A Review on Y-Chromosomal based DNA Profiling and Bayesian Networks for Crime Evidence Investigations in Forensic Labs

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Abstract

The field of Bioinformatics has extended the scope of its applications in various fields like genetic engineering, phylogenies, protein synthesis, gene expressions and many more. A Promising application of Bioinformatics is in the field of Forensic DNA analysis for crime evidence investigations. DNA Profiling or DNA Typing is used in Forensic Labs for investigating the evidences of crimes like homicide, murder, rape and in mass destruction people identifications based on the DNA samples collected from the crime or disaster scenes. DNA analysis employs extremely sensitive PCR-based techniques to analyze biological material. Criminals and victims can be linked to crime scenes, or one crime scene to another, using DNA evidences collected from very small components like the saliva on a cigarette butt, skin cells on a steering wheel, cheeks swabs or pet hairs on clothing[1]. The aim of this article is to focus on the steps followed to carry out DNA typing and to explain the Y-STR Profiles for DNA sample identification along with Bayesian networks for statistical analysis of evidences. Y-STR Profiles will focus on the Y-Chromosomal structure of DNA and Bayesian networks will provide a probability or likelihood of the evidence collected from victim and the suspect.

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Index Terms

Computer Science  Information Science

Keywords

DNA Profiling  Bayesian Networks  Y-STR Analysis  PCR