



Clinical Decision Support System

BASED VIRTUAL TELEMEDICINE

Introduction: the problem

- ▶ Health care in Pakistan / developing countries
 - ▶ High population
 - ▶ Low resource
 - ▶ Shortage of medical experts and financial resources
 - ▶ Doctor/people ratio: 1 doctor per 1400 people
 - ▶ The doctors prefer not to work in the remote areas

Introduction: a solution

- ▶ Telemedicine?
 - ▶ Store-and-Forward
 - ▶ Cheap, easy but high response times
 - ▶ Real Time Method
 - ▶ Too expensive for developing countries (hardware, communication channels)

Virtual Telemedicine

- ▶ Expert system providing immediate response to patients
- ▶ Store-and-Forward with improved response times
- ▶ Improvements required:
 - ▶ Accuracy
 - ▶ Better analysis of patients' data
 - ▶ Enhanced medical explanation (usability)
 - ▶ Automated support for updating medical experts' opinions
- ▶ => Clinical Decision Support System



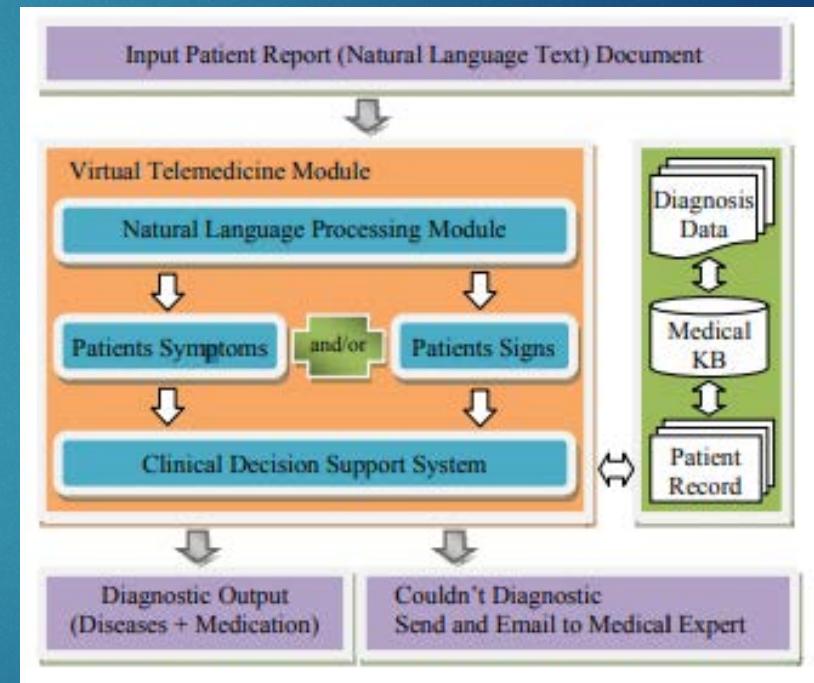
Virtual Telemedicine System

1. Patient describes issue
2. Dispensar creates a report
3. Dispensar passes report to Clinical/Diagnosis Decision Support System (CDSS)
4. CDSS makes initial diagnosis
 - ▶ Using patient's historical data + the given report
5. If no diagnosis can be made: data is passed to a doctor/specialist

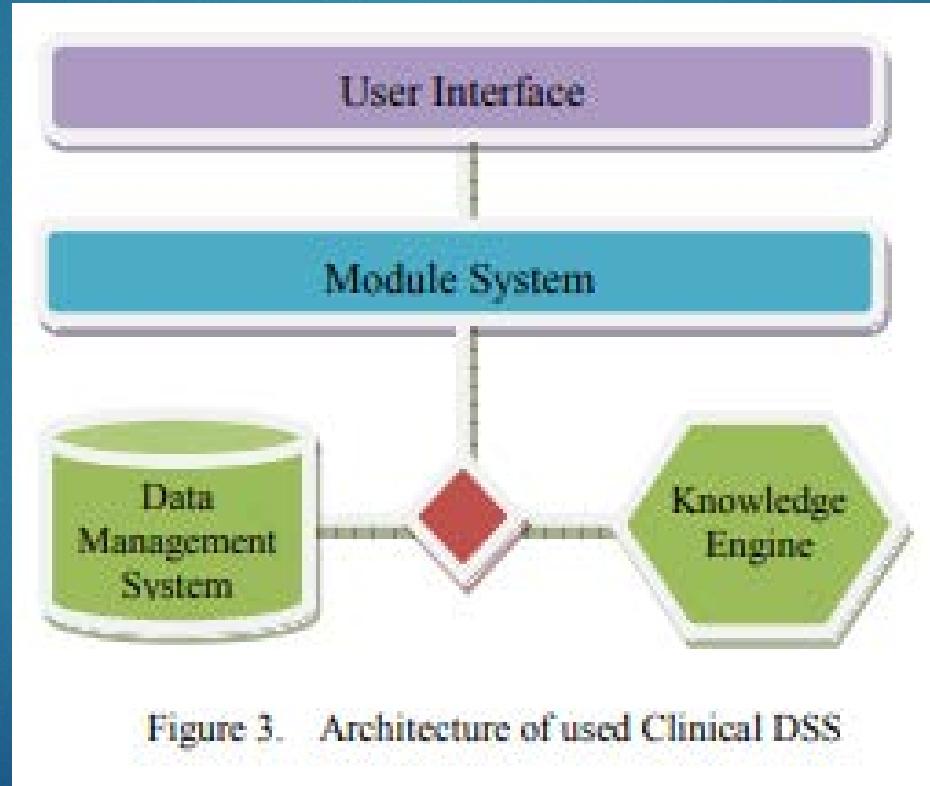


Virtual Telemedicine System

- ▶ Convert dispensar's report to patient symptoms + signs
 - ▶ Natural language processing using:
 - ▶ Sentence splitting
 - ▶ POS Tagging
 - ▶ Morphological Analysis
 - ▶ Syntactical Analysis
 - ▶ Semantic Analysis
- ▶ Pass to CDSS for actual diagnosis



The Clinical Decision Support System



Case Testing

- ▶ 5 different cases
- ▶ 3 different written reports per case, in varying difficulties
- ▶ Average accuracy of 91%

Conclusions

- ▶ Offers a solution for lack of medical experts in developing countries
 - ▶ Does not require medical experts to be present in remote locations
 - ▶ Relatively high accuracy that can be improved over time
 - ▶ Immediate support
-
- ▶ Needs yet to be tested real time
 - ▶ Affordability for the targeted countries needs to be confirmed

Questions

How could the virtual telemedicine solution be further improved?

Questions

Who should be responsible for the diagnoses?