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An Intelligent system for diagnosing heart disease

Heart diseases are becoming a common problem in the society. In recognizing heart diseases, Electrocardiogram (ECG) is considered as the major diagnostic technique.

However, ECG machines are relatively expensive to be made available at small hospitals, in particular, in rural areas in Sri Lanka. This paper describes the design, implementation and incremental testing of a low-cost ECG machine with an Intelligent System

The system is developed on a general-purpose computer with three components, namely, ECG hardware unit, Neural Network for disease recognition and an Expert system for explaining the answers. The ECG unit receives electrical signals coming from the electrodes, converts the signals into Digital form, and passes the digitized signals to a computer through a parallel port. The port reads the digitized signals and writes data into a file.

The data file is read and analyzed by a Neural Network emulating the *Backpropagation* training algorithm. The current system is capable of recognizing five diseases, namely, *first-degree heart block, second-degree heart block, complete heart block, bundle branch block and arterial fibrillation,* using Lead-II analysis. The system is to be supplied with an expert system, which explains how and why a disease is recognized. In the system, interestingly, further training is also to be built into the system such that while recognition is done the same data I automatically used for training too the system can be run on an ordinary personal computer with a minimum of 486 processor and 16MB RAM. The cost of the proposed system is approximately Rs. 50,000.

The incremental evaluation of the system is done with regard to performance of ECG and the Neural Networks units. These units operate with a great accuracy. Based on that, we are currently working on integrating these units and developing of an expert system together with a further training mechanism.