An Effective Security Management of Database through DNA Fingerprinting Recognition using Geometric Parameters

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ABSTRACT

History bears testimony to the fact that the march of any civilization has been on the shoulders of science and technology. Almost everything that distinguishes the modern world from earlier centuries is attributable to science specially information technology. With the rapid growth in computing technology and its application in all spheres of modern society, databases have become an integral component of our everyday life. Database management system manages all the information to our use. The database needs to ensure its security and make it personalized and secure. To make it personalized up to family or royalty, DNA fingerprinting is only the aspect that serve best. In this present article, the researcher has endeavored to make all possible attempts to clarify the DNA database as the tool for Database Security that maintain the hierarchy of family inheritance. In this work, we are going to recognize the DNA sample present in the database with a feature based approach. The approach here is mainly by using the histogram plot by this we are going to extract the characteristics of the image features. By comparing these image features with images present in the database, we can decide whether the test image is from among DNA sample already known or not. If the test image is find in the database then system is displaying the identity of the user as well as works as the password to access the particular database on the basis of biological inheritance.

Keywords

Database security, Genealogy, Genetic code, DNA database, Duchdean distance

1. INTRODUCTION

As the ICT grow and now becomes as the breath of us the security of the database get focus of the researchers. Today, to maintain and manage the database is not as important as its security. Whenever this has a need of family inheritance. DNA is getting in focus. DNA (Deoxyribonucleic acid, or DNA is a nucleic acid molecule) and RNA (Ribonucleic acid is a nucleic acid polymer), the nucleic acids that contain genetic information - are composed of nucleotides, specialized molecules that - in certain orders, code for the production of proteins. Certain sequences of three nucleotides. Also known as tri-nucleotide sequences are called codons. Each codon contains the genetic code for a single amino acid. The genetic code is a set of instructions for transferring genetic data stored in the form of DNA or RNA into proteins. Proteins are integral to almost all of the biological processes that occur in living things. They are made up of amino acid sequences and amino acids are produced based on the sequence of the genetic code. So, this is a biological method of information storage.

DNA database is simply an organized collection of database that stored the DNA fingerprinting with other information. DNA fingerprinting is a way of identifying a specific individual, rather than simply identifying a species of some particular trait. It is also known as genetic fingerprinting of DNA profiling. As a technology, it has been around since at least 1985, when it was announced by its inventor. Sir Alec Jeffreys. DNA fingerprinting is currently used both for identifying paternity or matemity and for identifying criminals of victims. There is discussion of using DNA fingerprinting as a sort of personal identifier as well, although the viability of this is debatable. The vast majority of a human's DNA will match exactly that of any other human making distinguishing between two people rather different. DNA fingerprinting uses a specific type of DNA sequence, known as a microsatellite, to make identification much easier. Microsatellites are short pieces of DNA which repeat many times in a given persons DNA. In a given area, microsatellites tend to be highly variable, making them ideal for DNA fingerprinting. By comparing a number of microsatellites in a given area, one can identify a person relatively easily. DNA fingerprinting has a high success rate and a very low false positive rate, making it an extremely popular from of paternity and maternity verification.

DNA typing, as it is sometimes known, debuted in the 1980s, and by the late 1900s, it was in widespread use. A number of misconceptions also arose about the process fans of crime shows, for example, may be under the impression that DNA profiling can be done in minutes, and that samples of DNA are always easy to work with. In fact, some samples can be very difficult to work with and the process of DNA profiling can take weeks or months, especially at a busy lab. The process is also not totally infallible, as samples can be damaged or contaminated resulting in false negatives or positives. Genecology is the study of a family's lineage. People might use genealogy to trace out their family trees, or simply to find a specific person in a family's past and connect him or her to other members of that family. Genealogy is interested solely in who is in a family and who they are related to, as opposed to the more general study of family history, which might also track dates of birth and death, occupations held by family members, and other members, and other important facts about their lives and deaths. While some people, on occasion refer to this larger field as genealogy, genealogy is better viewed as a subset of a greater discipline.

Historically, genealogy was a very important field, because family connections between nobility were crucial to the idea of inheritance and the passing down of titles and ruler ship. In many societies, for example, if a king had no direct heir, the next closest heir would have to be found. Detailed genealogical records ensured that the passing down of titles would never have to rely on incomplete facts. Despite this,

many differing genealogies' would often crop up, allowing multiple people to lay claim to a title of ruler hip or inheritance. A feature based approach for DNA sample reorganization requires the detection and measurement of salient structure points using geometrical distance and angles to classify DNA sample using an economic representation of the DNA fingerprinting where the elements are based on the there relative position and size. Template matching involves the use of pixel intensity information as original grey level which is processed to highlight specific aspects of data. Cross correction of test template with all training template is used to identify the best match. The size and shape parameter in such templates can be translated, rotated and deformed to fit the best representation of the shape present in the template and these variations give a feature description allowing both detection and representation.

2. HISTOGRAM PROCESSING

Histograms are obtained and plotted for the purposes of image enhancement. The histogram of a digital image with intensity levels in the range [0.1] is a discrete function specified as

$$h(rx) = nx$$

Where rx is the kth intensity value and nx is the number of pixels in the image of intensity rx.

Histograms are frequently normalized by the total number of pixels in the image Normalized image are approximations to the probability of occurrence of each intensity level in the image. It is complex mathematics that would take more steps that is base for algorithm of the method.

3. GEOMETRICAL PARAMETERS

The following parameters are considered

1. Area
2. Centroid
3. Major axis length
4. Minor axis length
5. Eccentricity
6. Orientation
7. Filled image
8. Convex image
9. Convex area
10. Convex hull
11. Euler number
12. Extrema
13. Equivalent diameter
14. Solidity
15. Extent

4. IMPLEMENTATION

The DNA fingerprint image recognition scheme is implemented using MATLAB 7.8o (R2009b) the main function provides the GUI windows which enable the user choose the operation to be carried out. The given flowchart of the various operations performed on the test DNA fingerprint image. Original BMP images of 272x204 pixel size are taken and converted into JPEG images. The parameters as area. Centroid-x, Centroid-y, eccentricity, orientation, major axis, minor axis and solidity are used. It is found that recognition accuracy is not suffered due to omission of remaining parameters. It will processed with the following steps-

STEP-I: Selection of input DNA fingerprint image.

STEP-II : Scan the input image

STEP-III : Features extraction from test image.

STEP-IV : Compute the geometrical properties.

STEP-V : determine the difference between the test image features with data base image feature.

STEP-VI : Identify the image.

5. CONCLUSION

In this paper, a new approach for DNA fingerprinting reorganization from geometric attributes is proposed. It is capable of extracting the DNA fingerprint features such as area. Centroid, eccentricity, orientation major axis minor axis and solidity. From these attributes, a set of feature vector is created. These geometrical features are used in our algorithm. But this is flexible to that someone incorporates more features also. The similarity measure used in this work may Euclidean distance, geodesic distance, cosine measure.

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