FAMILIAL DNA DATABASE SEARCH SYSTEM

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The Denver Police Crime Laboratory has developed a web-based familial searching database system that considers genotypes over all CODIS markers with statistical ranking based on likelihood ratios. This technology can be easily accessed by appropriate authorities, through a web-based cloud system that will be available to users through a secure gateway over the Internet (or intranet) to detect familial relationships based on DNA profiles. Strong encryption technologies from Security First are used to secure upward and downward genetic data flow to allow rapid familial searches between forensic samples, offender databases, DNA databases of individuals or unknown samples, and other datasets based on the CODIS core STR loci, used routinely for human identification. Intelligence can be derived from unknown forensic DNA samples recovered from crime scenes by comparing those samples to existing databases and determine relatedness and possibly identification of unknown subjects. This web-based system allows millions of comparisons between DNA profiles in seconds with a user friendly graphical data output and interpretation interface. Each user can upload desired allele frequencies and determine custom likelihood ratio thresholds. Familial search results are presented using parallel coordinates and a histogram approach to determine the most valuable investigative leads to pursue. During this presentation we will provide a demonstration of the system and outline the advanced mathematics allowing these rapid searches. We will also discuss the IT architecture that allows a stand alone or extended network implementation of the system.