USE OF CLINICAL DECISION SUPPORT SYSTEM ON THE PERSONAL DIGITAL ASSISTANT (PDA) OF THE MEDICAL EXPERT

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BACKGROUND:

The doctor to population ratio in Pakistan is very low (1:1436). Normally, a doctor has to go through a manually filled file of every patient for analyzing and finding anomalies. Performing efficiently in such a situation becomes a challenging task for a doctor. We believe that the use of our clinical decision support system (CDSS) in the Doctor’s PDA, using EMR, can effectively decrease the work load of a medical expert and will play an important role in improving efficiency as well as accuracy of the diagnosis.

OBJECTIVES:

Our CDSS on PDA shall be able to:

- Autonomously classify patients into high risk, low risk, and potential high risk using the current patient’s data and the previous electronic medical records (EMR). Our existing EMR currently contains the data collected in the last 6 months from RGH, PIMS and LHWs working in the area of Chirah.

- Autonomously generate alerts on the PDAs of doctors for the high risk & potential high risk cases and suggest the related diagnosis.

- Perform self-diagnosis of low risk patients.

- Learn from the decisions of a doctor.

- Provide a tool for a medical expert on his PDA which can help him/her visually analyze different diseases, relate various factors and analyze trends in the data gathered from the population of an area.

METHODS:

When a patient’s record is entered into the EMR, our system connects to the EMR server and picks the five most similar cases using case-based reasoning. It classifies the patient using the decision rules derived from the Artificial Intelligence (AI) algorithms. The results and related suggestions are then
displayed on the doctor’s PDA and are finally sent to the main EMR server. For visual analysis our system generates bar charts and tables.

RESULTS:

- Our system successfully finds the five cases closest to a patient and also displays their similarity scores. Our AI techniques have achieved the mean best accuracy of 87.22% with the standard deviation of 13.5 on 31 most challenging medical problems (such as breast cancer, Ann thyroid and diabetes).

- Data visualization tool shows correlations between different factors affecting a disease and also provides visual analysis of general trends in a population.

![Figure1 Statistical Analysis of the Types of Hypertension](image)

For example, figure 1 shows an interesting relationship found by our system. The values of average gestational age are highest for pre-Eclampsia. These values decreases as we move from pre-eclampsia to PIH and then to chronic.

CONCLUSION:

We believe that the common use of this system on the doctor’s PDA will play a vital role in improving the efficiency of the medical experts and it will also help the decision makers in making short & long term health policies.

LEARNING OBJECTIVES:

Use of novel methods for decreasing doctor’s work load and finding ways to discover new trends in medical data.