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KING COUNTY, WASHINGTON

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SUPERIOR COURT OF WASHINGTON FOR KING COUNTY

STATE OF WASHINGTON,

Plaintiff,

vs.

JOSHUA PULOKA,
Aka JOSHUA EVERYBODYTALKSABOUT,

Defendant.

No. 21-1-04851-2 KNT

FINDINGS OF FACT AND
CONCLUSIONS OF LAW RE: FRYE
HEARING ON ADMISSIBILITY OF
VIDEOS ENHANCED BY
ARTIFICIAL INTELLIGENCE

On Wednesday, February 21 and Thursday, February 22, the Court heard testimony from defense witness Brian Racherbaeumer and State's witness Grant Fredericks regarding proposed defense video exhibits enhanced by artificial intelligence. On Monday, February 26, the Court heard oral argument from both parties. In addition to the witness testimony and oral arguments, the Court reviewed each party's filed briefing and the relevant pre-trial exhibits, and gave an oral ruling on Thursday, February 29, which is incorporated by reference. The Court makes the following findings of fact and conclusions of law:

FINDINGS OF FACT & CONCLUSIONS OF LAW
ON STATE'S MOTION TO SUPPRESS PURSUANT
TO FRYE

I. FINDINGS OF FACT:

1. The use of artificial intelligence (AI) tools to enhance video introduced in a criminal trial is a novel technique.
2. Defense expert witness Brian Racherbaeumer utilized at least one AI enhancement tool to enhance a total of 7 (seven) videos, admitted on a flash drive as pre-trial Exhibit 5 (five).
3. At trial, the defense intends to admit – at a minimum – an AI-enhanced version of a video recorded by a civilian witness on an iPhone. The original recording was streamed to Snapchat. The AI enhanced copy of the video recording was admitted pre-trial as Exhibit 2 (two).
4. A version of this iPhone video extracted directly from the civilian witness’s iPhone was admitted on a flash drive as pre-trial Exhibit 1 (one). This video – hereinafter referred to as the ‘source video’ – is about 10 (ten) seconds in duration.
5. Defense witness Racherbaeumer was a self-identified videographer and filmmaker who started working with video in 1993. He was very candid and open about the fact that he is not – and has not claimed to be – a forensic video technician and has not been forensically trained.
6. Racherbaeumer testified that the source video (Exhibit 1) was of low resolution, and contained substantial ‘motion blur’
7. In contrast to Exhibit 1, the defense witness presented Exhibit 2 as an enhanced version of Exhibit 1 which he said added clarity through use of an AI video-editing tool in the program ‘Topaz Labs AI’, and was further processed on Adobe Premier Pro.
8. Racherbaeumer testified that the Topaz Labs AI program uses ‘technology to intelligently scale up the video’ to increase resolution. He stated that the tool adds sharpness, definition, and smoother edges to objects in the video, whereas the source video contained fuzzier images with ‘blocky’ edge patterns.
9. Racherbaeumer was candid, and was unable to say whether the Topaz Labs AI tool he used, which has been commercially available for about 3 (three) years, is currently utilized by the forensic video analysis community. He described peer usage as ‘corporate.’ He was unaware of any testing, publications, or discussion groups within his peer group that was involved in evaluating the reliability of AI tools for video enhancement purposes.
10. Racherbaeumer described that the Topaz Labs AI tool uses ‘machine learning,’ employing specific processing models based on a vast library of videos, but he did not know what videos the AI-enhancement models are ‘trained’ on, did not know whether

1 such models employ 'generative AI' in their algorithms, and agreed that such algorithms
2 are opaque and proprietary.

3 11. The defense argued that the AI tool is not based on new science and urged the Court to
4 accept the 'video production community', which embraces both filmography and
videography, as the relevant community for purposes of Frye.

5 12. In its oral argument, the Defense candidly admitted to the court that its other retained
6 expert, Matt Nodel, could utilize the source video (Exhibit 1) as the basis for his expert
testimony.

7 13. The State's expert witness, Grant Fredericks, is a Certified Forensic Video Analyst, with
national and international forensic video analysis credentials.

8 14. According to Fredericks' testimony, which the Court finds credible, about half of his 300
9 appearances testifying in Court over the last ten years have been for the State or Plaintiff,
and about half for the Defense.

10 15. Fredericks' focus in performing forensic video analysis is on 'image integrity', and not
11 on creating a smoother, more attractive product for a user.

12 16. According to Fredericks, the AI tool(s) utilized by Racherbaeumer added approximately
13 sixteen times the number of pixels, compared to the number of pixels in the original
14 images to enhance each video frame, utilizing an algorithm and enhancement method
unknown to and unreviewed by any forensic video expert. Furthermore, he demonstrated
15 that the AI method created false image detail and that process is not acceptable to the
forensic video community because it has the effect of changing the meaning of portions
of the video.

16 17. As Fredericks explained, the AI tool(s) modified the source video by eliminating much of
17 the motion blur and smoothing edges such that objects in the enhanced video on Exhibit 2
did not maintain their original shape and color from the source video on Exhibit 1.

18 18. Mr. Fredericks explained and demonstrated that the AI process removed information that
19 was in the original images and it added information that was not in the original images.
The proffered AI-enhanced video removed artifacts on individual images, altered shapes,
20 and removed the opportunity to forensically analyze which frames in the video utilized
reference, predictive, and bi-directional images. In short, the AI-enhancement tools made
proper, accepted forensic analysis of the video impossible.

21 19. Fredericks defined the relevant community as the forensic video analysis community, one
22 that spans across North America, Europe, and other parts of the world.

23 20. In contrast to approved image enlargement techniques like 'nearest neighbor', 'bi-cubic',
24 and 'bi-linear' – which have been utilized by the forensic video analysis community for
decades, and which create video products that are reproducible across approved video

1 processing programs such as Adobe Premier Pro, Adobe Photoshop, Amped5 and Axon
2 Investigate – the Topaz Labs AI model uses an opaque process called ‘machine learning’
to enlarge and enhance video.

- 3 21. Fredericks referenced the Scientific Working Group on Digital Evidence (SWGDE),
4 whose members represent state, local and federal law enforcement agencies engaged in
5 forensic video examinations, as a peer group that regularly publishes Best Practices and
6 Guidelines for video enhancement for legal purposes. One specific SWGDE publication
7 “*Fundamentals of Resizing Imagery and Considerations for Legal Proceedings*”, was
admitted as Pre-trial Exhibit 6. Fredericks testified consistent with the SWGDE document
that up-scaling an image (resizing) is referred to as ‘interpolation’ and that the most
accurate interpolation method that preserves image detail when observing small objects is
called Nearest Neighbor. Section 6 of the SWDGE document establishes that:

8 Utilizing Nearest Neighbor interpolation to enlarge imagery that
9 contains small objects within (e.g., weapon in hands) may help
mitigate the distortion of the object’s shape, length, or size
10 represented by a few pixels. The Nearest Neighbor algorithm can
reduce the potential of providing a misleading representation of the
11 level of pixel detail in the original imagery.

12 See Pre-trial Exhibit 6 at 8.

- 13 22. Although the ‘machine learning’ AI-enhancement algorithm(s) utilized by Topaz Video
14 AI tools may have been market-tested by members of the video production community,
they do not have a formal organization and they do not publish their testing outcomes. As
15 a result, their findings, if they exist, cannot be evaluated by the defense expert, the
forensic video analysis community, or by this court.
- 16 23. Rather than approving the use of such AI-enhancement tools, the forensic video analysis
17 community has issued only warnings about the use of such tools in a courtroom; for
example, SWGDE has found that, for ‘machine- learning’ interpolation algorithms, “it
18 can be challenging to identify what process were applied to the imagery and replicate
those steps with accuracy.” See Pre-trial Exhibit 6 at 7.

19
20 II. CONCLUSIONS OF LAW

- 21 1. Given the Court’s finding that use of artificial intelligence (AI) tools to enhance video
22 introduced in a criminal trial is a novel technique, the proponent of evidence utilizing
these AI tools must make a showing that any expert’s opinion or theory is based on a
23 methodology accepted in the relevant community. State v. Russell, 125 Wn.2d 24, 41
(1994).

- 1 2. The standard for admitting evidence utilizing a novel scientific theory or principle is
2 whether it has achieved general acceptance in the relevant scientific community. Frye v.
United States, 293 F.1013, 1014 (D.C. Cir. 1923).
- 3 3. To determine whether a consensus of scientific opinion has been achieved, the court
4 examines testimony that asserts general acceptance, articles and publications, widespread
5 use in the community, secondary legal sources, and/or legal authority from other
6 jurisdictions. Lake Chelan Shores Homeowners Ass'n v. St. Paul Fire and Marine Ins. Co.,
7 176 Wn. App 168, 176, 313 P.3d 408, 412 (2013)
- 8 4. Testimony from an expert is admissible only if such evidence will assist the trier of fact,
9 and is reliable. ER 702.
- 10 5. Even if relevant, evidence is not admissible if its probative value is substantially
11 outweighed by the danger of unfair prejudice. ER 403.
- 12 6. "Frye excludes testimony based on novel scientific methodology until a scientific
13 consensus decides the methodology is reliable, [whereas] ER 702 excludes testimony
14 where the expert fails to adhere to that reliable methodology." In re Detention of
15 McGary, 175 Wn.App. 328, 339 (2013).
- 16 7. The court does not determine if the scientific theory underlying the proposed testimony is
17 correct; rather, the court "must look to see whether the theory has achieved general
18 acceptance in the appropriate scientific community." State v. Riker, 123 Wn.2d 351, 369-
19 370 (1994).
- 20 8. For example, where a psychologist's opinion was based on the 'MATS-1' test he himself
21 had created, the test had not been sufficiently utilized by other forensic experts in the
22 community, and no published state or federal appellate court decisions referred to the
23 'MATS-1' test, a trial court did not err in finding that "the test was not reasonably relied
24 upon by experts generally [in the relevant community] and thus not sufficiently reliable
to support [this expert's] opinion." McGary, 175 Wn.App. at 341.
9. The scientific community relevant to this Court's determination of the admissibility of
videos enhanced by AI tools is the forensic video analysis community.
10. The Topaz Video AI enhancement tool(s), which utilize 'machine learning' algorithms,
have not been peer-reviewed by the forensic video analysis community, are – at the
present time – not reproducible by that community, and are not accepted generally in that
community.
11. The defense has not offered any state or federal appellate court decisions, from any
jurisdiction, which have examined – let alone approved of – the introduction of AI-
enhanced videos in a criminal or civil trial.

- 1 12. The defense has not offered any articles, publications, or secondary legal sources
2 approving the introduction of AI-enhanced video evidence in a criminal or civil trial.
- 3 13. The video evidence produced by the Topaz Video AI enhancement model does not
4 satisfy ER 401, as the resulting video does not show with integrity what actually
5 happened but uses opaque methods to represent what the AI model 'thinks' should be
6 shown.
- 7 14. Moreover, this Court finds that admission of this AI-enhanced evidence would lead to a
8 confusion of the issues and a muddling of eyewitness testimony, and could lead to a time-
9 consuming trial within a trial about the non-peer-reviewable-process used by the AI
10 model, such that any relevance is substantially outweighed by the danger of unfair
11 prejudice under ER 403.
- 12 15. The danger of unfair prejudice is particularly concerning in this case, as the jury will
13 likely be focused on the size and location of individuals and objects during the events
14 depicted by the AI-enhanced video.
- 15 16. The best evidence for the jury is the source video recorded and preserved in Exhibit 1.
- 16 17. Any testimony which would be offered using the AI-enhanced video is not crucial to the
17 charges, as the State intends to call multiple eyewitnesses and will offer the source video
18 (Exhibit 1) at trial. Both sides can use the source video for argument, and the jury will be
19 able to utilize the source video for its determination.
- 20 18. The Defense's proffered pre-trial Exhibit 2 is refused, and all AI-enhanced videos on pre-
21 trial Exhibit 5 are refused.

22 Signed in OPEN COURT this 29th day of March, 2024.

23 
24 The Hon. Judge Leroy McCullough

Presented by:

21 /s/ Thomas O'Ban
22 Thomas C. O'Ban, WSBA #50179
23 Brandy Gevers, WSBA #45234
24 Senior Deputy Prosecuting Attorneys

FINDINGS OF FACT & CONCLUSIONS OF LAW
ON STATE'S MOTION TO SUPPRESS PURSUANT
TO FRYE

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2 Approved as to Form:

3 *no motion received 3/28/29 2:40 pm*

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FINDINGS OF FACT & CONCLUSIONS OF LAW
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Judge's AI-Video Rejection Evokes Broader Tech, Evidence Issues

By Kyle Jahner

- AI-enhanced video excluded as untested in criminal case
- Unease with 'black box' echoes earlier tech used in court

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Judge's AI-Video Rejection Evokes Broader Tech, Evidence Issues

By Kyle Jahner 2024-04-09T11:01:03000-04:00

AI-enhanced video excluded as untested in criminal case

Unease with 'black box' echoes earlier tech used in court

A Washington state judge's exclusion of AI-enhanced video evidence puts a novel twist on controversial issues regarding what technologies to put in front of juries.

The video—offered by a man accused of shooting five people, killing three, outside a Seattle bar—relied on an artificial intelligence model that hadn't been validated and could lead to confusion, King County Superior Court Judge Leroy McCullough ruled March 29. The model altered pixels with opaque methods and hadn't been peer reviewed, which could have led to "a time-consuming trial within a trial" over its reliability, McCullough said.

The ruling comes as AI's capabilities and applications continue to proliferate and raises questions about how to draw boundaries regarding the role AI-generated evidence can play in courts. And while AI technology is new, concerns about the ability to inspect, vet, and challenge it mirror ones legal professionals say persist for other technologies, often without satisfactory answers.

"That kind of black-box process can't be explained in court," criminal law professor Andrew Guthrie Ferguson of American University said of large-language models. "That should be troubling for courts and judges."

While in the Washington case, it was defendant Joshua Puloka seeking to introduce the evidence to support his claim of self-defense, it's more often prosecutors pushing courts—often successfully—to admit evidence generated or enhanced by technology, criminal law professor Rebecca Wexler of University of California at Berkeley said. Attention to AI "is sorely needed," she said, but courts also fail to vet other technologies, and vendors often rely on contract law and trade secrets to evade transparency and scrutiny.

"It's an opportunity to fix general problems that apply to AI technology and also have applied to forensic software for a long time," said Wexler, who has testified before Congress on AI-based evidence. "There's nothing about AI specifically that we should blanketly exclude it. But we should hold AI-makers to high standards to make sure the tools are fair and accountable."

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technique can be and has been tested, is subject to peer review, has a known or potential error rate, and has acceptance in the scientific community.

But courts have no definition for what counts as "peer review," Wexler said, and that imprecision leaves judges a lot of discretion that often weighs in favor of prosecutors admitting evidence hinging on technology.

Aside from being open to interpretation, Ferguson said, the rules are often dated. He said he tells students, "most rules of evidence were written in an era they can't even comprehend," before the digital age, leading to "tension applying this old law to technology."

Judges often have been too willing to accept prosecutor assertions that a technique is reliably used in law enforcement and vendors' trade secret claims to deny defendant access, criminal law professor Brandon Garrett of Duke University said.

He noted that in December the Federal Rules of Evidence on expert testimony were amended for the first time since the 2000 codification of *Daubert*. To ensure judges were adequately exercising their gatekeeping function, language clarified a burden on the introducing party to demonstrate a likelihood of relevance and reliability. It also clarified that judges shouldn't leave it to a jury to assess methodology.

Ferguson pointed to forensic bite-mark evidence as an area where courts often admitted evidence that purported to be more definitive than science allowed. Complex DNA samples, containing a mix of multiple unknown parties' genetic materials, is another example.

In one capital murder case in Virginia a prosecutor's expert testified there was a 1-in-1.1 billion chance elements in the DNA mix didn't belong to defendant Leon Winston. But years later, criminology professor William C. Thompson of UC Irvine argued in a paper that the analytical methodology was flawed and the chance was closer to 1 in 2.

"Maybe we've learned our lesson that jumping into untested criminal science in criminal cases can lead to bad results," Ferguson said.

Wexler, the co-director of the Berkeley Center for Law and Technology, testified before the Senate Judiciary Committee in January, arguing lawmakers should require AI tools used in court to be available for auditing by independent researchers. She cited an email from crime-scene DNA analysis company Cybergenetics that said the company "does not provide research licenses." Congress also should bar using trade-secret privileges to block access to relevant criminal evidence, she said.

"Vendors of some forensic software systems that are consistently used in criminal prosecutions flat-out refuse to provide research licenses to independent experts seeking to conduct independent quality assurance and validation studies," Wexler told Bloomberg Law. "Private forensic systems we use to put people behind bars or even take their lives are using contract law to block peer review of their products."

'Black Box'

Despite Judge McCullough's caution, Wexler said, "judges are not going to be able to keep AI out of the evidence system for long"—which she says isn't inherently bad. As in other fields, AI comes with the vast potential to assist courts in administering justice. She said it's "going to be built into everything," including pattern and facial recognition.

"We want the best, most fair, most accurate technologies in the criminal system. We want both sides to have access to those technologies," Wexler said.

That means understanding how large-language models and other AI tools operate, what they can do, and what their limitations are, legal professionals said. Ferguson noted that the same prompt can lead a model like ChatGPT to produce different answers, and the popular chatbot operates without indicating the specific steps it took or what information factored into any specific output.

Garrett noted the "black box" problem leaving attorneys at a loss to challenge an expert witness. "How can the defense meaningfully cross-examine if the witness doesn't know how the software works?" he asked.

Wexler told the Senate committee at least six people have been wrongfully arrested or jailed from mistaken hits from AI facial recognition software, and that a "state-of-the-art" AI system for estimating a person's height and weight from a photo performed worse than regular people with no training. Meanwhile, 90% of police deployments initiated by Chicago's AI gunshot detection system turned up no corroborating evidence of gunfire, but led to use of force on at least 82 mostly Black and Latino men as well as three false imprisonments, she said, citing data compiled by the MacArthur Justice Center.

"AI's going to present new problems, the next generation of new problems of whether we can trust and test the evidence in a way that we feel is going to be reliable enough to give to jurors to be able to believe it and use it," Ferguson said.

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