court, year by year.[50] The new rule that has supplanted the original does not require a given quantity of evidence, but instead reflects the predilection to pursue the most primary evidence, since this is, by the nature of things, presumed to be the most reliable.[51]

This rule has been moderated and winnowed over time by recent case law.[52] Initially, the rulings gave rise to exceptions to this rule that sought to contend with its problematic linearity, whereby its application amounted to a "zero-sum game." This rule was then further moderated, as expressed in the *Unger* case,[53] wherein Justice Heshin reached the following determination, which remains in effect today:

> The exemptions and loopholes that have accrued to [the best evidence doctrine] have withered the import of this rule, and today this rule scarcely peeps at us from between the lines of its exemptions. Indeed, it is not unfounded to reason that today, this rule is satisfied with requiring the litigant to present a suitable reason for not presenting the original document.

We are left with but to wonder what the "suitable reason" might be that would satisfy the court. Investigation of further case law in this vein reveals that a

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proportionality, the criteria and discussions of which are quite similar to the discussion of evidentiary weight. It should be mentioned that the criminal proceeding underwent a similar process, transitioning from discussion of the elements of the crime to discussion of the *mens rea*, with reliance on the perpetrator's mentality serving as a decisive factor in yielding a conviction. *See* 1 GABRIEL HALLEVY, THEORY OF CRIMINAL LAW 13–14 (2009).

[48] *See* Riccardo Vecellio Segate, *Cognitive Bias, Privacy Rights, and Digital Evidence in International Criminal Proceedings: Demystifying the Double-Edged AI Revolution,* 21 INT'L CRIM. L. REV. 242, 242–79 (2021). Similarly applicable here are the words of Segate at the start of his article: "Over-relaxed admissibility rules become unsustainable as far as digital evidence is concerned, in that they add to the latter's inherently low reliability and heavy cognitive impact." *Id.*

[49] *Id.* On these rules, cognitive biases and the risk of judicial prejudice resulting from same, we will expand in § C(3), *infra*.

[50] *See* CA 28/49 Zarka v. Attorney General, 4 HCP 504, 515–16 (1950) (Isr.) [hereinafter the *Zarka* case]. On pp. 515 of the verdict, Justice Agranat established the significance of this duty incumbent on the litigant by virtue of this rule: "The meaning of the aforesaid rule is that the party bearing the burden of evidence must present the court with the best evidence available, which, by the nature of things, is presumed to be present." *Id.* at 515. Later, on pp. 516 of the verdict, the court explains the founding premise of this rule, as Justice Agranat states: "The purpose standing behind the aforesaid rule is *to prevent any attempt on the part of the party bearing the burden of proof to mislead the court by hiding evidence." Id.* at 516 (emphasis added).

[51] *See* Doron Menashe, *The Requirement of Reasons for Findings of Fact*, 8 INT'L COMM. L. REV. 223, 223–245 (2006).

[52] *See e.g.*, CA 373/54 Aharonost v. Noyman, 10 HCP 1121 (1956) (Isr.). Wherein Justice Zussman stated in para. 7 to his verdict that, "When a litigant does not bring forth evidence in their possession that is likely–though not required–to serve as the basis for reaching a conclusion, [it is assumed] that they withheld such evidence because it is detrimental to that litigant's case." *See id.*

[53] CA 6205/98 Unger v. Ofer, 55(5) HCP 71 (2001) (Isr.) [hereinafter the *Unger* case].

"suitable reason" is an illustration that the copy is of the same quality as the original evidence. This reason is, of course, completely opposed to the underlying premise of the best evidence doctrine, which seeks to prevent the infiltration of forgeries, and not merely to ensure that the court sits on a crate of evidence of any particular level of quality. In this state of affairs, it would seem the evidentiary flexibility that has accompanied the march of technological development has created a circumstance where the court's practical ability to investigate the truth has been compromised. As his Hon. Justice Rubenstein noted, "The law is chasing technological developments, and the legal conundrums they present; chasing, but not overtaking."[54]

This is the place to note that, unlike in other areas, where the court recognizes its own limitations as relates to evidence law, the court will in many instances refuse to recognize such limitations as far as technology is concerned.[55] Accordingly, and with respect to digital evidence in particular, judges are vulnerable to many cognitive biases.[56] But this only scratches the surface;[57] we will discuss the totality of cognitive biases derived in the present situation in Chapter 3.3 below.

### B. Law of Evidence Trends Against the Technological Development

At this stage, we will examine technological developments through the lens of the two principal trends presented above: The transition from admissibility to probative weight, and the abandonment of the best evidence doctrine. In recent times, and as a direct consequence of Justice Heshin's ruling

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[54] File No. 5870/14 High Court of Justice, Accountants HPC Business Information Ltd. v. The Courts Administration (Nov. 12, 2015), Nevo Legal Database (by subscription, in Hebrew) (Isr.). *See* Assaf Herdof, *Voyage Between Authorities: Infiltrating Computer Hardware and Infiltrating the Legislature*, 228 DEF. ATT'Y 4 (2016); Doron Menashe, *A New Paradigm for Understanding Judicial Notice and Its Implications in The Modern Digital Era*, 9 ELON L. REV. 267, 267 (2017).

[55] *E.g.*, when there is a need for actuarial computation of losses or calculation of damages caused to houses or cars, the courts are often assisted by assayers or accountants. When there is a suspicion of forged handwriting, the court is availed of graphologists as needed. And yet, the court rarely seeks the expertise of technocrats or raises doubts about the authenticity of digital evidence. For an expanded discussion of this topic, *see* Eric Van Buskirk, & Vincent T. Liu, *Digital Evidence: Challenging the Presumption of Reliability*, 1 J. DIGITAL FORENS. PRAC. 19, 19–26 (2008).

[56] The most relevant being the fallacy of overconfidence in the evaluation. In this regard, unsurprisingly and similarly the other decision-makers under conditions of uncertainty, as described above, judges also make use of heuristics and logical shortcuts that can give rise to systematic errors. *See* Chris Guthrie et al., *Inside the Judicial Mind*, 86 CORNELL L. REV. 777, 784 (2000); Doron Menashe & Hamutal E. Shamash, *The Narrative Fallacy*, 3 INT'L COMMENT. EVID. 1 (2006).

[57] *E.g.*, under circumstances where there is a lack of awareness and comprehension as to the ubiquity of forgeries among the general public, the availability fallacy all but guarantees severe risk allocation errors. The frequency of the relevant category of cases (e.g., the base rate of forgeries among the general population) affects the probability of a specific instances belonging to that subset (e.g., the probability of a specific article of evidence being forged), but not the level of similarity to that subset (e.g., the level of similarity between the given article of evidence and the subset of forged evidence). This is bound to lead to undervaluation of the data concerning the frequency of forgeries among the population, and thus, undervaluation of the all-important data relevant to gauging the probability of the instance in question belonging to that subset. *See* Guthrie et. al, *supra note*, 49, at 780–782. The position of this study is that the aforesaid statistic, notwithstanding its current place in Israeli evidence law, ought to be available for the court to use in many cases. *See, e.g.,* Amit Pundik, *Proving Causation with Statistical Evidence*, 41 TEL AVIV UNIV. L. REV. 253, 294 (2018).

in the *Unger* case (as presented above),[58] the case law has continued this trend of easing restrictions on submitting digital evidence to the court, in spite of the inherent difficulties in doing so. To quote Justice Shoham in this regard with respect to the *John Smith* case ("Justice Shoham's Ruling"):[59]

> [O]n the backdrop of the trend of easing the rules of admissibility of evidence, and to focus on the question of the weight and reliability of evidence . . . as well as in light of technological developments that have allowed for the presentation of copied documents that are identical to the originals, the "best evidence doctrine" has only continued its decline. Pursuant to this trend, case-law has determined that the contents of a document can be proven using a copy–i.e., secondary evidence–as long as the relevant litigant provides a suitable reason for failing to present the original document [ . . . ] in effect, the rule that has taken hold in case-law is that "in absence of doubts as to the reliability of the copy, failure to present the original document shall not, in and of itself, degrade the evidentiary foundation of the litigant seeking to make use of same." (Civil Appeal 9622/07 Holin v. Clalit HMO of the General Organization of Workers in Israel, Nevo Legal Database (May 30, 2010).

Justice Shoham's verdict in the *John Smith* case showcases the court's modern approach to digital evidence, which assigns a sort of "presumption of integrity" to same.[60] Based on his ruling, barring a specific doubt as to the veracity of a copy, the failure to bring the original evidence itself does not undermine its evidentiary foundation. Effectively, this ruling requires the litigant demanding the best evidence to refute the presumed integrity of the secondary document.

This goes a step further than the ruling of the Supreme Court in the *Unger* case, which requested presentation of a suitable reason for failing to be the original document. In practice, Justice Shoham's ruling is no less than a complete reversal of the best evidence doctrine, and an unwarranted one at that. Let us reiterate, given the importance of this point, that apart from waiving the best evidence doctrine, we are also essentially transferring the burden of proof as to the reliability of the document to the litigant who claims against it, in a manner that is likely to harm the weaker party in court.[61] It is worth mentioning that, later in

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[58] CA 6205/98 Unger v. Ofer, 55(5) HCP 71, (2001) (Isr.).

[59] CrimA 4481/14 John Smith v. State of Israel (Nov. 16, 2016), Nevo Legal Database (by subscription, in Hebrew) (Isr.).

[60] *Id.* We must point out here that foreign rulings have established that, in certain cases, there may be a "presumption of fallibility," i.e., his Honor's ruling is actually opposed to these other approaches.

[61] At the risk of over-expounding on this issue, it is possible that abstaining from discussion of the potential for forgery, alongside the presumption of integrity set out by the Supreme Court, will create a situation on which powerful players in the market will be incentivized to "bluff." For example, a claim against a large cellphone provider could be thrown out because of a forged contract, a "photocopy" of which (easily forged) could be presented under this presumption of integrity. As an aside, the subject of forgery itself is unlikely to be raised by the court on account of the aforesaid presumption, so the challenger would be required to challenge this point independently. Not only this, but the party attempting to raise a claim of forgery would need to overcome a significantly expanded burden of proof. *See, e.g.*, CA 3725/08 Hazan v. Hazan (Feb. 3, 2011), Nevo Legal Database (by scubscription, in Hebrew) (Isr.). Wherein Justice Procaccia

his ruling, which was largely acceded to by his colleagues on the panel, he did recognize the greater forging capabilities that exist in the digital age; however, he assigned only passing significance to this point.[62]

Under these circumstances, we can see that the choice to forgo the best evidence doctrine was based on the starting premise that technological developments have brought us to a place where there is no material difference between the original document and a copy. While this sentence is not, in itself, inaccurate, and this study does not presume to suggest otherwise, this approach nonetheless fails to account for several problematic aspects of the above statement, as we will present below:

First, the choice to forego this rule creates a wide opening for evidence forgers to exploit. Compared to the original article, a copy is far easier to forge. Similarly relevant here are the words of Haim Rabia:[63] "Jurists are accustomed to thinking of evidence as fixed, tangible and clear. Digital evidence is something other entirely: for as it is generally easy to identify attempts to counterfeit a physical item, electronic articles are subject to constant change, and can be manipulated without leaving a trace of interference." After all, a date scribbled in the handwriting of the litigant is hardly comparable to a Microsoft Word contract wherein the date is digitally imprinted on the file, and can be edited without leaving any clues. A further indication of this is brought in Chapter 1 above, wherein we established the ease with which photographs can be forged today.[64]

Second, and with respect to the epistemic value of evidence that does not meet the bar of the best evidence doctrine, it must be noted that presenting such evidence contravenes the founding principles of evidence law, as well as due

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determined her ruling that, "A litigant who raises a claim of forged contract against their counterpart levies a serious accusation, one that can even amount to an accusation of fraud or false representation. As a rule, claims of this nature, which generally involve an insinuation of bad faith, *require a significant threshold of proof be met to uphold them.* Accusing a litigant of bad faith, deception or fraud requires firm and reliable evidence. And just as accusing a person of fraud requires a high bar of evidence to uphold, so, too, claims concerning a fabricated deal, which similarly involve accusations of fraud, require a level of evidence whose weight and import match the severity of the claim." *Id.* at ¶ 31 (emphasis added). Meaning, the procedure required to prove falsification of evidence, and the burden of proof incumbent on the litigant who raises such a claim, will themselves prevent the issue of forgery from being raised. I don't believe, to put it mildly, that this is an ideal order of operations.

[62] *See* CrimA 4481/14 John Smith v. State of Israel, (Nov. 16, 2016), Nevo Legal Database (by subscription, in Hebrew) (Isr.). Justice Shoham stated in his verdict, "I believe that closer scrutiny of the reliability of the recording may provide a solution to such doubts, since it is specifically in light of recent technological developments that it has become easier to forge recordings using software, without leaving a physical trace." *Id.* at ¶ 35. I.e., the justice is aware of this concern, but believes in the ability of the court to expose forgeries under closer scrutiny.

[63] 2 HAIM RAVIA, ELECTRONIC EVIDENCE, Nevo Legal Database (by subscription, in Hebrew) (Isr.).

[64] *See* NIMROD KOZLOVSKI, THE COMPUTER AND THE LEGAL PROCEEDING 34 (Bar Ass'n Pub'g, 2001) (Isr.)

> In a paper document it is relatively easy to identify when more than one actor has edited the document. This is also true of "documents" that are not paper documents. An example of this would be an audio recording on which more than one voice can be heard, and wherein, by identifying these voices, it is possible to identify the speaker. On a computer, by contrast, a single "document" might have been edited by multiple users, without this finding any external expression in the completed "document." In many cases, we would be left with no clue as to what actor inserted specific inputs, nor would we have any guarantee establishing that the party purporting to be the source of such inputs was, in fact, their source.

process–such can even be seen as constitutional principles.[65] Moreover, it is the right of every litigant, and every defendant in a criminal trial, that law enforcement institutions will do all that is in their power to ensure that the evidence forming the basis for their conviction has a minimal potential for forgery and/or fabrication. This is the only consistent approach with the principle of protecting the innocent from false conviction.[66]

Third, and as far as claims of "efficiency," which would ostensibly justify the court's ruling are concerned, we must emphasize that claims of this nature, that regard efficiency, saving valuable court time and preventing miscarriages of justice, all unequivocally support the notion of bringing no less than the optimal evidence before the court to establish any given fact.[67] In this sense, it could even be argued that, above all else, Justice Shoham's ruling harms the educational contribution inherent in the fastidious requirement of the best evidence doctrine.[68] This educational contribution is expressed in the understanding that only through exhaustive investigation, which produces the best evidence, can we minimize, to the greatest extent possible, the risk of false conviction. As matters stand today, we can already see indications (even if few in number) of indictments filed wherein the investigative authorities were not in possession of the "best evidence" to establish the guilt of the defendant, and the investigators were lax in their pursuit of the truth.[69] This phenomenon, of the cheapening of procedure and the growing

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[65] *See* Doron Menashe, *On the Necessity of the Best Evidence Principle*, 25 HA-SANEGOR 3 (1999) (Isr.).

[66] *See* Nahshon Shohat, *The Moral and Legal Duty to Protect Innocents from False Conviction: A Critical Analysis of the Legal System's Normative and Procedural Derived Obligations* (essay for the completion of a doctorate in Philosophy, March 2015) (Isr.).

[67] Menashe, *supra* note 56, at 4–6.

[68] Although we should note that Justice Shoham's ruling was the direct continuation of prior rulings in this matter. *See, e.g.*, CA 2450/01 Rubenstein v. Ein Tal, Ltd., 55(4) HCP 385, 386 (1983) (Isr.) (emphasis added). Wherein Justice Dorner states:

> It must be noted that this manner of using electronic documents holds advantages over only using original documents. Among these advantages are saving time and costs, streamlining the proceeding, elevating the degree of accuracy, ease of retrieval, the convenience of inferring conclusions and more, depending on the case . . . *thus, being assisted by technological means, in general, and electronic documents in particular, is desirable and commendable.*

[69] To reiterate, realizing the epistemic, probative value of investigating the truth requires *the greatest possible reconstruction of the truth*, and not an "efficient" reconstruction. As an aside, the Supreme Court has already declared that it does not intend to pursue merely the maximum quantity of evidence, as stated in Zarka: "The rule requiring the presentation of the best evidence does not require the relevant party to *collect the maximum quantity of evidence* relating to every single fact, nor that such party should be compelled to seek better evidence than the material available to it. Indeed, *the entire purpose underpinning this doctrine is to prevent fraud by undermining any potential attempts by the party charged with presenting evidence to conceal such evidence from the eyes of the court.*" CA 28/49 Zarka v. Attorney General, 4 HCP 504, 517 (1950) (Isr.) (emphasis added) The *Zarka* case also illustrates for us the optimal balance with respect to the burden of evidence incumbent on the accuser: there is no requirement that maximal evidence be brought, but only, that the *best evidence available* be brought. As described above, this balance, requiring the best available evidence to be brought, has been weakened over the years, and would appear to no longer be carefully kept.

concern of false convictions, is finding expression both in Israel[70] and around the world.[71]

Perhaps it is easiest to summarize the current state of affairs per the approach of the Israeli judiciary by citing (in its own words) the ruling of the Tel Aviv Magistrates Court in the *Allenby 99* case: [72]

> The world of technology is advancing at the speed of light. The technical means at the disposal of the reasonable person are highly advanced, with these advances progressing at a pace that dwarfs the pace of legislative and case-law proceedings in the conservative world of law by several orders of magnitude. By the time a precise legal verdict is reached with respect to the means of recording under examination, it will likely be rendered obsolete by some new and updated arrival. Today, recording using a tape recorder is already quite rare. Recordings are usually made using simple devices that are available to anyone, such as a smart phone. Such a device is not readily accessible to the litigant, it being the personal device of the person performing the recording. An audio file is the appropriate means of discovery and examination of this sort of recording. Therefore, the demand to receive a tape recording and the device with which the recording was produced is an outdated request, one inconsistent with the pace of this generation.

Now, in light of the above-described state of affairs, we will proceed to describe the serious risk-allocation errors caused, among other things, by the combination of these technological developments, on the one hand, and the development of modern evidence law, on the other hand.

III. DIGITAL EVIDENCE IN A NON-DIGITAL COURT: INHERENT RISKS OF ERROR

In this chapter, we examine the difficulties stemming from the multitude of digital evidence and the manner in which these are submitted to a court, whose proceedings and procedures are unsuited to deal with evidence of this nature. Ignorance of this specialized field leads to cognitive biases on the part of the court. Given the nature of this evidence and the ease with which they are forged (as illustrated above), these biases create a serious concern of risk-allocation error on

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[70] *See* File No. 44591-11-10 Magistrates Court (Haifa), Internal Affairs v. Elhades (Dec. 4, 2011), Nevo Legal Database (by subscription, in Hebrew) (Isr.). Wherein a police officer was convicted of staging evidence by forging the testimony of the eyewitness. The forgery involved adding items to the testimony so that it would match the description of the defendant. This serves to illustrate the erroneous approach of the officers in attempting to reach a conviction while ignoring the danger of convicting innocents. This is, of course, consistent with the abandonment of the best evidence doctrine, as described above.

[71] *See* Christopher Slobogin, *Testilying: Police Perjury and What to Do About It*, 67 U. COLO. L. REV. 1037, 1044–47 (1996); Gabriel J. Chin & Scott C. Wells, *The Blue Wall of Silence as Evidence of Bias and Motive to Lie: A New Approach to Police Perjury* 59 U. PITT. L. REV. 233, 246 (1997).

[72] File No. 60129-12-12 Magistrates Court (TA), Allenby 99 v. Naqdai (Jul. 22, 2014), Nevo Legal Database (by subscription, in Hebrew) (Isr.) [hereinafter the *Allenby 99* case]. Various courts have upheld this ruling. *See* File No. 34162-08-17 Magistrates Court (TA), Levy v. Bareket Chicken and Turkey–Factory Store, Ltd. (Sept. 28, 2017), Nevo Legal Database (by subscription, in Hebrew) (Isr.). Indeed, parties to the proceedings–and, in particular, defendants–will complain about the ease with which photocopies are admitted, as evidenced by the case law.

the part of the court. At the end of the chapter, we will discuss current efforts to contend with these difficulties.

### A. The Characteristics of Digital Evidence and the Inherent Concerns Relying Upon Them

The characteristics of digital evidence are different from those of other forms of legal evidence. The difference is found in the manner in which the evidence is obtained (digitally), its recording, its analysis, and its presentation to the court.[73] The legislature has recognized the existence of digital evidence and its unique properties in the Evidence Ordinance. Yet, notwithstanding its inherent distinctiveness, only a handful of articles are dedicated to it, which cannot suffice as a comprehensive and exhaustive understanding of its application.[74] Recently, a renewed effort was made to expand the Evidence Ordinance's reference to digital evidence. In 2017, a memorandum of law was tabled on the Knesset plenum to amend the Ordinance in order to bring it in line with the aforementioned Supreme Court case law relating to the elimination of the best evidence rule.[75] In addition, the memorandum of law seeks to go a step further by adding a specific reference to digital evidence to the Ordinance. For instance, the memorandum would add computer files to the definition of a "document."[76]

The reason for this appears simple: there is significant probative value in adding digital evidence of all kinds to the totality of evidence presented to the court, both because more evidence is likely to yield a better-founded ruling,[77] and given the court's preference to be exposed to the actual documented event, in lieu of testimony of some kind or another.[78] The court's aspiration to widen the basket of evidence to the greatest extent possible is evidenced often and consistently.[79]

In essence, this memorandum of law represents a practical illustration of the approach of the Israeli court system, which tends, as illustrated above in the *John Smith* case, to overemphasize on digital evidence generally, and on digital

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[73] *See* EHUD ROFFEH, PRACTICAL DIGITAL EVIDENCE–LAW AND TECHNOLOGY 19 (Bursi Publ'g, 2014).

[74] *E.g.*, Evidence Ordinance Law, 5731–1971, § 39A (1971). The Evidence Ordinance disqualifies digital evidence consisting of a computer extract that amounts to an opinion. In doing so, the Ordinance appears to draw an analogy between classical evidence and digital evidence by installing identical requirements: that opinions must be supported with expert testimony.

[75] *See* Memorandum of Law, Draft Bill to Amend the Evidence Ordinance (Originals and Copies as Evidence), 5778–2017.

[76] *Id.* at § 40. (proposed definition of "document" is "To include computer materials, as defined in Section 1 of the Computers Law.").

[77] All subject, of course, to the rules of admissibility, as set out in the Evidence Ordinance Law, *supra* note 74.

[78] It should be said that the preference for evidence in the form of a recording over the testimony of a witness who heard that same audio has been confirmed by research. Consider, for example, under circumstances where John hears a conversation between A and B, whereby A appears to solicit B to commit a crime. If John is brought to testify that he heard the solicitation, his testimony will inexorably contain additional interpretation, i.e., his interpretation of the words he heard. Thus, the court is dependent on the tone of speech described by John, the linguistic nuances, expressions, and so forth. This dependence is not present in evidence consisting of a digital recording of that same conversation. *See* MALCOLM COULTHARD ET AL., AN INTRODUCTION TO FORENSIC LINGUISTICS: LANGUAGE IN EVIDENCE 131 (Routledge, 1st ed. 2016).

[79] *See* File No. 62272-08-18 District Court (Haifa), Abu Hadir v. Goldwag (Dec. 30, 2018), Nevo Legal Database (by subscription, in Hebrew) (Isr.) Wherein the district court refused to order the exclusion of the recordings made with the respondent's cellular phone, among other things, because these recordings served to illustrate the relationship that had existed between the parties, which was a relevant finding to reaching a verdict.

copies in particular. Given this reliance, the proposal was shot down by various parties to the proceeding, especially by parties representing those standing to incur potential injury from adoption of said proposal, i.e., the defendants in criminal trials. Take, for example, the letter delivered by the deputy chief of the Criminal Law Forum of the Bar Association, Dr. Nahshon Shohat, which lays out ad nauseum the inherent difficulties, both practical and academic, contained in this approach.[80] Given the importance of Dr. Shohat's words in connection with the attempt to do away with the best evidence doctrine, we will quote them verbatim: "This doctrine must preserve the crucial status of the court as the 'gatekeeper,' protecting the trial from biases and forgeries . . . and this doctrine must protect litigants from exposure to risk-allocation errors that were inadmissible from the start (in the sense that they are impossible to contend with)."

From the above discussion (which is not intended to be exhaustive), it can be unequivocally argued that there are different (and indeed, sometimes diametrically opposed) viewpoints with respect to admissibility of and reliance on digital evidence; yet there is no Israeli legal literature on this particular subject.[81] Opinions remain divided, and the risk of error, alongside the volume of digital evidence submitted to courts, only continues to grow.

Thus, since everything stored on an electronic drive, such as a computer or a smart phone, constitutes digital information, there are very few cases (civil or criminal) that do not include evidence sourced to computers, phones, or other digital means.[82] The difficulties described above are what led to the application of the tests for admissibility of scientific evidence from the well-known *Daubert* case[83] being applied to digital evidence as well.[84] In this regard, it should be noted that there have been many instances in Israeli law wherein over-reliance on digital evidence has led, in effect, to risk-allocation errors and associated damages. This is true not only of the classical legal proceeding, but also of various entities that rely on digital evidence and digital documents (i.e., files), such as the Income Tax

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[80] Letter from Dr. Nahshon, Deputy Chief of Crim. L. F. of the Bar Ass'n, to Knesset Comm. (July 25, 2017) (on file with author) (This letter was dispatched personally by its author, Dr. Nahshon Shohat, after being sent to the Knesset committee presiding over the aforesaid memorandum of law. The letter will be provided upon request).

[81] The author of this study is aware of the important book, HAIM WISMONSKY, CRIMINAL INVESTIGATION IN CYBERSPACE (2016); *see* Haim Wismonsky, *Sentencing Guidelines for Computer Crimes*, 24 BAR-ILAN L. STUD. 92 (2008). Nonetheless, despite his broad understanding of the collection of this evidence, the author does not address the question of the proper evidentiary model for digital evidence.

[82] The main difficulty here is that digital evidence is perceived by the public (including the legal community) as more authentic (in real time), durable and reliable than "classic" documents, without accounting for the broad potential for manipulation and forgery of these documents.

[83] Daubert v. Merrell Dow Pharms., Inc., 43 F.3d 1311, 1316–17 (9th Cir. 1995). Wherein the Ninth Circuit established a four-point test for determining if evidence is admissible and reliable: (1) examination of the theory or technique by which the evidence was collected; (2) determining if the theory in question has been peer-reviewed; (3) determining if the technique in question enjoys the support of a consensus of experts in the relevant field; and (4) *the rate or potential for error associated with the theory or technique. Id.* And while the rate of error for digital evidence in general is not high, the court must ask: where was this digital information located from the time of its production and until its submission to the court? Was it published publicly? Were true copies of it distributed to third parties? These questions are rarely asked by the court, and thus, it seems that the potential for error associated with digital evidence may be higher than that associated with it today.

[84] *See* Buskirk, *supra* note 55, at 23–24. *See generally* Williford v. Texas, 127 S.W.3d 309, 312–13 (11th Cir. 2004) (providing extensive discussion of application of *Daubert* to technology.

Authority, which relied on a forged invoice;[85] or a Korean corporation that held all of its correspondence over email, only to discover that it had been dealing with a hacker the entire time.[86]

This blatant threat of forgery, and the various means and capabilities that exist to stage and fabricate evidence, demands discussion of how the criminal justice system should address digital forgeries, as opposed to conventional forgeries. While this study does not address the substantive criminal law, we should nonetheless note that an inherent part of the proposed solution to the difficulties posed above relies on distinguishing between different types of forgeries. It is evident that this matter, as well, regarding the diagnostics and isolation of the various forms of forgery, demands its own separate, comprehensive and exhaustive research.[87]

In summary, the over-reliance on digital evidence, coupled with ignorance of the subject matter among a large portion of the public, and the widespread forging capabilities (as demonstrated by the e-mail debacle described above);[88] the

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[85] *See* CrimC File No. 2657-08-13 (TA), State of Israel v. Kardish (Jan. 14, 2016), Nevo Legal Database (by subscription, in Hebrew) (Isr.). Wherein the defendant was accused of "editing, producing and extracting, using a computer at his office (and paid software), 1170 fictitious invoices appearing to be tax invoices. The aggregate sum of these invoices amounted to ILS 81,223,554, bearing taxes in the amount of ILS 11,339,261. The defendant issued these fictitious invoices to companies and dealers, and received monetary compensation that he did not report to the tax authorities." *Id.* at ¶ 4.

[86] File No. 50665-08-16 (BS), Hae Kwang Co. Ltd. Jinkwang v. Hensel Phelps Construction Co. (date), Nevo Legal Database (unpublished) [hereinafter the *Kwang* case]. In this particular case of reliance on e-mail correspondence, we should do well to heed the words of Omer Cohen: "Since the e-mail titles are originally generated by the mail server that handles the message delivery, they add a plethora of environmental variables attesting to the existence of the message, in addition to backing up the date and time on which they were generated and reached their destinations. Since these titles are generated by the server, *any simple user can, after understanding the structure of the titles, verify the sender of the message (such as banks or other service providers) and thus avoid falling prey to phishing scams*." Omer Cohen, *Reliability of Digital Evidence*, DIGITAL WHISPER (Aug. 2010), https://www.digitalwhisper.co.il/files/Zines/0x0B/DW11-3-DigitalEvidence.pdf (emphasis added).

[87] Already today, we are receiving indications of the aforesaid normative hierarchy. Conceptual indications of this can be seen scattered throughout the case law relating to the interrogative schemes of the Israel Police. Even in this case law, there is an approach taken whereby an officer lying during an interrogation is not as serious as presenting a false document to a suspect. The former will not result in the disqualification of the suspect's confession, but the latter, on the face of it and if the case law is any indication, will. In other words, one interrogative trick might be deemed "tolerable," while another is "unacceptable." This normative hierarchy can be applied to the issue of forged materials. *See* CrimA 8702/12 Zawi v. State of Israel (Jul. 28, 2013), Nevo Legal Database (by subscription, in Hebrew) (Isr.); CrimA 2831/95 Alba v. State of Israel, 50(5) HCP 221, 291 (1996). Thus, in broad strokes, it would appear that when the time comes for this study to discuss the criminal justice system's treatment of digital forgeries, as opposed to regular forgeries, the principle characteristics that we will need to avail ourselves of are: the *mens rea* of the forger; the potential for deception; the element of preparation and work required to create the forgery (which is somewhat connected to the *mens rea*, if not entirely overlapping); and the theoretical consequences of the forgery, were it to be successful. To be clear, these are only broad conceptual strokes in a tangential discussion, which do not purport to exhaust this topic.

[88] *See* Wismonsky, *supra* note 81, at 25–26, wherein he states that digital evidence is perceived as objects in the physical realm, while, in reality, the fact that it is digital and exists only in the cyber realm materially alters the nature of such evidence, and the manner in which we should examine it. *Id.* Moreover, closer examination of this sort of evidence, according to the author, *similarly yields the conclusion that this evidence is not impregnable, and that their reliability should be regarded as doubtful. Id.* (emphasis added). *Accord* Cohen, *supra* note 79, at 7 ("We should recall that any space can be penetrated and any document can be forged; ultimately, this is *simply a question of time and resources*.") (emphasis added).

aforesaid under-enforcement with respect to obstruction of evidence in the broad sense (both in terms of classical forgery and digital forgery); and the inability to identify digital forgeries,[89] all combine to create a clear and present danger of errors in risk-allocation as relates to the forging of digital evidence. This clear and present danger is only exasperated, a fortiori, in light of the cognitive biases associated with the issue, as we will illustrate below.

### B. Cognitive Biases of the Non-Digital Court in the Digital Era

Having explored the properties of digital evidence and the dangers associated with their forgery,[90] we will now illustrate how these properties greatly exacerbate the risk-allocation errors that plague the various legal instances, through the lens of the cognitive processes employed by decision makers (which are regularly evidenced by the courts as well),[91] bearing in mind the biases applicable to courts examining digital evidence, and especially images as illustrated above.

As noted above, decision making is a cognitive process, and in this sense, there is no difference between a judge and any other person. This is true of any decision-making process, but particularly true of decision-making under conditions of uncertainty. In their study on the matter, Tversky and Kahneman empirically illustrated how people rely on any number of heuristic short-cuts (or "rules of thumb") to estimate values and probabilities, and how, in many cases, the results yielded by these heuristics do not reflect the sought values and probabilities in practice.[92] In one of their studies, Tversky and Kahneman expanded this notion to show how, when we attempt to make judgments under conditions of uncertainty, we are likely to fall victim to serious and systematic fallacies.[93]

However, it gets worse. As we will demonstrate below, the presence of digital evidence and, in our case, digital images in the courtroom itself evokes

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[89] Wismonsky, *supra* note 81, at 25–6.

[90] *See* Chris William Sanchirico, *Evidence Tampering*, 53 DUKE L.J. 1215, 1291–95, 1300–01 (2003) (more discussion on the topic of the danger of forgery); Greg Marston & Rob Watts, *Tampering with the Evidence: A Critical Appraisal of Evidence-Based Policy-Making*, 3 THE DRAWING BOARD: AN AUSTRALIAN REVIEW OF PUBLIC AFFAIRS 143, 149–52 (2003); Micah K. Johnson & Henry Farid, *Exposing Digital Forgeries in Complex Lighting Environments*, 2 IEEE TRANSACT. ON INFO. FORENS. AND SEC. 297, 450–61 (2007).

[91] *See, e.g.*, Russell B. Korobkin, THE PROBLEMS WITH HEURISTICS FOR LAW 1 (UCLA Sch. of L., Law & Econ. Research Paper Series, Research Paper No. 04-1, 2004) (emphasis added):

> A large body of evidence, now familiar to the legal community, demonstrates that *individual judgment and choice is often driven by heuristic-based reasoning, as opposed to the pure optimization approach presumed by rational choice theory*. The evidence of heuristic-based reasoning presents several challenges for consequentialist legal scholars who wish to make normative public policy recommendations.

[92] *See* AMOS TVERSKY & DANIEL KAHNEMAN, JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES (1974), *reprinted in* DANIEL KAHNEMAN, RATIONALITY, FAIRNESS, HAPPINESS 45–63 (Maya Bar-Hallel ed. 2005); Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCI. 1124, 1124–31 (1974) (Original Article); Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision under Risk*, 47 ECONOMETRICA 263, 265–68 (1979).

[93] KAHNEMAN, RATIONALITY, FAIRNESS, HAPPINESS, *supra* note 85, at 45. Specifically, they mention that, "We rely on a limited number of heuristic principles that the reduce complex tasks of evaluating probabilities . . . generally, these heuristics are quite useful, *but they can sometimes lead to serious and systematic errors*." *Id.* (emphasis added).

inherent cognitive biases.[94] These cognitive biases, which are prevalent in the courts, will naturally result in mistaken rulings, and even convictions of innocents.[95] For good measure, we will present below the three most significant cognitive biases that find expression in the courts' attempts to wrestle with digital evidence, and particularly, with images.

*1. Confirmation Bias and Presumption of Integrity Regarding Digital Evidence*

The first cognitive issue relates to the overvaluation that courts tend to assign to visual evidence. This argument is based on studies that have illustrated how the courts tend to valuate visual evidence (i.e., images) as more persuasive, or as deserving of greater credit or valuation, than verbal evidence in the form of the testimony or affidavit of a witness.[96] This is in light of the ostensible objectivity of videos and visual images, which purport to present facts directly and without interpretation ("naïve realism").[97] In practice, however, the manner in which a video clip is presented can reflect several subjective influences, such as the length of the video, the angle and other choices that are, in their totality, at the discretion of the photographer.[98] Thus, even though we ought to understand that the documentation shown to contains a consistent line of interpretation offered by the photographer, the court will nonetheless treat this as objective documentation.[99] This presumption of integrity, and the judges' disregard for the selectivity inherent in these forms of documentation, raise serious difficulties. Accordingly, it has been argued more than once that the basing of legal arguments on images threatens the courts' fact-finding process by presenting articles purporting to be "facts" before the judge at an early stage of the proceeding.[100]

*2. Wrong Application of Availability Bias*

The second cognitive difficulty relates to the availability heuristic, as evidenced in the research conducted by Tversky.[101] Using this heuristic, it has been empirically proven, decision-makers tend to evaluate the probability of an event occurring based on its availability, i.e., the probability of such an event occurring

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[94] *See* Segate, *supra* note 48, at 254–256.

[95] Doron Menashe, *Can the Pursuit of Truth Reconcile with the Principle of Minimizing False Convictions?*, 21 CARDOZO J. CONFLICT RESOL. 381, 393–95  (2020).

[96] *See* Elizabeth G. Porter, *Taking Images Seriously*, 114 COLUM. L. REV. 1687, 1687–95 (2014).

[97] Segate, *supra* note 48, at 255.

[98] *Id.*

[99] It should be emphasized, as an aside, that there is entire profession consisting of "Photo manipulation," which goes to illustrate the importance and potential impact of such manipulation. *See* Wilson Lowrey, *Normative Conflict in the Newsroom: The Case of Digital Photo Manipulation*, 18 J. OF MASS MEDIA ETH., 123–42 (2003); Allison J. Lazard et al., *Impact of Photo Manipulation and Visual Literacy on Consumers' Responses to Persuasive Communication*, 39 J. OF VISUAL LITERACY 90, 90–110 (2020); Cuihua Shen et al., *Fake Images: The Effects of Source, Intermediary, and Digital Media Literacy on Contextual Assessment of Image Credibility Online*, 21 NEW MEDIA & SOC'Y 438, 438–463 (2018).

[100] *See* Segate, *supra* note 48, at 256; Porter, *supra* note 96, at 1693.

[101] VARDA LIEBERMAN & AMOS TVERSKY, CRITICAL THINKING: STATISTICAL REASONING AND INTUITIVE JUDGMEN*T* 122–29 (1996) (Isr.).

as conceived in their mind.[102] In other words, our perception of the frequency of an incident is influenced by our memories of similar incidents occurring. Thus, we are more influenced by our own ability to conceive of a thing than we are by their objective probability in practice.[103]

The difficulty presented by the availability heuristic is exacerbated in our case, since courts generally lack knowledge in the field of digital forgery. Consequently, the probability of this occurring, per their internal perception of it, is especially low, to the point of being negligible or even non-existent. Since the probability of forgery as imagined by the court is much lower than its probability in reality, we find ourselves in a position where the court is quite likely to err in its evaluation of the situation, resulting in false convictions.

Moreover, this difficulty is further exasperated, *a fortiori*, in light of the erroneous valuation of probability *a priori*, which stems, among other things, from the very ignorance that plagues the courts with regards to digital evidence.[104]

### 3. Quantity Bias

Further to the fallacy concerning the false application of the availability heuristic leading to the mistaken evaluation of the base frequency rate, we should also note the third cognitive difficulty, which relates to the influence of a large quantity of digital evidence, such as a large number of digital images and/or data on a cellular device. There is a tendency to grant a large quantity of evidence of this nature a certain probative weight, despite that such quantity, under the circumstances, is not deserving of such probative weight.[105] Thus, the concern is that the images will then go on to serve in place of the entire legal argument, until we reach a point where the legal case consists of simply one massive databank of images,[106] leading the examiner of the statement of claim – i.e., the court – to believe that these form a coherent case, regardless of whether or not they actually do.[107]

### 4. The Story Model and Its Application Regarding Digital Evidence

According to the "Story Model," as described in greater depth in the books of Zamir and Teichman,[108] evidence is essentially a set of tools that serves the courts in constructing the story, or narrative, that will serve as the set of facts upon which their legal ruling will be based. In their word: "The creation of a narrative that explains the various items of evidence that have been deemed reliable and relevant–is the core cognitive process by which the facts in adjudication are determined."[109]

The Story Model starkly illustrates the risk-allocation errors that occur in judicial rulings. Since the Model is comprised of the evidence presented to the

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[102] On the relationship between the availability Heuristic and judicial decision-making, *see* Hami Ben Nun, *Cognitive Biases, Intuitive Judicial Decision –Making and Methodical Thinking in the Work of the Judge*, 5 GATES OF L. 177, 207–08 (2010) (Isr.).

[103] Lieberman & Tversky, *supra* note 101, at 124–25.

[104] Hami Ben Nun, *supra* note 102, at 195–99.

[105] Porter, *supra* note 96, at 1694.

[106] *Id.*

[107] *See e.g.*, Dan Simon, *A Third View of the Black Box: Cognitive Coherence in Legal Decision Making*, 71 U. CHI. L. REV. 511, 511–21, 523–86 (2004).

[108] *See* EYAL ZAMIR & DORON TEICHMAN, BEHAVIORAL LAW AND ECONOMICS 527–28 (Oxford Univ. Press 2018).

[109] *Id.* at 529.

court, the presiding panel's knowledge of similar incidents, and additional information is subjective to the specific incident. In our case, as shown above, it is not inconceivable that the court, when crafting such a narrative, will find itself working with the doctored evidence (as noted above–doctored images); and with its faulty valuation of the frequency of this phenomenon (which is caused by the availability bias, as described above). Based on all of the foregoing, the court will seek to craft a story that most precisely fits the evidence presented before it. This concern only grows *a fortiori* when the litigant that has forged evidence is aware that it is precisely the evidence they have forged that can best serve to shape the court's narrative into the narrative they choose.[110] Other studies regarding the Story Model have found that, the more that the story presented by a litigant is found to be both coherent and encompassing of the evidence, the greater confidence the court will assign to their version of events.[111] Moreover, the court's confidence will only grow in light of the lack of plausible alternative "stories,"[112] i.e., alternative hypotheses that could serve to refute the story as told. Given all of the foregoing, it would seem that, in these circumstances, the forger possesses two alternatives that can be used to base their claim. The first, and most obvious alternative, is to create an image/evidence that will support their story. The second, following from the first, is to doctor evidence that undermines the story of their counterpart, thus leading to the rejection of their claim.[113]

We can illustrate the difficulty posed by digital evidence in terms of the story model as follows: Suppose there is a dispute among tenants in an apartment complex relating to the aspirations of Tenant A to expand his apartment, along with the other apartments in the building. Tenant B opposes the expansion, and thus prevents all of the building tenants, including Tenant A, from expanding their apartments and taking advantage of the associated financial benefits. At the conclusion of a tenant meeting, A declares that he intends to cause financial damage to B, just like B caused financial damage to him through his intransigence. Around a week and a half later, B approaches his car and discovers that it has been damaged–all of the windows are broken and the tires have been punctured. As he approaches his car, a neighbor informs him that he saw a figure bearing similarities to A loitering near B's vehicle. Based on this account, B files a financial claim against A for damaging his car, and for the property damage incurred to him as a result. B's evidence consists of A's declaration of intent to cause him financial damage; documentation of the damage that occurred; and the testimony of the neighbor regarding the circumstances, whereby a person of the same height and weight as A was seen loitering near B's vehicle just before the damage occurred. A, who believes his chances in pitting his account against B's are not high, forges two articles of evidence. The first article: A photo of himself on a camping trip from that same say. The second article: A fictitious receipt for gas at a gas station located dozens of kilometers from the place where the incident occurred, bearing the same

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[110] This is a very serious concern, given that the judges seek to establish facts in such a manner that the facts they establish will best explain the evidence in the file. *See id*. at 529.

[111] *See* Nancy Pennington, & Reid Hastie, *Explaining the Evidence: Tests of the Story Model for Juror Decision Making*, 62 J. PERSONALITY AND SOC. PSYCHOL. 189 (1992); Nancy Pennington & Reid Hastie, *Reasoning in Explanation-Based Decision Making*, 49 COGNITION 123, 134–36 (1993); Reid Hastie, *The Case for Relative Plausibility Theory: Promising, but Insufficient*, 23 INT'L J. EVID. & PROOF 134, 134–40 (2019).

[112] For Zamir's and Teichman's words, *see* Zamir & Teichman, *supra* note 108, at 529–30.

[113] On the difference in bringing refutational evidence in the course of the court's fact-finding, *see* Craig R.M. McKenzie et al., *When Negative Evidence Increases Confidence: Change in Belief After Hearing Two Sides of a Dispute*, 15 J. BEHAV. DECISION MAKING 1 (2002).

date and time as that of the incident. As we explained above, there is no way for the claimant to refute this narrative, since the fictitious gas receipt appears to completely refute B's narrative by providing A with a solid alibi. Under these circumstances, even were it to be determined not to assign any weight to the receipt, the combination of these two articles of evidence would still refute B's story.[114] Furthermore, should B attempt to summon the gas station workers to give testimony as to the authenticity of the receipt, the court would likely reject such a motion, seeing as the camping picture would still lead to the factual finding that the defendant possesses an unrefuted alibi.[115]

Maintaining our focus on the story model and its application to the world of digital evidence, we will now address efforts to contend with these difficulties.

### C. Attempts Dealing with Digital Evidence–Overview

In light of the aforesaid cognitive biases afflicting the court, it is important to note that digital evidence effectively constitutes the catalyst and incentive for a significant portion of these biases. This leads, little by little, to the degradation of the judges' cognitive perceptions, which in turn impacts their evaluation of which facts are relevant to the case's needs.[116]

However, notwithstanding the foregoing, it would appear that judges who are aware of this issue and come cognitively prepared to contend with the issues surrounding digital evidence are likely not to suffer from the aforesaid biases.[117] An example of this can be seen in the *Andalib-Goortani* case,[118] which illustrates for us the challenging nature of digital evidence from the opposite perspective. In this case, the court faced a criminal trial wherein a police officer was charged with assaulting a protestor during protests against the G20 Summit in Toronto. The main evidence presented against the officer was a photograph that was uploaded to the internet anonymously. In this case, the court ruled that the picture was inadmissible because the prosecutor had not succeeded in proving that the picture was not staged or altered in any way.[119] The main difficulty arising from this verdict stems from the fact that the complainant had confirmed that the picture

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[114] To be clear, the court is likely, notwithstanding a determination that this evidence is inadmissible, to reach a fact-finding conclusion on the basis of its existence. *See* Zamir & Teichman, *supra* note 108, at 567 (discussing the court's difficulty ignoring inadmissible evidence and other information to which it is exposed).

[115] Granted, this determination effectively assigns probative weight to an ostensibly inadmissible article of evidence, as long as it is not submitted by its creator. Nonetheless, for the sake of efficiency and sparing judicial resources, as well as other reasons, the courts tend to accept evidence that is inadmissible or partially admissible, and determine guilt based on the assistance they provide, both in civil (as described in our example) and criminal proceedings. On the admissibility of evidence that is inadmissible in criminal proceedings, *see* Doron Menashe & Guy Alon, *Criminal Law—Does A Confession Matter? A Defendant's Confession as Irrelevant to Prove His Guilt*, 42 W. NEW ENG. L. REV. 191, 201–04 (2020).

[116] *See* Segate**,** *supra*, note 48, at 260–61.

[117] *Id.*

[118] R. v. Andalib-Goortani 2014 ONSC 4690 (Ont. S.C.J.) (Can.).

[119] *Id.* at ¶ 34. It is important to note, in respect of this verdict, that it discusses home graphics editor suites and illustrative of the issues surrounding digital evidence. *See id.* at ¶ 31. Similar to the difficulties we indicated with regards to the IDF and the falsification of sick notes, here, as well, it was Photoshop software that irked the court. *See id.* at ¶ 32. In this context, claimant may argue that the bar is too high–i.e., that from now on, any prosecutor seeking to rely on digital evidence would be required to prove that the evidence was not staged or altered in any way. This would mean, in effect, that digital evidence would be rendered inadmissible by default almost across the board.

was consistent with her memory of the attack, and with the height and appearance of the officer. Despite this, and despite the apparent consistency of the complainant's account with photograph, the picture did not meet the admissibility test. This, in spite of the fact that in the past, such evidence would have been considered sufficient to verify the integrity of a video or picture.[120]

The arguments provided in the verdict explain that the reason the evidence was thrown out by the court stemmed from the fact that the picture was essentially from an unknown source ("Open-source evidence"); i.e., one obtained from public sources, and that as such, its probative value lessened,[121] since its nature and reliability could not be verified.

It thus seems that, no matter what direction we approach from, this (admittedly superficial and non-exhaustive) review illustrates the inherent difficulties presented by digital evidence, as the situation stands. As an aside to this review, we also illustrated the issues presented by the Israeli law's failure to properly enforce in this regard, and, for the sake of contrast, presented other case law illustrating the dangers inherent in over-enforcement–or, at the least, reasoning to that effect. This study will attempt to find the appropriate balance by proposing a model that addresses all of the relevant considerations, including, in particular, the desire to widen the evidence basket as much as possible, albeit not at the cost of increasing the risk of error or contaminating the legal proceeding.[122] This will come on the heels of successfully demonstrating–as was done in the aforesaid *Andalib-Goortani* case–how each article of evidence could be fabricated and staged, and the inherent danger in the court's basing of fact-finding on fabricated evidence. We will also proceed to elaborate on how the approaches of Israeli law exacerbate these issues tenfold, due to human error.

IV.        THE ISRAELI LAW OF EVIDENCE AND ITS UNIQUE CHARACTERISTICS

As mentioned above, following the British mandate that ruled over the territory prior to the establishment of the State of Israel, the Israeli legal system maintained its form as a Common Law system. Accordingly, the Israeli system functions as an adversarial system,[123] wherein the court is passive and the parties– i.e., the litigants and their counsel–are responsible for conducting the proceedings. To clarify, the parties are responsible for monitoring the evidence and identifying omissions, and it is they who must object to a particular article of evidence. As described above, this adversarial model creates very real challenges in light of the

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[120] *See* David Tanovich, *Andalib-Goortani: Authentication & The Internet*, 13 CRIM. REP. 140, 140–143 (2014) (Can.) (offering criticism on the verdict); Brock Jones, *Authenticating Online Images Key to Their Admissibility: A Comment on R v Andalib-Goortani 2014 ONSC 4690*, CANLII CONNECTE (Feb. 5, 2015), https://canliiconnects.org/fr/commentaries/35673 (Can.).

[121] *See* Lindsay Freeman, *Digital Evidence and War Crimes Prosecutions: The Impact of Digital Technologies on International Criminal Investigations and Trials*, 41 FORDHAM INT'L L.J. 283, 334–35 (2018).

[122] For more reading on the contamination of the legal proceeding, and on the relationship between the prejudicial effect of evidence and its probative value, *see* Doron Menashe, *That's Not It, Further Thoughts in the Wake of the Olmert Conviction*, 12 LEGAL BULL. 80–82 (Isr.). Rule 403 of the Federal Evidence rules in the United States, entitled "Excluding Relevant Evidence for Prejudice, Confusion, Waste of Time, or Other Reasons," states, "The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence." FED. R. EVID. 403.

[123] *See* Ray Finkelstein, *The Adversarial System and the Search for Truth*, 37 MONASH UNIV. L. REV. 135, 135–43 (2011).

realities of legal practice in the State of Israel, which stem from an overabundance of lawyers. Below, we will discuss the issues arising from this legal practice when applied to the Israeli Common Law system (or any Common Law system, for that matter).

### A. Israel's Number of Advocates and Its Implications

As of April 5, 2021 one out of every 128 residents of the State of Israel is a lawyer.[124] This is the highest per capita ratio in the world. In the Center Block, which mainly encompasses the city of Tel Aviv, one in every 20 residents is a lawyer, with the vast majority of these (some 70% being below the age of 40).[125]
On the face of it, the multitude of lawyers have served the Israeli public well–and, in particular, the more vulnerable segments of society. Now, owing to the ubiquity of lawyers, legal services are essentially accessible to the public, with law schools opening up across the country, from Safed in the north and all the way to Sderot in the south.[126] Thus, Israel has become a land bustling with lawyers and, ostensibly, with social justice[127] and the social rights that accompany it.[128]

And yet, in Israel, rather than finding ourselves in a race to the top, wherein said vulnerable populations receive good, quality legal services to assist them in protecting their rights, we instead find ourselves in a race to the bottom, wherein the more the number of lawyers in Israel increases, the poorer the quality of the legal services provided.[129] This drop in quality mainly steams from basic economics, as a result of the situation where the supply continues to grow astronomically out of proportion to the demand. This results in a situation where many lawyers struggle to find employment, owing to the fierce competition that inevitably sidelines many of them. The flooding of the profession, as it has been written, "causes some lawyers to specialize in everything, without specializing in anything. Even worse, the financial distress causes many lawyers to seek to break into fields in which they never specialized, and at times, even to cause serious damage to their clients, who believe that merely their status as lawyers is sufficient."[130]

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[124] *See* Lital Dobrovitsky, *The Ratio of Lawyers to Population in Israel–the Highest in the World*, YNET (May 24, 2010), www.ynet.co.il/articles/0,7340,L-3893213,00.html; Oleg Morbyov, *Israel Leads in Number of Lawyers Per Capita*, DAVAR (Apr. 5, 2021), www.davar1.co.il/294855.

[125] *See* Dobrovitsky, *supra* note 124.

[126] Albashan has written extensively on the importance of having many lawyers and thus removing the economic and geographic barriers that would otherwise bar vulnerable communities from access to their legal rights. *See* Yuval Albashan, *Access to Justice of Underpowered Communities in Israel*, 3 ALEY MISHPAT 497 (2003) (Isr.).

[127] *See* Karen L. Loewy, *Lawyering for Social Change*, 27 FORDHAM URB. L.J. 1869 (2000); Louise Trubek & M. Elizabeth Kransberger, *Critical Lawyers: Social Justice and the Structures of Private Practice*, *in* CAUSE LAWYERING: POLITICAL COMMITMENTS AND PROFESSIONAL RESPONSIBILITIES 201 (A. Sarat & S. Scheingold eds., 1998).

[128] The connection between social justice and social rights has been examined at length by Albashan as well. Albashan, *supra* note 19. *See also* T.H. Marshall, *Citizenship and Social Class*, *in* CLASS, CITIZENSHIP & SOCIAL DEVELOPMENT 46 (1964) (from the very start of the movement). Nonetheless, it is worth noting that this is not a widely held position in Israel, and there are many approaches that see no advantage in investing public resources in expanding the community of lawyers in Israel. *See* Yaara Levi & Yigal Borochovsky, *Who Needs Lawyers? Stop Subsidizing Law School*, THEMARKER (Feb. 5, 2019), www.themarker.com/news/education/1.6911937 (Isr.).

[129] *See* Lital Dobrovitsky, *10 Tips for Picking a Lawyer*, YNET (Dec. 15, 2003), www.ynet.co.il/articles/0,7340,L-2839956,00.html (Isr.).

[130] *Id.* at ¶ 1.

In addition to the overabundance of lawyers, there's also the matter of the level of education received at the law schools. Many voices in the Israeli academia have sounded the warning in recent days. Many and leading researches in Israel have declared, "The legal profession in Israel is facing its greatest crisis since the founding of the State, as the academic level of legal studies is terrible across the board."[131] Astoundingly, these claims have been raised as well by none other than the heads of the Israeli Bar Association, who have asserted that "not everyone who graduates law school should be a lawyer. Those who wish to be lawyers ought to undergo a much more rigorous academic track, of much greater quality, than that which they are subject to at present."[132] Such statements regarding the dismal level of legal training in Israel have even been sounded by the Israeli legislature.[133]

With the multitude of lawyers, their (ostensibly) dismal level of performance, and the economic influences that have affected the legal field, we find ourselves in a circumstance wherein many lawyers find themselves taking on as many cases as possible in order to earn a living.[134] This is because, as mentioned above, lawyers are earning less and less for each case they take on[135] and it should be emphasized that this matter has been discussed at length in the professional quarters, and there appears to be a consensus among the members of the Bar Association that these statistics are "deeply troubling."[136]

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[131] *See* Hila Raz & Nurit Roth, *Criticism of the Level of Legal Studies at Colleges Stems from Frustration with the Universities*, HA'ARETZ (Dec. 28, 2018), www.haaretz.co.il/misc/1.1370004 (Isr.).

[132] *Id.* In the words of Adv. Yoram Guy-Ron, former chairman of the Israeli Bar Association. This statement related to the need, as he saw it, for the Bar Association to be involved in the training process, in order to prevent the situation that we find ourselves in today.

[133] *See, e.g.*, statements issued from the Knesset in the Draft Bill. This was also voiced in greater detail in the protocol of the hearing of November 23, 2009: "Obtaining a lawyer's license has become a relatively easy track compared to other professions, such as accountancy, psychology or medicine; the period of studies is brief; some of the institutions even teach on a biweekly basis; only a bachelor's degree is required to obtain a lawyer's license; the acceptance conditions and period of the internships are very short. This situation has also led to the opening of many law schools, which has in turn promoted lower acceptance standards and, ultimately, an unnatural glut of lawyers flooding the market. But more importantly–it has seriously degraded the level of the profession."

[134] *See* Tamar Kricheli-Katz et al., *Hierarchy and Stratification in the Israeli Legal Profession*, 52 LAW & SOC'Y REV. 436 (2018), wherein the difficulties created by the flooding of the profession are described: "The flooding of the profession is problematic in two senses: From the vantage point of the public, the issue stems from the fact that the public must contend with an excess of lawyers, without a means to gauge which are quality professionals and which are less so, increasing the risk of mishandling of cases, up to the point of malpractice. However, the flooding of the market is problematic for lawyers as well, and is accompanied by such side-effects as lowering the esteem of the profession, uncontrolled competition and a 'race to the bottom,' and a dramatic decrease in legal fees." *Id.* at 436–37. *See* Ori Shilo, *A Multitude of Malpractice Suits–a Warning Sign for Lawyers in the Real Estate Market*, THEMARKER (Nov. 18, 2016), https://www.themarker.com/realestate/1.3125691 (Isr.).

[135] *See* Ella Levy-Weinrib, *The Flooding of the Profession, Overburdening the Files and Maintaining the Rule of Law: The Burning Problems of the Elected Chairman of the Bureau*, YNET (June 18, 2019), www.globes.co.il/news/article.aspx?did=1001290067 (Isr.). In the body of that article, in discussing the urgent matters facing the new chairman of the Bar Association, the author notes that "Whoever is elected to lead the Bar Association will be required to address the issues that are plaguing lawyers today, including *the flooding of the profession and loss of respect for its practitioners . . . in addition to – for many lawyers, especially among younger lawyers – the financial squeeze and difficulty making a living in the profession.*" *Id.* (emphasis added).

[136] *See* Ella Levy-Weinrib, *Candidates for Head of the Bar Association Respond to Survey of Lawyers' Salaries Published on Globes: "Disturbing Figures,"* YNET (May 27, 2019),

To provide a fuller picture, below is a table of salaries per the results of the market survey conducted regarding the salaries of lawyers in Israel.[137]

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www.globes.co.il/news/article.aspx?did=1001287293 (Isr.). This article is published pursuant to a survey that was taken regarding lawyers' salaries in Israel, which indicated that a third of lawyers earn less than ILS 11,000 gross per month (a sum barely a few hundred shekels higher than the average salary in the economy). *See* Ella Levy-Weinrib, *Survey: One Third of Lawyers Earn Less Than ILS 11 Thousand Gross. And How Much Do They Earn in the Top 0.1% of the Profession?*, YNET (May 27, 2019), www.globes.co.il/news/article.aspx?did=1001287162 (Isr.).

   [137] *See* GLawBAL, *Situation Snapshot, Trends and Changes in the Legal Sector in Israel and Abroad*, GLAWBAL (Jan. 1, 2020), http://www.glawbal.com/upload/Legal%202020.pdf (Isr.) [hereinafter GLawBAL Study].

| Decile | Monthly Salary Range for Israeli Lawyers (in ILS and USD) | Experience | Type of Firm |
|---|---|---|---|
| 1 | Between ILS 4,977-5,855 (USD 1,542-1,815) | 0-2 years at firm | Small firms, **mainly in the periphery** |
| 2 | Between ILS 5,856-8,805 (USD 1,816-2,739) | 0-2 years at firm with some prior experience (up to 5 years) | Small firms |
| 3 | Between ILS 8,806-11,102 (USD 2,740-3,442) | 0-2 years at firm, prior experience (up to 5 years) | Small and medium-sized firms |
| 4 | Between ILS 11,103-13,972 (USD 3,443-4,331) | 0-2 years at firm, prior experience (up to 5 years) | Small and medium-sized firms and some large firms |
| 5 | Between ILS 13,973-15,815 (USD 4,332-4,902) | 0-2 years at firm with prior experience, some contract partners and partners | Small and medium-sized firms, some large firms and boutique firms |
| 6 | Between ILS 15,816-19,261 (USD 4,903-5,971) | Midrange associates, senior associates, contract partners and partners | Small, medium-sized and large firms, assorted highly rated- boutique firms |
| 7 | Between ILS 19,262-23,706 (USD 5,972-7,349) | Midrange associates, senior associates, contract partners and partners | Small, medium-sized and large firms, assorted highly rated- boutique firms |
| 8 | Between ILS 23,707-29,295 (USD 7,350-9,081) | Senior associates, contract partners and partners | Small, medium-sized and large firms, assorted highly rated- boutique firms |
| 9 | Between ILS 29,296-40,508 (USD 9,082-12,557) | Senior associates, contract partners and partners | Small, medium-sized and large firms, assorted highly rated- boutique firms |
| 10 | ILS 40,509 or higher (USD 12,558 or higher) | Senior associates and partners | Medium-sized and large firms, and luxury boutique firms |

This is an extremely difficult and untenable situation, where the salaries of some 30% of lawyers are actually *below* (or equal to) the average earning wage in the economy. To the best of our knowledge, there is no precedent for such a dynamic in any other country in the world, where tens of percentiles of lawyers that have undergone studies, training and passed the Bar examinations are earning less than the national average. This helps us to understand how we have reached the situation we find ourselves in, where lawyers are taking on more cases than they can manage, which, in turn, further harms the professionalism of the

lawyer, who is limited in time and manpower and cannot manage an infinite number of cases. This is an anticipated consequence of the flooding of the profession and depressed wages, and it is inexcusable.

Unlike the issues stemming from the abundance of lawyers, which, exists in the United States as well,[138] we can see that the depressed wages, both objectively and comparatively, are a unique feature of the Israeli legal field.[139] However, this isn't the only gap between Israel and the United States as it relates to lawyers' salaries. An in-depth read of the GLawBAL study reveals that there is also a significant gap in the pricing systems routinely employed by lawyers. Whereas in the United States, some 54.6% of income comes from hourly billing,[140] the rate of income from cases billed hourly in Israel stands at only 36.7%.

Another gap worth mentioning between the U.S. and Israel involves the division of the profession into classes based on fields of employment. For instance, in both Israel and the U.S. there is a gap between commercial lawyers, who deal in the field of trade (including commercial litigation), and between lawyers employed in "household" fields,[141] owing to the nature of the clients (individuals versus large corporations). And yet, this gap is far more moderate in the U.S. compared to the gap in Israel. While this discrepancy stood at 215% in the U.S. as of 2018, the same figure stands at 392% in Israel. This illustrates the low salaries that lawyers employed in household fields can expect, which are the fields in which the most vulnerable members of society tend to be active.[142]

In summary, the State of Israel is home to a disproportionately large population of lawyers, many of whom are forced to take on an excessive burden of cases in order to make ends meet. At the same time, there are worried voices from academia stating that the level of training these lawyers receive is insufficient or, at the very least, doubtful.[143] Not only are the skills of these lawyers in question, it

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[138] In certain parts of the United States, the excess of lawyers is more apparent even than in some parts of Israel. E.g., in the District of Columbia, 1 of every 13 people is a lawyer, and in the State of New York, 1 of every 113. These are per capita rates of lawyers that match or surpass even the highest rates in Israel. GlawBAL Study, *supra* note 137.

[139] Given the similarities between the Israeli and American markets–both in terms of the numbers of lawyers and the trend of overlitigation–Israeli lawyers are compared against their American colleagues.

[140] I.e., cases in which lawyers' fees are derived directly from the hours of work they invest in a case.

[141] These are lawyers handling personal status law, torts, enforcement and so forth.

[142] To be clear, unlike in commercial litigation, where the parties to the proceeding are commercial corporations, the parties in household cases tend to belong to all segments of the population. In some of these fields–such as debt enforcement–near exclusive representation of vulnerable populations can be seen.

[143] And this is only further exacerbated *a fortiori* in the circumstances of our case, i.e., when such lawyers are called upon to handle matters involving digital evidence, considering that the legal training does not include (or at least, previously has not included) technological training in the use of computers. This is very important owing to the great difficulty involved in effecting changes in the legal system. It's well known that judges refuse to update their thinking (and the Digital Revolution is an update that has yet to be properly accounted for by judges). There are many fields in which it is evident that judges are unwilling to stay current. *See* Oren Gazal-Ayal, et al., *Do Judges Obey the Law?*, 47 MISHPATIM–HEBREW UNIV. L.J. 327 (2018) (Isr.). This issue has naturally impacted the legal system in the Digital Age more than ever. *See* Roffeh, *supra* note 66, at 2. "The twisted results find expression on a daily basis: *jurists and judges are called on to address cases that combine law and technology – and find themselves witless.* They must represent, counsel and render judgment – *but they possess neither the necessary knowledge nor skills to do so.* Already several years ago, Justice Dr. Agmon Gonen declared that 'Courts don't need to concern themselves with this;' *another judge admitted in court that he does not know how*

is also questionable how much time they actually invest in each case, since the pricing structure they employ creates a conflict of interest whereby the lawyer is incentivized to spend as little time as possible on the case–in stark opposition to the interest of the client. This difficulty is further exacerbated *a fortiori* with regards to lawyers engaged in the household fields, which tend to involve private individuals in need of assistance. Now, having established this, we shall proceed in the next chapter to explore the further difficulties that arise from this situation.

### B. Israel's Adversarial System and its Implications

The Israeli legal system originates in the Common Law system (itself originating in England), and, accordingly, it adheres to the adversarial system of deliberation.[144] The adversarial system is known for its primary characteristic: the minimalist role of judges, who are relegated almost entirely to ensuring the rules of the game are fair, including by safeguarding the basket of evidence–and, in particular, discerning which articles of evidence will enter the court file, and which will be excluded from it.[145]

We believe that this situation gives rise to a clear and present danger of false convictions and/or the miscarriage of justice in civil trials. This concern applies equally to all adversarial systems of law, as it were;[146] however, it is further exacerbated *a fortiori* in considering of the litigant parties in Israel, as we will illustrate below.

### 1. The Parties in the Adversarial System in the Digital Age

As stated above, the adversarial system relies almost entirely on the parties' attorneys. The lawyers are the ones who manage the proceeding, and are responsible for determining which points of contention will be debated. They are responsible for the discovery; for drafting the preliminary questions to be posed to the primary witnesses; and for choosing strategy, both in terms of how to proceed and how not to proceed. The court, thus, remains passive, and adapts itself to the rules of the game outlined by the parties.

For instance, should party A's counsel choose an illegitimate or prohibited strategy that involves attempting to expand the field of debate, presenting inadmissible evidence, raising claims that cannot be raised at the current stage of

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*to handle cases involving technology;* and a third judge requested to be provided with an expert opinion from a computer specialist, and even notified the parties that the expert's opinion would be binding and final." *Id*. It must be emphasized that this is true of the entire system. *See* Stephen Mason, *Towards a Global Law of Electronic Evidence?*, 103 AMICUS CURIAE: J. ADV. LEGAL. STUD. 1, 19–28 (2017). Wherein the following passage is of the highest pertinence to our case: "It seems, that a large majority of lawyers, legal academics and judges have failed to realize they are now living in a world dominated by digital evidence, and that digital evidence is now the dominant form of evidence . . . *the majority of lawyers, legal academics and judges do not know they do not know; a smaller number know they do not know, and an even smaller elite know about digital evidence, but they are realistic enough they need to know more.*" *Id.* (emphasis added).

[144] *See* ROBERT A. KAGAN, ADVERSARIAL LEGALISM–THE AMERICAN WAY OF LAW (Harvard Univ. Press, 2009*)* (for more discussion on the adversarial system and its contemporary practice).

[145] *See* PETER MURPHY, A PRACTICAL APPROACH TO EVIDENCE (Blackstone Press, 1992) (Murphy describes a judge frustrated with the adversarial system with the following dialogue: "'Am I never to hear the truth?' 'No, my lord, merely the evidence,' replied counsel.").

[146] Since it is evidence that any adversarial system would seek to "rely" on the litigants as far as digital evidence is concerned, even if they lack the expertise to ensure an accurate verdict.

the trial or similar, it becomes the responsibility of party B to object and point the court to such transgression. Should party B fail to do so, the court, as a rule, will refrain from interceding and allow the admission of evidence or claims, regardless of these being against procedure and likely to harm party B.

The concern described above worsened exponentially in the digital age, in which we are presented with new and sophisticated evidence at a high frequency, which is also constantly updating and changing over brief windows of time.[147] And yet, the sophistication of this evidence is only part of the problem. The greatest difficulty is posed by the sheer volume of evidence, with claims frequently being made to the effect that the court is presented only with the tip of the iceberg of the full volume of evidence held by the parties.[148]

In other words, not only is the evidence gradually increasing in sophistication, but the quantity of evidence is also inexorably growing. The parties control both the ability to explain the evidence to the court, and the sampling of evidence presented before the court. This once again illustrates the importance and significance of the parties themselves in the adversarial system, particularly in the digital age.[149] Furthermore, if this were not enough, it would seem that the court is aware of its limitations in this regard with respect to digital evidence. These limitations come into play when a dispute comes before the court relating to digital evidence, and it is required to decide between the conflicting positions of the parties. The court, being aware of the difficulties inherent in digital evidence, as well as of its own limitations, tends toward creating broad rules aimed at providing a future solution, if and when the same arguments arise again under different circumstances.[150] The result is that the rulings of the various courts in matters involving new technology are often hesitant, rather than decisive.[151] This, in turn, gives rise to two problems that we will describe below.

The first difficulty, and most significant, relates to the management of criminal trials in the adversarial system, and, in particular, the abuse of proceedings by law enforcement agencies resulting from the aforesaid circumstances. This abuse is expressed in the fact that law enforcement personnel often find themselves collecting evidence in illegal manners (which is not always sufficiently clear, when it comes to digital evidence),[152] based on the understanding that there is no clear ruling one way or the other in this matter, if and when it reaches the threshold of the court (i.e., in the event that the illegal search yields incriminating evidence). Under these circumstances, where we have an illegal search, on the one hand, and incriminating evidence on the other, the court is faced with a difficult decision. Now it must not decide merely on the admissibility of the evidence, but on the admissibility of the evidence in light of the fact that such evidence is key to a conviction. For this reason, which is likely to influence the court's decision, the law enforcement agents are willing to wager on the fact that

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[147] *See* Daniel M. Scanlan, *Issues in Digital Evidence and Privacy: Enhanced Expectations of Privacy and Appellate Lag Times*, 16 CAN. CRIM. L. REV. 301 (2012) (Can.).

[148] *Id.* at 302.

[149] *See* Orin Kerr, *The Fourth Amendment and New Technologies: Constitutional Myths and the Case for Caution*, 102 MICH. L. REV. 801, 868–69 (2004).

[150] *See* James Stribopoulos, *In Search of Dialogue: The Supreme Court, Police Powers and the Charter*, 31 QUEEN'S L.J. 1, 37 (2005).

[151] Colton Fehr, *Digital Evidence and the Adversarial System*, 16 CAN. J. OF L. AND TECH 437, 439–41 (2016) (Can.). *See* R v. Fearon, [2014] 3 S.C.R. 77 (Can.).

[152] *See* Steven Penney, *Reasonable Expectations of Privacy and Novel Search Technologies: An Economic Approach*, 97 J. CRIM. L. & CRIMINOLOGY 477, 501 (2006) (providing discussion regarding the difficulty this raises under the current circumstances of overload and the need for legislative intervention).

the court's decisions, with regard to the admissibility of evidence, are made *ex-ante*, based on the (understandable) faith that a determination regarding evidence already known to be incriminating will, for obvious reasons, be found in their favor.[153]

The second difficulty relates to civil cases in the adversarial system. In civil cases, as in criminal cases, the advent of digital evidence has generated significant issues and encumbered the proceeding. Once again, this difficulty stems from the court's ignorance of how to best evaluate digital evidence.[154] In these circumstances, as with criminal proceedings, the situation becomes such that the stronger party with the greater access to resources holds the advantage. The stronger party possesses the greatest knowledge of and control over digital evidence; has greater capacity for collecting such evidence; and, as illustrated above, has the time, resources and know-how so that, if and when the interest arises, they are primed to make use of evidence whose admissibility is questionable.

### 2. The Israeli System and its Increased Risks of Error

In the previous subchapter, we illustrated the difficulties posed by the adversarial approach in the Digital Age, as well as the many avenues for forging evidence. Now, we will demonstrate how the Israeli approach and, specifically, the Israeli courts are the most exposed courts in the world to risk-allocation errors resulting from forged evidence (relative to other legal systems that also employ the adversarial method). This conclusion is based on two principal rationales.

The first reason, as detailed above, is the current trend of evidence law transitioning from rules of admissibility to rules regarding probative weight, which grant courts greater discretion in choosing whether to admit evidence. As we know, under the adversarial system, the parties responsible for ensuring fidelity to these rules, and ensuring that the courts prevent the admission of inadmissible evidence, are the litigants' attorneys. And yet, as we illustrated above, Israeli lawyers specifically are often insufficiently trained and lack sufficient expertise in matters pertaining to digital evidence. This conduct sometimes impedes the courts, as has been shown in a study released on the subject.[155] In that same study relating to practices that impede the courts, judges in the various Israeli courts were asked about this issue, and these judges, presiding over various courts around Israel, described the phenomenon as follows: "One explanation offered by some of the judges as to the issue of behaviors that impede the court consisted of a general explanation that applies to a large proportion of the lawyer population–lack of legal knowledge and lack of preparation for the trial, or in other words– unprofessionalism."[156] In layman's terms, the unprofessionalism of Israel lawyers is the first reason why the danger of risk-allocation errors is higher in Israel compared to other legal systems around the world.

But this is not all. The second reason, which is intrinsically tied to the first, relates to the amount of time each lawyer invests in the cases they manage. This length of time is directly derived from the profit margin expected to accrue to the attorney from handling the case, and thus, the amount of resources they are able

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[153] *See* Fehr, *supra* note 151, at 440.

[154] *See* Penney, *supra* note 152.

[155] *See* Chemi Ben Noon, Boaz Shnoor, & Eyal Katvan, *Judges' Perceptions of Lawyers' Behavior in Court*, 20 HAMISHPAT L.J. 11, 21 (2015) (Isr.).

[156] *Id*. at 32–33.

to invest in the case. As we have illustrated above, the average wage of Israeli lawyers is lower (by tens of percentiles) than that of their colleagues abroad,[157] which accordingly results in less time invested in each case. This phenomenon is even more acute with respect to "household" cases, i.e., individual cases. In these matters, the wage gap is even more pronounced, and so, we can only assume, the time invested in each case is only further reduced. And to be clear, we should note that the amount of time an attorney invests in the cases they handle is not without consequence. For example, a recent study demonstrated an empirical direct correlation between the amount of time an individual invested in preparing and/or detecting forgeries, and their ability to prepare and/or detect said forgeries.[158]

And now, the question must be asked: what conclusion can we reach from these two trends, given the research with regards to the ability to detect forgeries, and the special circumstances of the Israeli legal system? There is only one possible conclusion: that in the State of Israel, the parties facing the greatest exposure to risk-allocation errors are the most vulnerable populations.

It could be argued that this is yet one more mechanism that is likely to exacerbate class differences in society by ensuring that in and when judicial errors occur with respect to the specter of digital forgeries (and all forgeries, for that matter), they are likely to discriminate against the weaker party. These are the parties likely to hire attorneys who charge less (and accordingly, lack sufficient time to invest in each case and to properly examine all of the evidence). These are the parties most likely to reach settlements that are influenced by this or that article of evidence in the case file, despite such evidence being staged, forged and/or otherwise uncorroborated. And, while the error risks affecting the most vulnerable parties apply to all legal systems, as it were, they are all the more pertinent given the unique characteristics of the Israeli legal system.

## V. Conclusion

This study sought to paint a picture of the current difficulties of evidence law in adjusting to the Digital Age, and to attempt to propose a sustainable solution to meeting the high rate of technological developments, which continues to lead us in an uncertain direction–whether forward or backward remains unclear[159]–with particular emphasis on the Israeli law, both in theory and in practice.

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[157] *See* § III(A), *supra* (providing our comparison to the United States).

[158] *See* Felix Freiling & Leonhard Hösch, *Controlled Experiments in Digital Evidence Tampering*, 24 Digital Investig. S83, S83–S92 (2018).

[159] The uncertainty pertaining to the vector of developments–"forward or backward"–reflects the philosophical question of whether technology has taken evidence law to a better place, or a worse place? Indeed, while it has presented us with the ability to present more and better evidence (DNA evidence, digital evidence, fingerprints, videos of a greater degree of quality and accessibility), and thus to better pursue the truth and avoid false convictions, it is nonetheless true, as well, that technology can be used to falsify and destroy evidence with greater ease than in the past. Thus, the nature of technology's impact on evidence law remains uncertain. The words of Justice Heshin, in his preface to Nimrod Kozlovski's book *The Computer and the Legal Proceeding* are relevant fear, as related on pp. d–e, wherein he writes: "Today we find ourselves amidst a technological revolution. For the computer and the internet are not mere mutations of forms of life previously known to us, and accounted for in our legal systems. These are new life forms entirely, that do not act like the life forms we've become accustomed to. They move like the knight in chess: *not exactly forward, not exactly backward, neither to the side nor diagonal; their movement is a bit of this and a bit of that, and ultimately, its own form. But in this sense, this*

This review was conducted by choosing a sample incident in which images were forged, which illustrated succinctly the ease with which images can be staged, and the difficulty in identifying such forgeries, when it comes to digital evidence. There seems to be no solution other than to turn the clock back to the period when evidence laws were carefully kept. Alongside our proposed solution, which will be based, among other things, on the technological reality and the unique circumstances of the Israeli legal system, we will attempt to ensure two primary aspects.

The first aspect of the proposed solution relates to the need for there to be a way to refute the evidence, i.e., the party wishing to review the picture on suspicion of forgery must have the ability to confirm the picture's nature and content. Falsifiability must be a prerequisite to presenting the evidence, without which the evidence should be considered inadmissible from the start.[160] In Menashe and Gruner's book, they illustrate why evidence of this nature should be blocked–i.e., evidence that is unfalsifiable owing to a "systemic barrier."[161] Per this approach, an unfalsifiable claim may not be accepted (examples from criminal law were provided to illustrate), since, according to the authors, accepting claims of this sort would undercut the effectiveness of the criminal trial.[162] From this we can derive that, in order to accept a factual claim that is made based on evidence, we must ensure that the party wishing to refute such claim–and consequently, such evidence–has the ability to do so; and if not, the evidence should fail the systemic barrier test.

The second aspect of the proposed solution intends to supply the aforesaid need, i.e., to ensure that the party seeking to oppose the article of evidence in question is granted the ability to refute it. This is done by establishing a new, preliminary mechanism that will serve as a necessary prerequisite to submitting the evidence. This mechanism will aim to achieve two purposes: the first purpose, is to prevent any incident from transpiring whereby the court is availed of evidence

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new life form differs from the knight, since we know in advance how the knight will move, and we know – if some with greater certainty than others – how to guard against its advance. Whereas the new life forms of the computer and the internet we have yet to fully understand – we have yet to reach the bottom of the rabbit hole. Click a button in Jerusalem, and you are in Tel Aviv; click again, and you are in Australia; click a third time, the whole system revolts, and all is erased as though it never were. *Our actions move at the speed of light, while our bodies remain in the carriage, and our minds process only as fast as the carriage*." SHNEUR HESHIN, *Preface to* NIMROD KOZLOVSKI, THE COMPUTER AND THE LEGAL PROCEEDING, at d-e (Bar Ass'n Pub'g, 2001) (Isr.) (emphasis added).

[160] *See* DORON MENASHE & EYAL GRUNER, THE ESSENCE OF THE REASONABLE DOUBT IN CRIMINAL LAW 183 (Nevo Pub'g, 2017) (Isr.).

[161] *Id*. at 99–102. The authors demonstrate this through the example of a defendant who claims an alibi, despite the existence of evidence placing him at the crime scene–both forensic evidence, such as photographs and fingerprints, as well as independent witness testimony. Under these circumstances, any innocence hypothesis–i.e., any claim by the defendant that he is innocent *in spite of* the aforesaid evidence against him–amounts, in effect, to a conspiracy theory, since in order for this claim to be correct, it would need to be based on the premise of the police having bribed false witnesses and staged the photo evidence, and that the fingerprints were not left at the time of the crime, but at a later stage. If a defendant is allowed to raise claims of this sort, the consequence would be that it would be impossible to ever convict a defendant. *See* ADRIAN S. ZUCKERMAN, THE PRINCIPLES OF CRIMINAL EVIDENCE 132 (Oxford Clarendon Press., 1989).

[162] *Id*. at 111–12.

whose authenticity is in question;[163] and the second purpose is to establish a professional mechanism for ensuring that the article of evidence submitted is, in fact, authentic. In other words, this mechanism will ensure the existence of some party that is familiar, to some degree or other, with the relevant digital evidence (in our case, photographs), and that can attest to their quality and reliability. This is necessary owing to the court's own lack of expertise in this regard, and, *a fortiori*, given the current situation in the Israeli legal system with respect to the adversarial system and the quality of legal training.

Therefore, and pursuant to the foregoing, our proposal is to assign to the party wishing to enter digital evidence (and in particular, photographs) into the court record the burden of submitting an expert opinion stating that the photograph has been examined by them and is authentic and reliable, and that it was not found to be doctored. The expert opinion should include an explanation of the technological means employed by the expert to verify that the photograph was not forged.

It should be noted that similar arrangements already exist in the Israeli legal system, largely in the context of providing proof in medical matters. Thus, just as proving a medical matter requires that an opinion be submitted by an expert in the relevant field, it would seem that there is no choice but to require similar proof when seeking to prove matters of technological expertise; in our case, proving that a photograph or photographs that the party wishes to submit have not been forged. In the framework of the opinion, experts will be required to assess whether the image is forged, and in doing so, answer the question of whether it is even theoretically possible that the picture was forged. This will be done by examining the most advanced photo-editing technologies, as we discussed above. This requirement, which involves setting up barriers intended to mitigate the risk of false judicial rulings, has already been extensively discussed by the Supreme Court in the *Tubul* case.[164] Given its relevance, we will cite the words of his Hon. Justice S. Levine: [165]

> The approach of the majority opinion is too simplistic. It emphasizes individual cases in which the court, owing to some evidentiary obstacle, is prevented from pursuing the truth (and such cases exist, without a doubt); but it also ignores the existence of many other cases in which the different judges may perceive the evidence differently from each other, and thus, reach differing factual conclusions . . . moreover, the "truth" is determined according to the perception of reality arising from the evidence,

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[163] While accounting for the fact that when the court encounters inadmissible evidence, even in situations where it announces unequivocally that it is not going to rely on this evidence, it has been empirically proven that a certain weight is nonetheless carried by such evidence. *See* Hanan Goldschmidt & Yaacov Schul, *The Difficulty Ignoring Information–Psychology and Law*, 12 LAW AND BUS. 67, 71 (2010) (Isr.). The study concerned inadmissible information concerning the criminal record of a litigant in a civil case. In one version of the story, information was presented regarding the criminal record of the claimant, with the criminal behavior in question occurring 14 years prior to the lawsuit. The control group, meanwhile, was not presented with this information. The judges were to rule on the matter of the head of damage of pain and suffering, as well as on whether the information was admissible.

[164] *See* CrimA 23/85 State of Israel v. Tubul, 42(4) HCP 309 (1988) (Isr.). It's worth noting that the *Tubul* case, and all of its implications, has been widely discussed in Israeli legal literature. *See* Doron Menashe, *Judicial Discretion in Fact-Finding, Freedom of Proof, and Professionalism of the Courts*, 43 HAPRAKLIT: ISR. BAR L. REV. 83 (1993) (Isr.).

[165] *Id*. at ¶ 3.

which may not reflect the "reality" on the ground. Under these circumstances, the imposition of "formalistic" evidentiary barriers, so-to-speak, has the power to balance the equation and to tip the scales, to some extent, toward standardization in fact-finding–thus contributing to the security of the legal process and serving as a constitutional guarantor against human error and arbitrariness.

This proposal, which seeks to impose the attachment of an expert opinion as a condition for admitting photographs, constitutes that same "'formalistic' evidentiary barrier" contemplated by Justice Levine. This is the mechanism that would seek to secure the legal system against risk-allocation errors by preventing reliance on bad evidence (as far as pre-emptive strategy is concerned) by requiring review by a professional to safeguard the integrity of the proceeding.

But this is not all. Our proposed requirement for the attachment of an expert opinion would also require it to meet the terms of Israel's *Mezgora* precedent,[166] which essentially adopted the ruling of the American judiciary in the *Daubert* case.[167] The rules established in *Daubert* can be divided into two categories: material and practical.

Firstly, in terms of the material aspects, it was established that scientific evidence should be admissible, but must meet several conditions, as determined by asking the following questions: Is the scientific theory accepted among the relevant scientific community, and to what extent? What is the known rate of error of the relevant examination and/or opinion? Was the application of the theory in the specific case properly and reliably executed? It should be noted that it is no longer considered necessary to establish a *consensus* of the scientific community, as was previously the case. Finally, *Daubert* emphasized that the validity of a scientific theory is itself always contingent on its falsifiability; i.e., its ability to be refuted using empirical evidence that can be reviewed by experts (this being the litmus test of any scientific theory).[168]

However, these are not the only consequences of *Daubert*, which finds greater expression in its practical aspects. It is important to emphasize the terminology, and the circumstances under which the U.S. Supreme Court handed down this ruling. The U.S. legal system is a jury system, in which the jurors–12 citizens with no legal background–assume the role of legal fact-finders. The *Daubert* tests were issued at a time when concerns were starting to grow– particularly among conservatives–regarding the ability of the jurors to carry out their duties as fact-finders in cases that involved complex scientific evidence. In other words, an examination of the social context of the *Daubert* ruling shows that the true question being considered by the U.S. Supreme Court was not, "what is reliable scientific evidence," but rather, "what scientific evidence will not confuse

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[166] CrimA 1620/10 Mezgora v. State of Israel (Dec. 3, 2013), Nevo Legal Database (by subscription, in Hebrew) (Isr.). The *Mezgora* ruling came after a series of other Israeli rulings that had already partially incorporated the American precedent; among others, CrimC 76/93 (BS), State of Israel v. Suleiman El-Abid (n.d.) (Isr.); CrimC 73/95 (BS), State of Israel v. Cohen (2004) (Isr.); CrimA 9742/02 (BS), Abu Hamad v. State of Israel (n.d.) (Isr.) [hereinafter the *Abu Hamad* Case]; SCrimC 1154/05 (TA), State of Israel v Schwartz (n.d.) (Isr.).

[167] Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 593–95 (1993). The Israeli court is not the only one to have adopted the *Daubert* ruling. See the ruling of the Canadian Supreme Court in R. v. J.-L.J., [2000] 2 S.C.R. 600, 615–16 (Can.); R. v. Mohan, [1994] 2 S.C.R. 9, 20–23 (Can.).

[168] *Daubert*, 509 U.S. at 594–95. The Israeli court has upheld the principles of *Daubert* on many occasions, with the same questions posed above being asked in the Abu Hamad case as well. *See* Abu Hamad Case, *supra*, note 166.

the jurors, who are already predisposed to show sympathy in proceedings involving mass-torts." The *Daubert* ruling determined that the judge is to act as a "gatekeeper" to prevent unreliable or irrelevant scientific evidence from being presented before the jury. Thus, the question investigated by *Daubert* is not the reliability of the scientific evidence itself, but the reliability of the evidence in the context of concerns over the ability of the jurors to properly valuate the evidence.[169]

As such, this same significance that applied to the *Daubert* ruling is equally relevant to our case, with respect to the submission of an expert opinion in the field of technology. As illustrated above, we argue with all due caution–as far as technological matters are concerned and particularly, as far as the ability to forge digital evidence is concerned, a professional judge is no different from a jury.

Therefore, pursuant to the foregoing, our proposal can be understood as requiring the submission of an expert opinion as a prerequisite for submitting digital evidence. Such opinion must meet the tests set forth in *Daubert*, including with respect to its methods being generally accepted by the relevant scientific community (in our case the computer engineering and software communities), and being falsifiable through the submission of a counter-opinion.

We wish to emphasize that not only is this proposed solution appropriate on the material level, it is also the appropriate solution on the procedural level, since by involving technological experts for the purposes of proving technological matters, we negate the concern that the lawyer of any party to the proceeding might avoid investigating the issue of authenticity of the evidence. Accordingly, we negate the risk of the power dynamics between the parties being exacerbated, as we noted above, by the adversarial system that prevails in Israel. Moreover, and if this were not enough, we should reiterate that we are, effectively, adding an additional link to the evidentiary chain, a link that may eliminate the doubt as to the reliability of the evidence–and thus, the guilt assigned to the defendant on account of such evidence.[170]

We should note that we anticipate a further, tangential advantage to this approach: that the adoption of our proposal might lead to a "chilling effect" on litigants with respect to attaching photos, since the requirement to attach an expert opinion would now render this a more costly option for litigants. We believe this will have a positive outcome. Now litigants who are hesitant as to the veracity of their photo evidence, or who don't believe the images will assist in their claim, may choose not to make use of them on account of the built-in cost associated with the required expert opinion–a cost unlikely, under those circumstances, to be recovered. Thus, we find ourselves in a situation in which the costs associated with this requirement provide an incentive for the parties to economically streamline their claims,[171] perhaps even to the point that the parties will only attach images whose authenticity and utility are beyond doubt.

[169] Or, as Menashe has coined it: the relationship between the probative value of the evidence and its prejudicial effect (and, accordingly, potential for evidentiary damage). *See e.g.*, Menashe, *supra* note 122, at 126–28.

[170] As an aside, and for the sake of illustration, it is worth mentioning the matter of Roman Zadorov, in which the prosecution presented a shoe-print as being that of the defendant, without so much as attaching an expert opinion. Now, following an enormous public outcry nationwide, it would appear that the authorities' failure to attach an expert opinion regarding this shoe-print has deeply harmed the public trust in them, and the general sentiment of confidence in Roman Zadorov's guilt. On the connection between the lack of an expert opinion regarding the shoe-print and the Zadorov case, *see* Doron Menashe & Eyal Gruner, *Was There a Mistake?* (Nevo Pub'g, 2021).

[171] *See* Sanchirico, *supra*, note 90 (discussing the use of evidence law for economic purposes).