Database of Biomedical Signals from Patients with Epilepsy

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***Abstract*—**

***Index Terms*—database, eeg, relational database**

I. Introduction

The functioning of the human body is frequently associated with electrical, chemical or acoustic signals, and they are carriers of information that describe brain, cardiac and muscular activity. Each type of signals can be interpreted differently, since they have characteristics and patterns that allow clinic diagnosis. Biomedical signals have played an important role in continuous research on the human body [1]. As an example, an electroencephalogram (EEG) is a test that allows studying the electrical activity of the brain and allows the diagnosis of diseases such as epilepsy.

Epilepsy is one of the oldest known diseases, surrounded by ignorance, fears and social esteem and influences the quality of life of the patient and their relatives. Around the world, some 50 million people have epilepsy, making it, not only one of the most common neurological disorders, but also a common condition such as diabetes or high blood pressure [2].

Databases are a set of information belonging to the same context, ordered in a systematic way for later retrieval and analysis [3]. These arise from the need to be able to store information and go to it later. Biomedical signal databases are a useful key when it comes to research, since they allow the testing and validation of algorithms performed for signal processing and obtaining relevant characteristics from them [4].

The goal of this work is the development of a relational database of biomedical signals from patients with epilepsy from the Centro de Epilepsia y Neurocirugía Funcional, HUMANA, as well as its interaction with the Matlab for the development of a software tool or toolbox in collaboration with María Angulo. The toolbox includes several interfaces for interacting with the database, and for processing signals and applying machine learning algorithms to those signals. It is possible to add new patients to the database, retrieve information from the patients, add analysis results, visualize those results, and more.

II. Background

A. Electroencephalogram

B. Relational Databases

A relational database is a type of database that stores and provides access to data points that are related to one another. Relational databases are based on the relational model, an intuitive and straightforward way of representing data in tables [5]. The standard user and application program interface (API) of a relational database is the Structured Query Language (SQL). SQL statements are used both for interactive queries for information from relational database and for gathering data for reports [6].

The relational model is best for maintaining data consistency across applications and database copies. Relational databases excel at this type of data consistency, ensuring that multiple instances of a database have the same data all the time [5]. Defined data integrity rules must be followed to ensure the relational database is accurate and accessible [6].

C. Some Biomedical Signals Databases

III. Database Implementation

IV. Toolbox Implementation

V. Results

VI. Conclusions and utilities

References

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