

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



Jamal Afridi, Muhammad Kamran , Humayun Irshad, Sadia Khan and
Mudassar Farooq

Next Generation Intelligent Networks Research Center
(nexGIN RC)

National University of Computer and Emerging Sciences (NUCES)
Foundation for Advancement of Science & Technology (FAST)
Islamabad, Pakistan



<http://rpms.nexginrc.org/>
<http://www.nexginrc.org/>



Agenda

Background

Objectives

Methodology

Results

Conclusion & Learning Objective

Background

- Poor “doctor to population ratio” (1:1555)
- Manually filled file..!!
- Over burdened doctor
- Challenging task



Time for Analysis of
health data.???



Time for study and
research..???

Time for other
office works..???

Reduce My Work Load ..!!

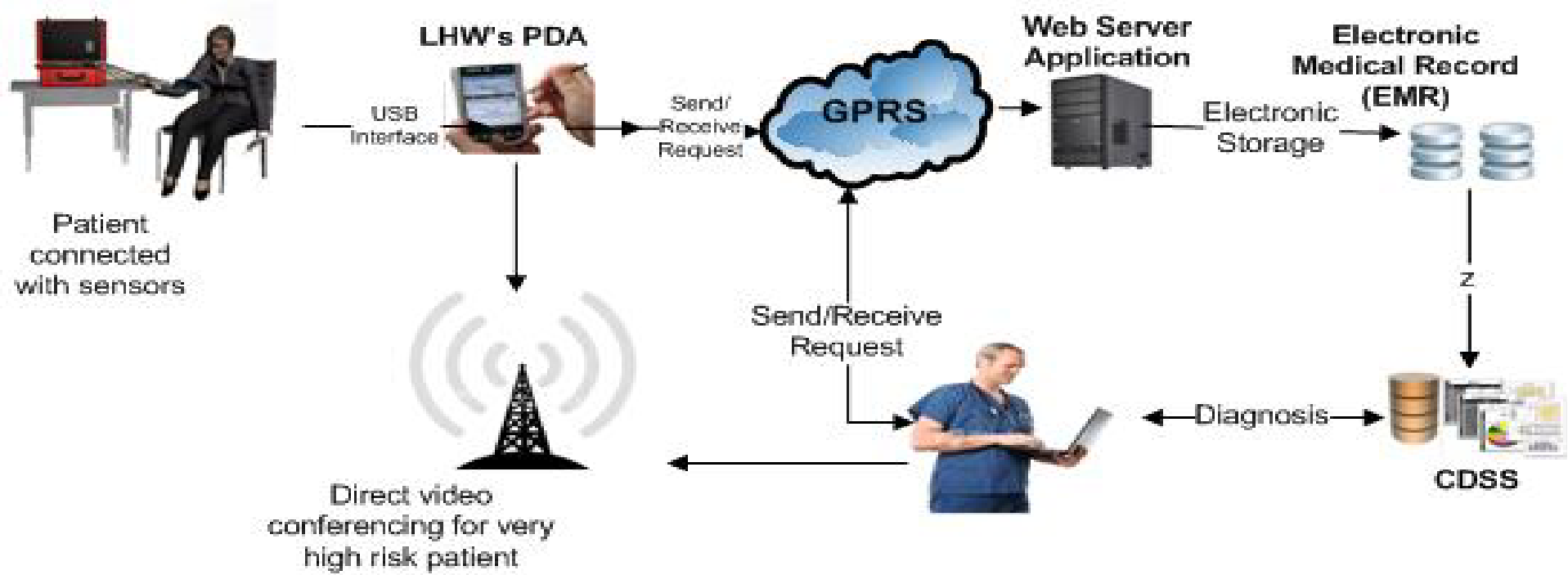
Time for Friends and
Family..???

Time for Patients..???

Objectives

To reduce the workload our CDSS will do ...

- Automatic classification of patients
- Self Diagnosis for low risk patients
- Passing only the High Risk cases
- Generating recommendations and Risk factors
- Learn with experience from Doctor's decision



Methodology

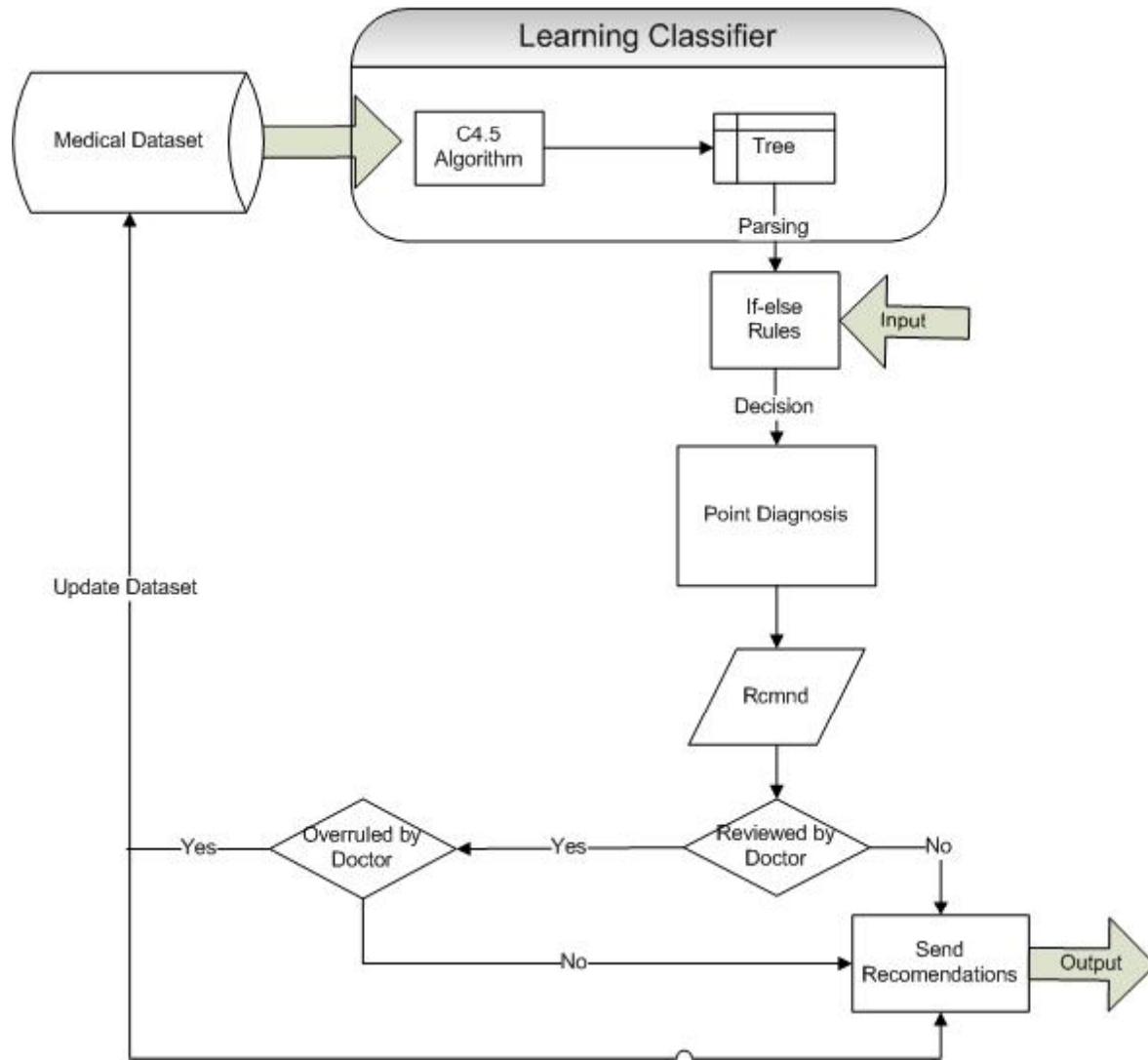
- Use of artificial intelligence techniques.
- Use of Case based reasoning.
- Data visualization.

Autonomous Rule Extraction

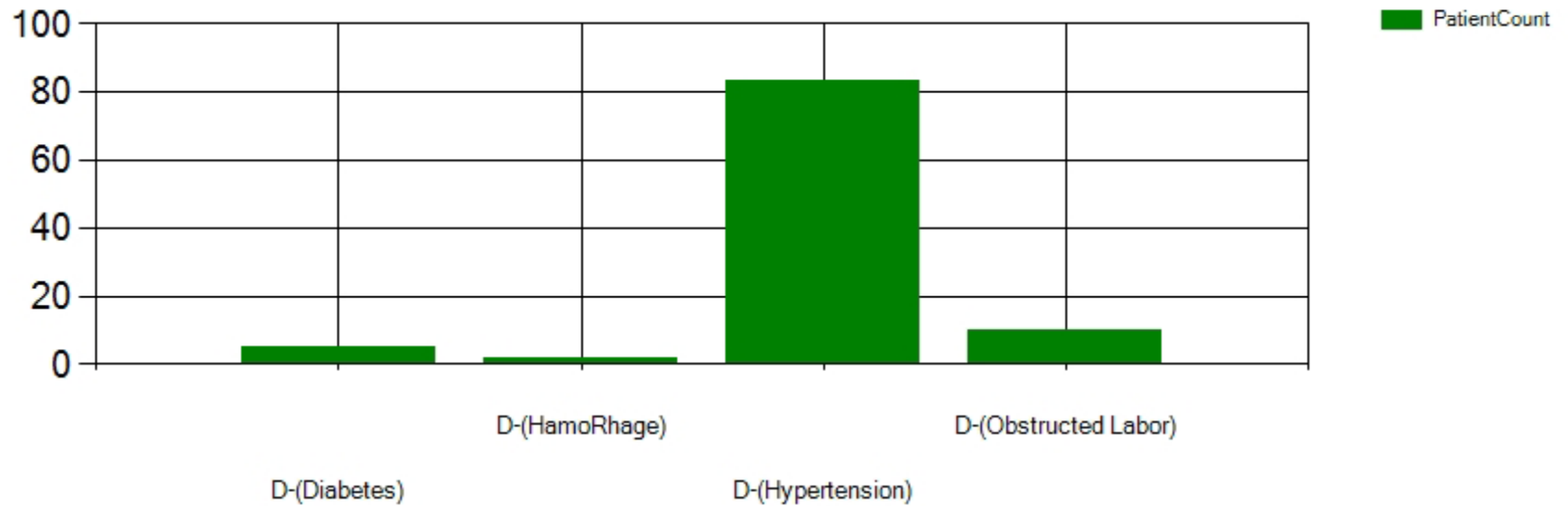
```
IF PRESENT_PREGNANCY.PREGNANCY_REACTION = NULL AND GENERAL_EXAMINATION.EDEMA = - THEN No
IF GENERAL_EXAMINATION.EDEMA = - THEN No
IF PRESENT_PREGNANCY.PREGNANCY_REACTION = NULL AND PRESENTING_COMPLAINST_HISTORY.VOMITTING = NULL THEN No
IF PRESENT_PREGNANCY.PREGNANCY_REACTION = Unpleased THEN Yes
IF GENERAL_EXAMINATION.EDEMA = + AND PRESENTING_COMPLAINST_HISTORY.PV_LEAKAGE = NULL THEN Yes
IF ROUTINE_INVESTIGATION.MSU_URINE = - THEN No
```

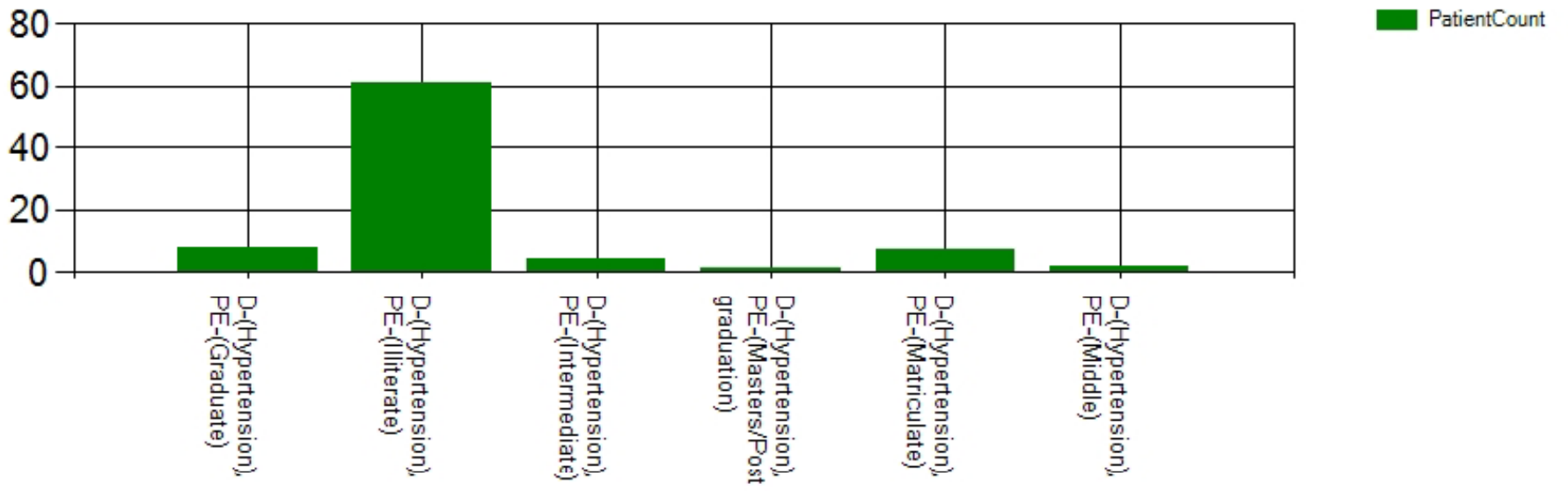
```
IF DRUG_HISTORY.SMOKING = Yes THEN Yes
IF PREVIOUS_PREGNANCIES.BIRTH_PLACE = PrivateClinic THEN Yes
IF PREVIOUS_PREGNANCIES.BIRTH_PLACE = GovernmentHospital THEN No
IF PRESENTING_COMPLAINST_HISTORY.POST_DATES_PROLONGED_PREGNANCY = NULL THEN No
IF SPECIFIC_INVESTIGATION.CTG_VARIABILITY = Positive THEN No
IF PER_SPECULUM_INSPECTION.VULVA_VAGINA = NULL THEN No
```

```
IF GENERAL_EXAMINATION.ORO_DENTAL_HYGIENE = Satisfactory THEN No
IF ROUTINE_INVESTIGATION.MSU_ALBUMIN = NULL AND ROUTINE_INVESTIGATION.VIRAL_ANTIHCV = Negative THEN No
IF PREVIOUS_OPERATIONS.HEART_SURGERY = NULL AND PRESENT_PREGNANCY.PREGNANCY_REACTION = Pleased AND SPECIFIC_INVESTIGATION.CTG_VARIABILITY = Positive THEN No
IF ROUTINE_INVESTIGATION.MSU_ALBUMIN = + THEN No
IF PRESENTING_COMPLAINST_HISTORY.POST_DATES_PROLONGED_PREGNANCY = Yes THEN No
```



Statistics & Data visualization





Tested Performance on Obs & Gynae

- **System's Accuracy on Hypertension Data → 98.7%**
- **Performance on obstructed labor dataset → 99.7%**
- **Septicemia, Hemorrhage and Thromboembolism**

Results on UCI Medical data

- Tested on 31 most challenging medical datasets
- Datasets for diabetes, cancer, liver disorders etc
- Thyroid → 99.12% (Max)
- Liver Disorder → 55.6%(Min)
- Mean accuracy → 87.22%
- Standard Deviation → 13.5

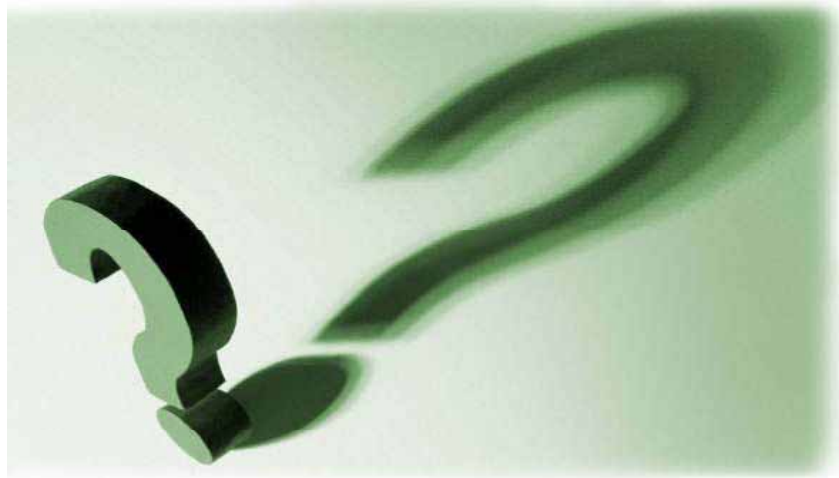
Conclusion

- **Reduction of workload.**
- **Will improve medical expert's efficiency.**
- **Help in Policy making from shown statistics.**

Learning Objective

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

Thank you



Questions?