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

International Journal of Computer Applications
© 2014 by IJCA Journal

Volume 105 - Number 16

Year of Publication: 2014

Authors:
Swinky Arora

10.5120/18460-9712

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.

References

- MA Jobling, P Gill 2004 Encoded Evidence: DNA in Forensic Analysis Nature Reviews
A Review on Y-Chromosomal based DNA Profiling and Bayesian Networks for Crime Evidence Investigations in Forensic Labs

Genetics, nature. com.
- N Hu, B Cong, S Li, C Ma, L Fu, X Zhang 2014 Current Developments in Forensic Interpretation of mixed DNA samples- A Review Biomedical reports, ncbi. nlm. nih. gov.
- FR Santos, DR Carvalho-Silva, SDJ Pena 1999 PCR Based profiling of human Y Chromosomes, Springer.
- V Keerl 2010 Genotyping of a worldwide panel of rapidly mutating Y-STR, dare. uva. nl.
- Ben Gai I 2007 Bayesian Networks, Wiley and Sons.

Index Terms

Computer Science Information Science

Keywords
DNA Profiling Bayesian Networks Y-STR Analysis PCR