

# TECHNICAL COMPUTING USING SYBASE DATABASE FOR BIOMEDICAL SIGNAL ANALYSIS

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Design a storage for a large amount of biomedical data in a structured way is a hard task. Especially if there is a requirement for realtime access to all of the stored data. For this purpose we decided to use Sybase Adaptive Server Enterprise as a main database engine and MathWorks MATLAB for mathematical data manipulation. Our database consists of approximately 40000 patient EEG anamneses. Each of them is around 120000 records in size.

*Sybase Adaptive Server Enterprise* is Sybase Corporation's relational model database. Adaptive Server Enterprise is mainly used on the Unix platform. It is also available for Windows.

*MATLAB* is a numerical computing environment and programming language developed by The MathWorks. MATLAB supports matrix manipulation, plotting of functions and data, creation of graphical user interfaces and communication with programs in other languages. It allows both numeric and symbolic computations. Simulink package adds graphical simulation and modelling capabilities.

In this article we would like to introduce the basic principles of MATLAB database toolbox, its cooperation with Sybase Adaptive Server Enterprise using different JDBC drivers and give real data examples how the database can be used with MATLAB. Sybase Adaptive Server Enterprise can be accessed from various environments and platforms. There is jConnect JDBC connector from Sybase as well as opensource jTDS driver.

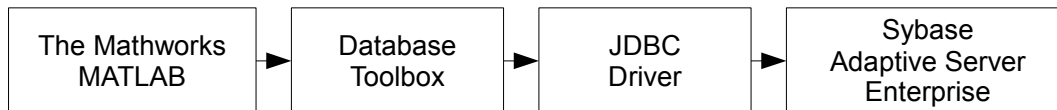
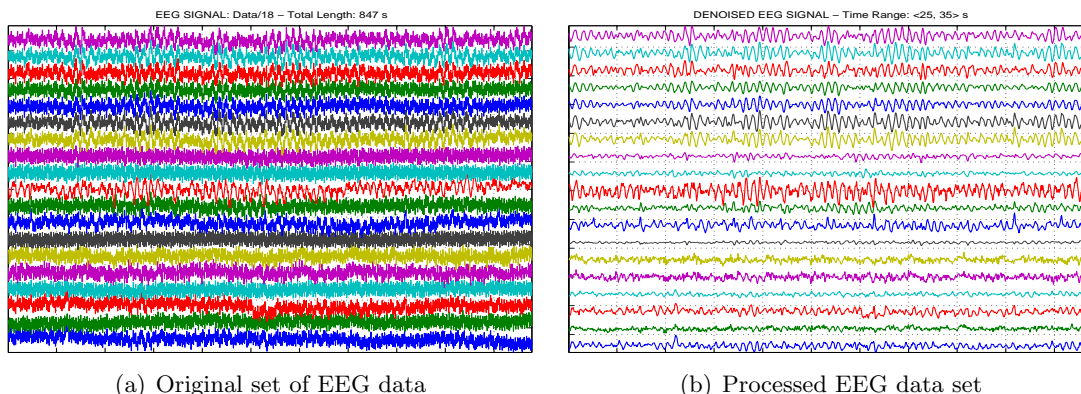


Figure 1: MATLAB - Sybase communication schema

Many programming languages contain native libraries for Sybase database access. We tried the implementation in *Python* and *PHP* programming languages. For the demonstration there is an example of distributed computing platform based on the database access from all of the application components - Python worker and data dumper, PHP web interface and MATLAB data manipulation script.



(a) Original set of EEG data

(b) Processed EEG data set

Figure 2: Selected record of 19 EEG channels before and after the low-pass filtering