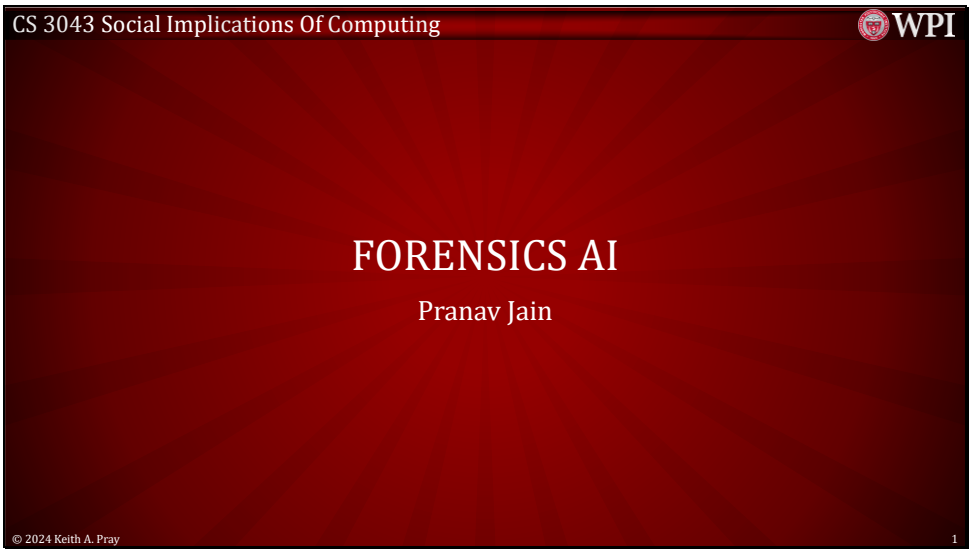
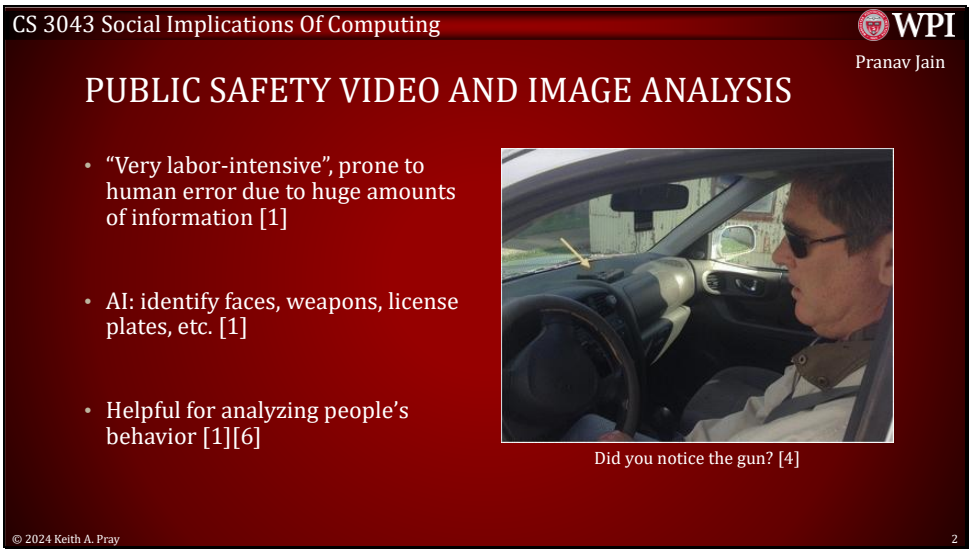
Slide 1



Should AI be used in Forensics?

Slide 2



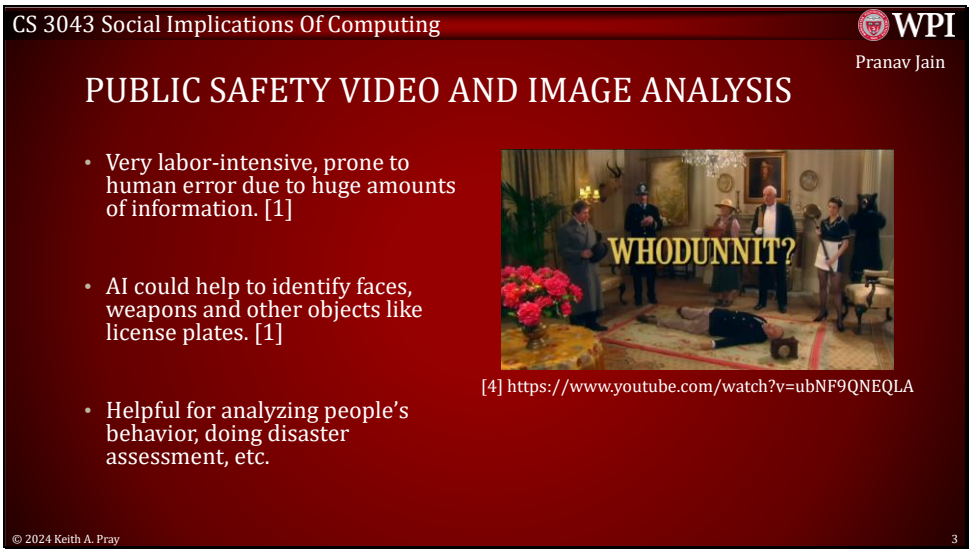
One of the first places where AI could be used is for analyzing images and video footage. This could be done manually; however, this would take a long time to go through the evidence and there is a possibility that humans might miss information. [1]

Do you notice anything weird/ out of place in this picture. Did you notice the gun on the dashboard? In this picture, even though the gun is kept in plain sight, most people focus more on the driver himself, making them miss the gun. In this study, done in 2017, 58% of the police trainees and 33% of the police officers failed to notice the gun. [4]

AI could be helpful in identifying faces, weapons and other objects like license plates. It could also be implemented with a criminal database search which could give crucial information about any criminals within the media. [1]

AI could be further trained to analyze the behavior of people, among other things. The behavior of people could be useful to determine if a crime might take place or detect crime and help identify suspects, especially in security cameras. [1][6]

Slide 3

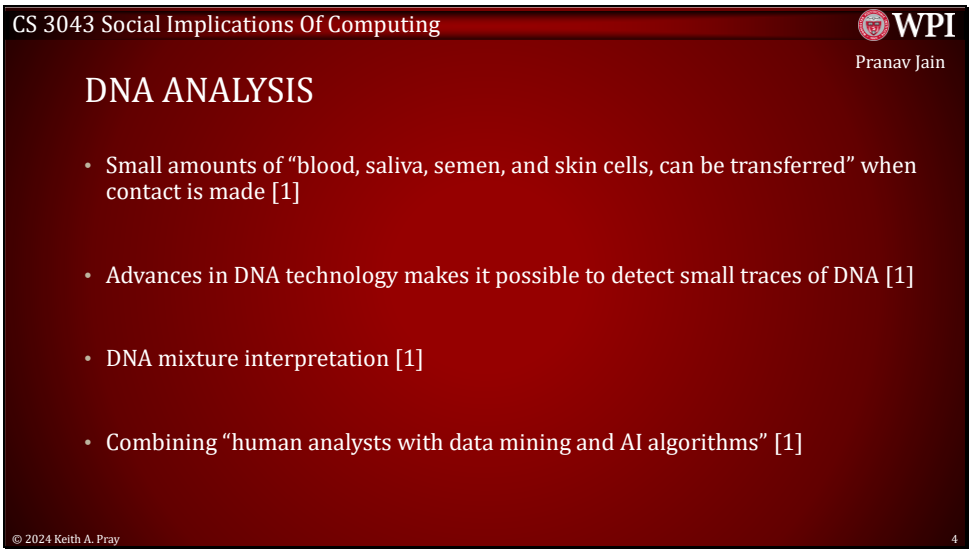


The first use of AI in crime is something that we all know about and is the first thing that we suggest. The use of AI to analyze images and video footage. This could be done manually; however, this would take a long time to go through the evidence and there is a possibility that humans might miss information. (This could be seen in the experiment.) [1]

AI could be helpful in identifying faces, weapons and other objects like license plates. It could also be implemented with a criminal database search which could give crucial information about any criminals within the media. [1]

This could be helpful for analyzing the behavior of people, do assessment of a disaster situation, etc. The behavior of people could be useful to determine if a crime might take place or detect crime and help identify suspects, especially in security cameras. [1][6]

Slide 4

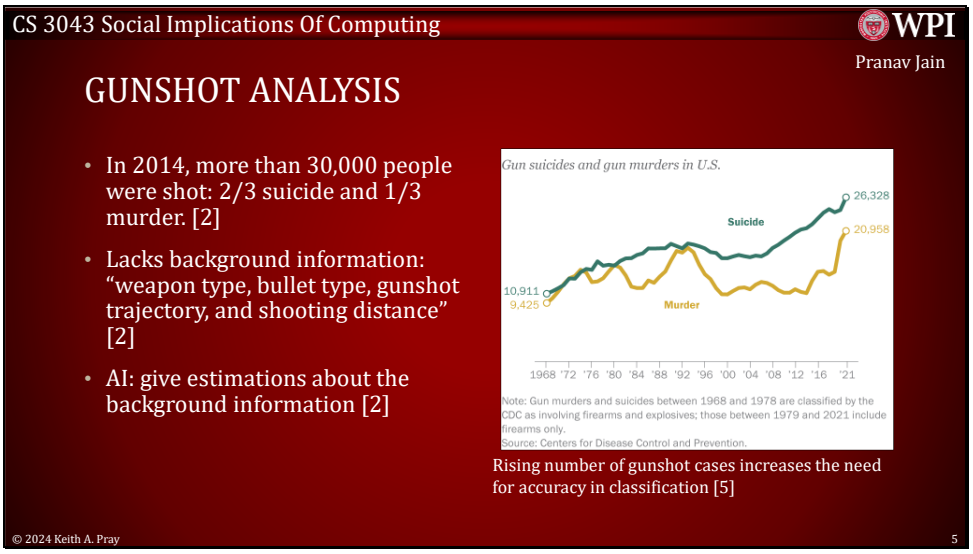


Another place where AI could be used is DNA analysis. When you touch another person or object, blood, saliva, semen and skin cells can be transferred. With the advances in DNA technology, it is possible to detect the small amount of DNA present on the sample, making it possible to find DNA from multiple people, even if they are small quantities. This causes the issue of DNA mixture interpretation where it becomes difficult to determine who were involved in the crime. [1]

The DNA analysis produces lots of complex data digitally. Hence, AI could be used to find patterns in the data, especially those which might not noticed by humans. [1]

This DNA analysis could be further improved by using a hybrid method by combining human analysts with data mining and AI algorithms. This would combine the strengths of all the approaches and hence, give a better output. [1]

Slide 5

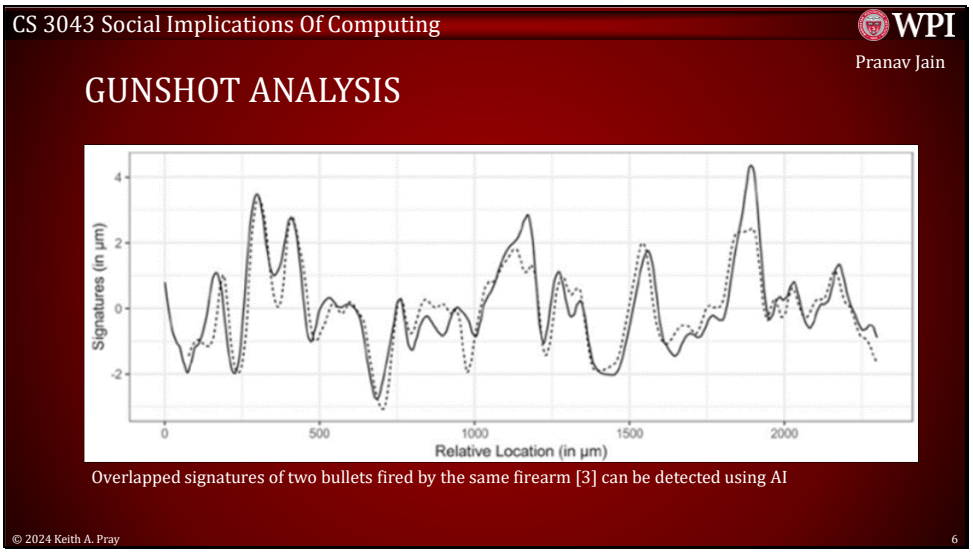


Another place where AI could be used is Gunshot analysis. In 2014, more than 30,000 people were with 2/3 being suicides and 1/3 being murder. These number are seeming increasing [5]. This requires the need for higher accuracy to classify the gunshots as suicide or murder. However, in many cases, there is a lack of background information, especially relating to the weapon used, the type of bullet, the trajectory of the gunshot and the shooting distance. These need to be inferred based on the wound on the victim's body. [2]

AI could give estimations about the various information by inferring these by using patterns from previous data. [2]

An experiment took place in 2016 where they shot a few pig carcasses, giving the pigs one of 3 types of wounds: distant wound, close-range wound and contact wound. A picture was taken, and AI was asked to determine the type of wound. It was able to predict with 98% accuracy. This could allow forensics to use AI as a tool to double check their predictions and help them make more informed decisions. [2]

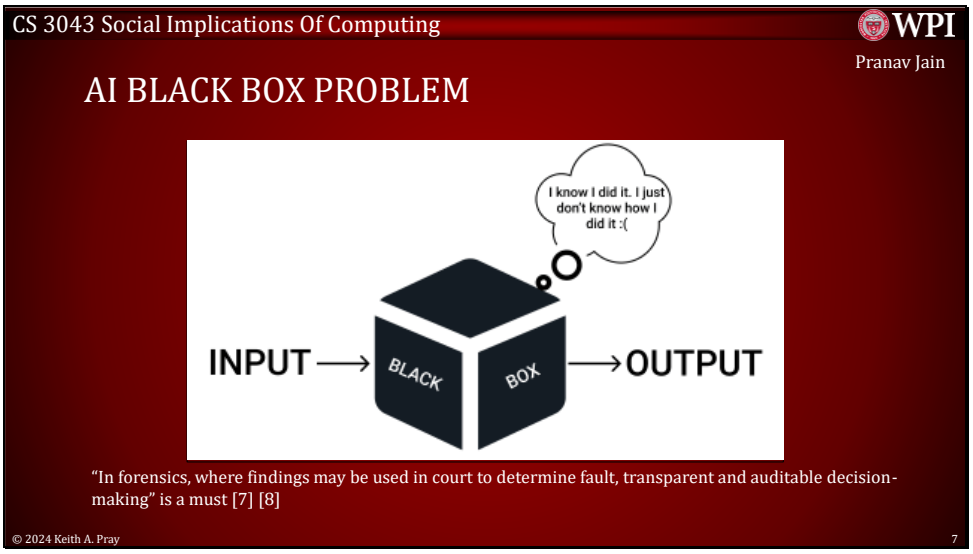
Slide 6



AI could also be used to determine whether the bullets were shot from the same gun. When a bullet shot from the gun, the bullet gets engraved at a microscopic level based on how it interacts with the gun. This is the signature of the bullet. When two bullets are shot using the same gun, they have very similar signatures as seen in the graph. [3]

AI could be trained to read these patterns. AI was implemented in the crime laboratories around the US to classify the performance of the bullets in a database. The results showed no false positives or negatives. [3]

Slide 7



However, with the use of AI, it causes the black box problem where the input and output can be seen; however, the process to reach the specific output isn't clear. "In forensics, where findings may be used in court to determine fault, transparent and auditable decision-making" is a must. [7]

Hence, a hybrid solution of humans and AI would give the best outcome in Forensic Analysis. [7]

Slide 8

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