



used as a back end. The reports are generated in html format using Matlab Report Generator.

**B. Design and Development of System**

The design of the system comprises of following:

- Design of I/p interface
- Design of Database and Fuzzy Rulebase
- Design of Reports

**C. Input and Output Interfaces**

The system comprises of three modules and user interfaces required for them are designed. The modules are as follows.

1. Patient
2. Disease
3. Report

Snap shots of the input/output interfaces are shown below.

**1: Input Interfaces**

**• Login Interface:**

Login interface is shown in Figure 2. It allows the user to start the system. Unauthorized user does not have access to the system.

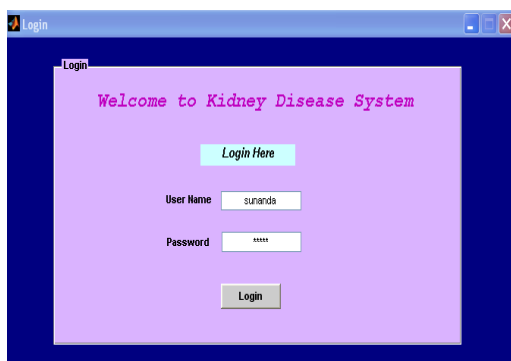


Figure 2: FSDTKD Login Interface

**• Menu Access Interface:**

After successful login, menu screen appears that allows access to different system modules. Menu interface is shown in Figure 3

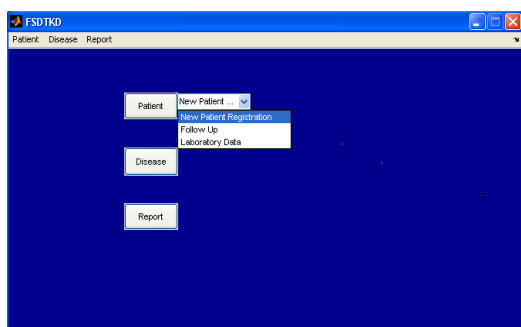


Figure 3: FSDTKD Menu Interface

**• New Patient Registration Interface:**

The interface shown in Figure 4 is used to register new patient which lets you enter personal and illness information of the patient.

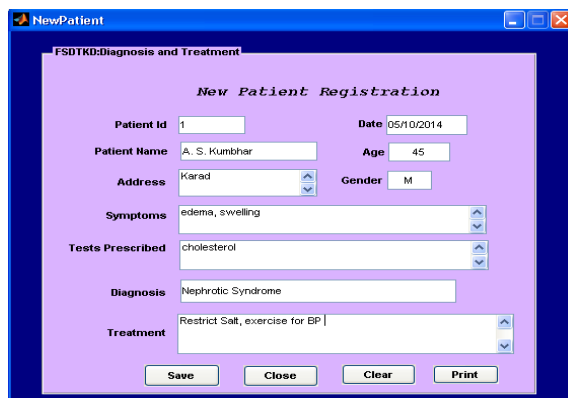


Figure 4: New Patient Registration Interface

**• Follow Up Interface:**

Patient Follow Up interface shown in Figure 5 is used to store patient's follow up information.

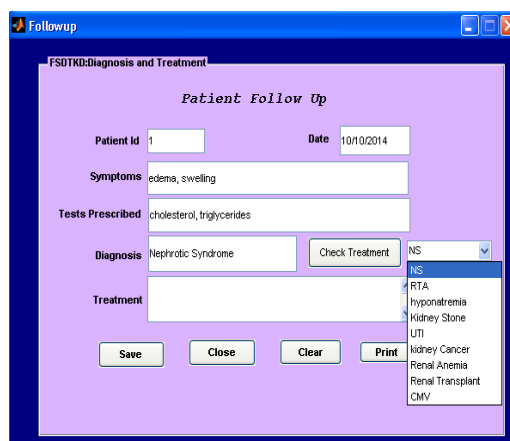


Figure 5: Patient Follow Up Interface

**• Laboratory Data Interface:**

Figure 6 shows the interface to input pathological data of the patient. Through this interface, we can enter and store results of blood and urine tests that the patient undergoes.

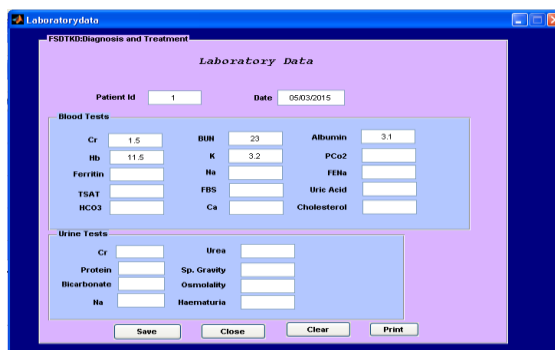


Figure 6: Laboratory Data Interface

**Diagnosis / Treatment Interface (DTI):**

Diagnosis and treatment interfaces are designed for each of the above nine diseases. These interfaces get the disease specific information of the patient and suggest treatment plans. Figure 7 and Figure 8 show sample interfaces for Nephrotic Syndrome (NS) disease and for calculation of Kidney Transplant Allocation Score (KTAS) respectively.

**Figure 7:** Diagnosis / Treatment Interface: NS

**Figure 8:** KTAS Calculation Interface**2. Output Interfaces**

Output interfaces are used to generate reports useful for the doctors. Using these interfaces, reports such as case paper report, last follow up report and laboratory data report can be generated. Figure 9 shows Last Follow-up report generation Interface. This interface generates the report of last visit of the patient detailing his symptoms, tests prescribed and treatment suggested to him. Sample report generated is shown in Figure 10.

**Figure 9:** Last Followup Report Generation Screen

**Figure 10:** Patient Last Visit Report**C. Implementation of FSDTKD**

FSDTKD is a single user windows application. It is used by doctor or his assistant. The system has been presented to doctors and doctors are satisfied with its performance and user friendliness.

**D. Software Requirements to Run the FSDTKD Tool**

- i) Matlab R2008a
- ii) Microsoft Access 2003

**3. Applications and Advantages of FSDTKD**

This section describes various applications and advantages of developed system. The system serves many different purposes few of which are discussed below.

1. System can be useful for doctors to arrive at proper treatment decision.
2. It can be used as an educational aid for the medical students.
3. In remote areas where medical experts are not easily available, this tool can help the general physicians in medical decision making.
4. The tool can be helpful to hospital administrative staff to maintain patient database.
5. It can be used in pathology labs to store pathology data of the patient.

The developed fuzzy system has many advantages as listed below.

1. The FSDTKD model has simple graphical menu drive interface where user can move quickly through the system making it more user friendly.
2. The system is easy to use and cost effective. Data entry and report generation screens are simple and easy to understand. Thus with a little training, doctors and support staff can easily operate it.
3. It is useful to store the patient database for later use.
4. The system generates the essential reports useful for the doctor such as report of last follow up of the patient.
5. The tool is useful to physician for decision making.
6. The model can be used as an educational aid for medical students.
7. Tool can be easily upgraded by adding kidney diseases that are currently not considered.
8. Tool can be easily updated as per the requirements of doctors and changes in the treatment guidelines over time.

## 4. Conclusion

Fuzzy system FSDTKD is developed to aid the physicians in medical decision making. The system is presented to the doctors. It has satisfactory level of accuracy and may prove to be helpful to the physicians for the selection of appropriate treatment option. Accuracy can further be enhanced by adding more decision variables. Also more number of diseases can be added to extend its usability.

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