



Artificial Intelligence Changing the World of Forensics Science

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Fundamentals of Computational Intelligence
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Abstract

There is increasing amount of artificial intelligence being used throughout the world of forensic science. With the use of artificial intelligence becoming progressively more common by aiding in the use of identifying faces, DNA, fingerprints, and overall identification and use in criminology. This is a recent discovery that is only benefitting in the world of forensic science, however, is greatly growing and changing the procedures used in forensic science. These recent developments in forensic science and artificial intelligence are one that are beneficial in increasing the productivity, usefulness, and resources. While the world of forensic science is being changed constantly due to the improvement of artificial intelligence there are various negative and positive growths to these developments.

1 Introduction

Forensics is a world that is greatly changing especially in the up-and-coming years. With various new ideas and techniques involving the use of Artificial Intelligence aiding in achieving a common goal. As the history develops so does various issues that is faced when using Artificial Intelligence. On the opposite spectrum this development has led to various new uses and applications that improve the efficiency of the forensic science industry. Specifically, the recent development of data analysis using algorithms and pattern recognition. However, the increasing popularity in using artificial intelligence can have an increasingly negative effect on the social ethics causing social consequences.

2 Development History

The development of artificial intelligence in the world of forensic science is one that is changing more frequently with examples of this shown through the techniques of data analysis. Originally the system was created by Sir Edward Richard Henry in the year 1897. However, with the help of artificial intelligence a more effective system for sorting and comparing large data sets. To which the artificial intelligence will use a pattern recognition to further analyse (Tilstone, Savage, & Clark, 2006). This artificial software intelligence was first created in 1980's and was known as the 'Automated Fingerprint Identification System' which greatly increased the success rate of locating fingerprint matches. The process in developing and improving this software is one that is still going. The latest software can examine fingerprints in a complex biometric transaction to which the artificial intelligence is able to link facial recognition to either fingerprints or iris scanning (Thales, 2021).

3 Current Uses and Applications

While using artificial intelligence in assisting the world of forensic science is still a new development, there are a multitude of different uses and applications however the most common techniques are ones that are widely used in forensic science.

3.1 Pattern Recognition

Pattern Recognition is the process of analysing large sets of data to locate and recognise a pattern in the data. The use of pattern recognition is used in forensic science to detect patterns in faces, emotions, and facial expressions (Gupta, Sharma, & Johri, 2020). The patterns are recognised using mathematical algorithms with the help of artificial

intelligence. As artificial intelligence can analyse the data in an efficient way with a known lower rate of false negatives and false positives (Richmond, 2020).

3.2 Data Analysis

Data Analysis is a similar process to pattern recognition however, instead of analysing data, the artificial intelligence helps in simplifying and managing data. This process is completed through data analysis software and its demand for artificial intelligence capable of completing this complex process is high in demand (P., 2019).

4 Improvements (Future Development)

While the development of artificial intelligence is already greatly improving there are still some areas to further develop. One example of this area is data analysis and the efficiency of the software to analyse the data to the point of which the origin of the data set can be located. This improvement in the future could allow for more accurate readings which in turn improves the world of forensic science. While also there is a development currently in process to try and locate accurate ways to find and transfer DNA in a more precise manner. By doing this it allows for the more efficient way to complete DNA profiling and probabilistic genotyping (Richmond, 2020).

5 Issues

Though the rate of development of artificial intelligence is going at a steady rate, there are still various issues that arise during this process. While the idea of using artificial intelligence to increase the efficiency is new.

5.1 Trial and Error

The artificial intelligence can learn through a process of trial and error. This process could cause issues which can overall affect how accurate the results are. If the accuracy of results is one that is being questioned it then can be justified against in court due to reliability. Leading to full access to the software to understand how it works. This becomes an issue when Artificial intelligence software understanding is not fully understandable by the developers. Due to the speed of the AI efficiency locating issues within the software become indecipherable causing more issues to arise.

5.2 Cross-Contamination

Another issue that can be caused is the cross-contamination as the transfer rate between items is dependable on the environment in which the sample is contained. While these issues are ones that seem big, they are issues that can be improved to be solved or even minimised to which it does not affect the efficiency of the artificial intelligence and the world of forensic science (Richmond, 2020).

6 Conclusion

To conclude, while there are still some uprising issues around using artificial intelligence to aid in the world of forensic science. There are major benefits as stated such as an increase in efficiency and quality of data sets and DNA. It is also an important development being made for this area as forensics is a major factor with its help in criminology, medical and legal issues. By finding ways to increase the speed in which these are analysed and produce results faster, which benefits the world of forensic science.

7 References

- Gupta, S., Sharma, V., & Johri, P. (2020). *ARTIFICIAL INTELLIGENCE IN FORENSIC SCIENCE*. Retrieved March 20, 2021, from <https://67.209.122.217/archives/V7/i5/IRJET-V7I51354.pdf>
- P., S. (2019). *AI in Forensic Science*. Retrieved March 24, 2021, from <https://www.news-medical.net/life-sciences/AI-in-Forensic-Science.aspx>
- Richmond, K. (2020). *AI could revolutionise DNA evidence – but right now we can't trust the machines*. Retrieved March 23, 2021, from <https://theconversation.com/ai-could-revolutionise-dna-evidence-but-right-now-we-cant-trust-the-machines-129927>
- Thales. (2021). *Automated Fingerprint Identification System (AFIS) overview - A short history*. Retrieved March 24, 2021, from

<https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/biometrics/afis-history>

Tilstone, W. J., Savage, K. A., & Clark, L. A. (2006). *Forensic Science: An encyclopedia of history, methods and techniques*. Retrieved March 20, 2021, from <https://books.google.com.au/books?hl=en&lr=&id=zIRQOssWbaoC&oi=fnd&pg=PA1&dq=Forensic+science+history&ots=wJZ2yXTMIY&sig=56RwmJePVoIew0MSXrvQ6Y0cSFg#v=onepage&q=Recent%20development&f=false>