Daily Meal Planner Expert System for Diabetics Type-2

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Agenda

- Goal and Objectives
- Medical knowledge
- Comparative features for Expert systems for diabetes
- Meal planner
- Conclusion

The Objectives

1. This paper presents the design and implementation of an intelligent medical expert system for diabetes diet that intended to be used in Sudan.

2. Determine the stages and the features in developing a new tool for treat of diabetes type 2.

3. Using these key features as a guide in developing a knowledge based system for diabetes type2 diet.

Medical knowledge

Motivation

1. There are many uncertain risk factors resulted from eating certain types of food with certain amount especially for diabetes patients

2. Sometimes it is really hard for experts to reach a good tasty and efficient in treatment, meal planning for such patient

3. An accurate tool will be of a great help for an expert to consider all these risk factors and show certain results

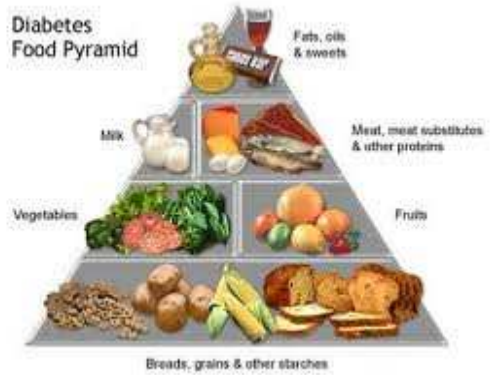
4. Developing an intelligent systems for diabetic type 2 diet provides self-monitor for patient of type 2 diabetes to get proper amount of daily meal.

Medical knowledge

Diabetes Mellitus

There are three diabetes types:

- Type 1 diabetes or insulin-dependent diabetes mellitus (IDDM)
- Type 2 diabetes, or non-insulin-dependent diabetes mellitus (NIDDM)
- Gestational diabetes, during pregnancy



Medical knowledge

Diabetes Mellitus

- The **normal** blood glucose level lies between (**70-100**) **mg**/100 ml during fasting.

  and **140 mg**/100 ml **otherwise**

- For a diabetic person, the blood glucose is around **126 mg**/100 ml during fasting

  and **200 mg**/100 ml **otherwise**

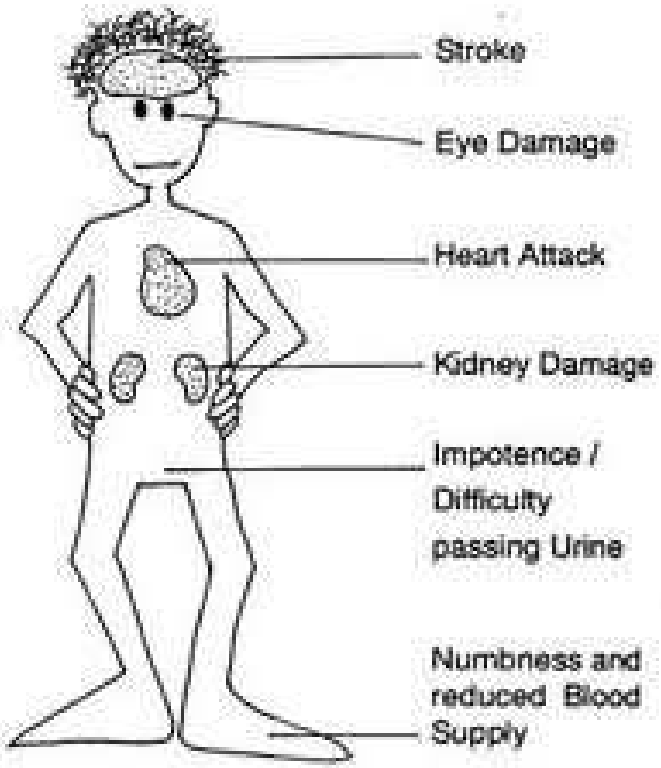
- In Sudan at around one million diabetic person, around 95% of whom have type 2 diabetes

Medical knowledge

Diabetes Mellitus

Complications

- Stroke
- Blindness
- Heart disease
- Kidney disease
- Nerve damage
- Leg and foot amputations
- Death



Related Work

Comparative Study

The frame work includes the flowing features:

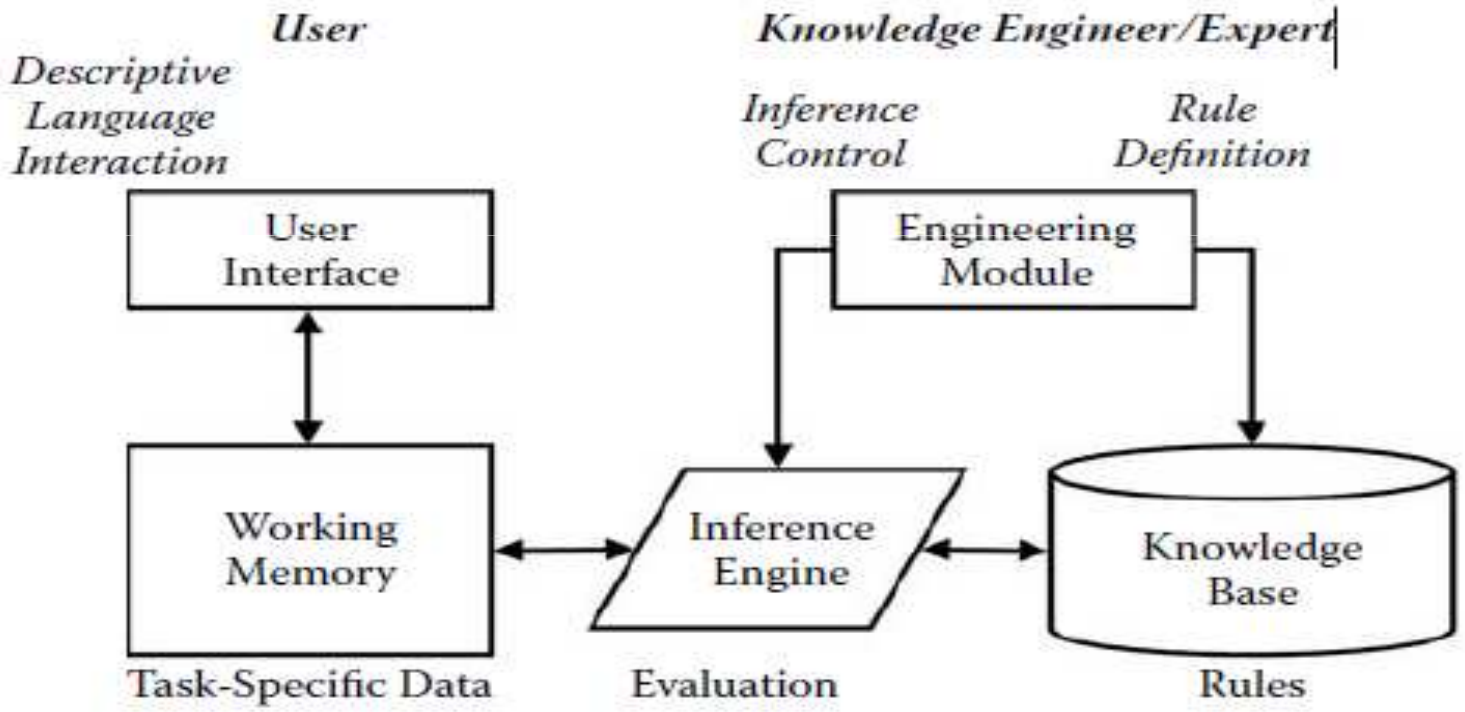
1. **System purpose**
2. **Data representation**
3. **Inference Engine technique**

Related Work

Comparative features for Expert systems for diabetes

Authors	System purpose	Data representation	Inference Engi technique
Cindy Marling et. al(2014)[11]	CARE-PARTNER diabetes renal, stress-related disorders	Case-based	NA
Joan Albert et. al (2013)[10]	Treatment of hypertension, diabetes mellitus and heart failure	Rule based	NA
N. Nnamoko et.al (2013)[12]	Type 2 Diabetes Mellitus (T2DM) management	Case-based and Rule based	NA
S.Kumar & B. Bhimrao(2012)[9]	Natural treatment information of diabetes in one place	Rule based	Backward chai
D.Forbes and J. Singh (2012)[13]	Understanding between the Type-2 Diabetes Patient and healthcare practitioner	Ontology. Based	NA
P. M. Beulah et.al (2007)[8]	Detect and give early diagnosis of three types of diabetes	Rule based	Backward chai

The Proposed Architecture of Expert System



Meal Planner

1. **Problem and Need Identification**
   1. Shortage of specialist
   2. no commercially or free expert system is available in this area of diabetes

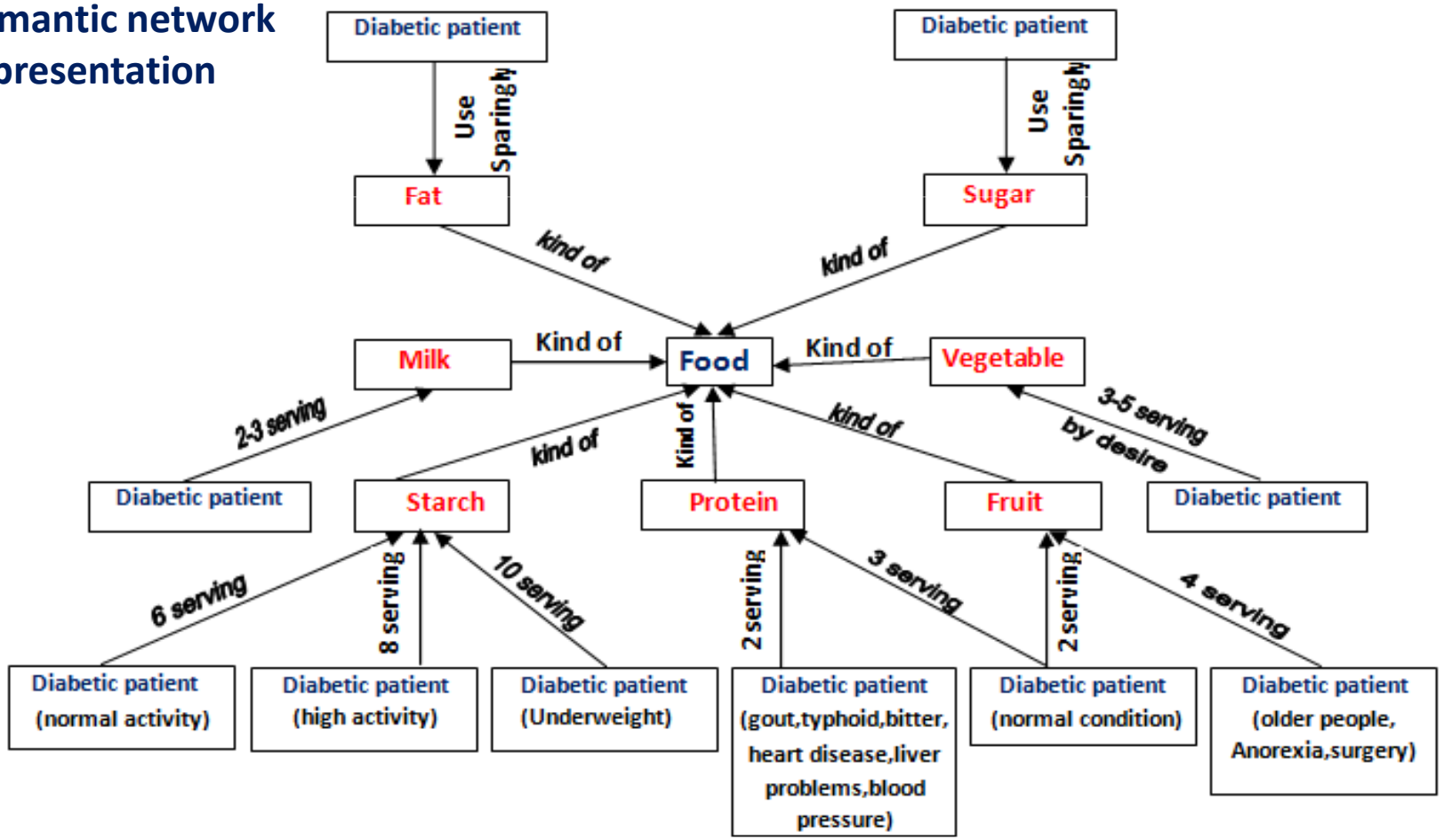
2. **Knowledge Acquisition**
   1. experts from military hospital and Federal Ministry of Health for medical resources (Dr. Iqbal and Dr. Nazik)
   2. medical books

Meal Planner

3 .Formalization

- calculating food servants semantic network representation is used
- calculating number of calories, a rule based representation is used
- Frame based representation is used to connect food types and subcategories

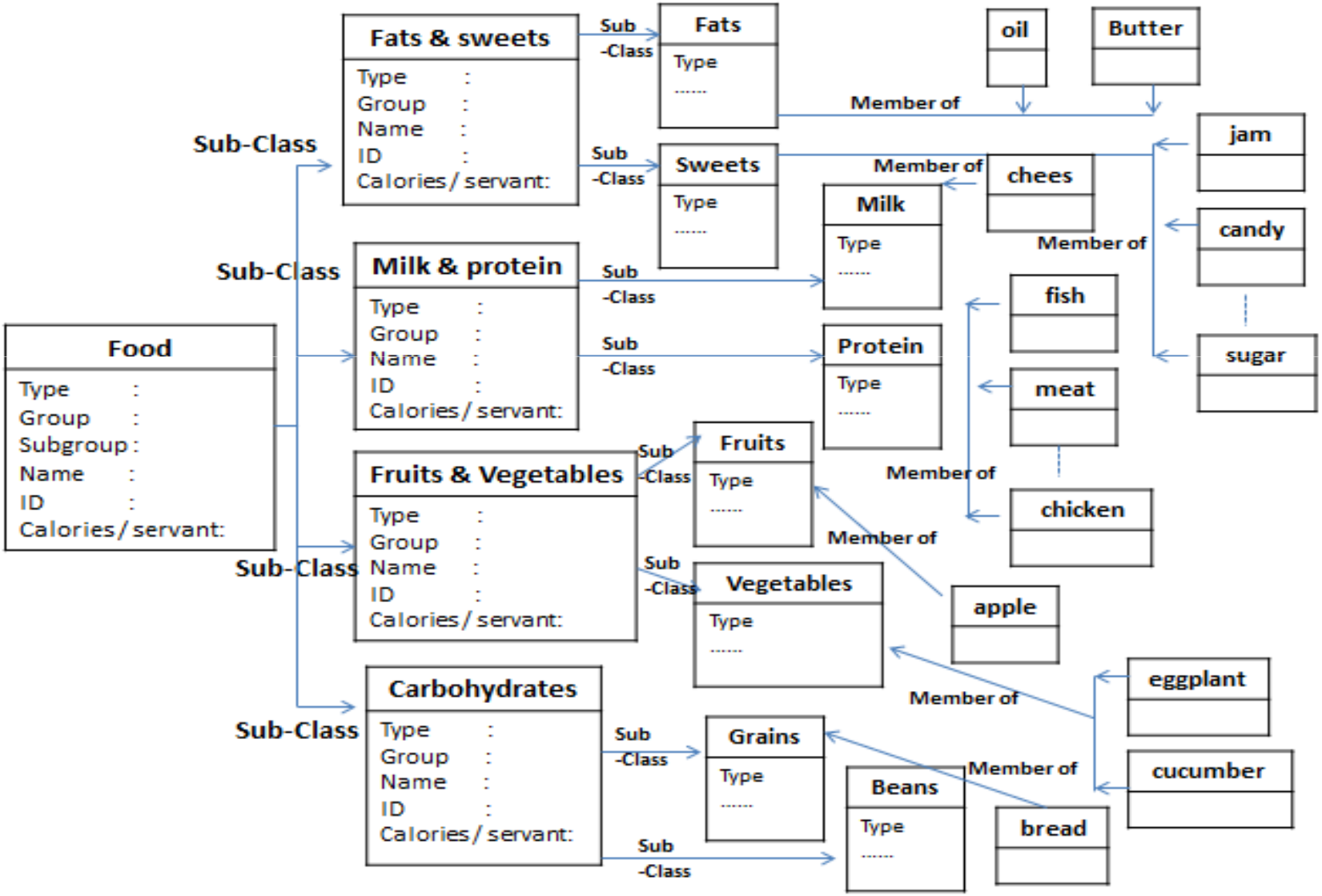
Semantic network representation



Meal Planner

3 .Formalization

Diabetics food frame representation

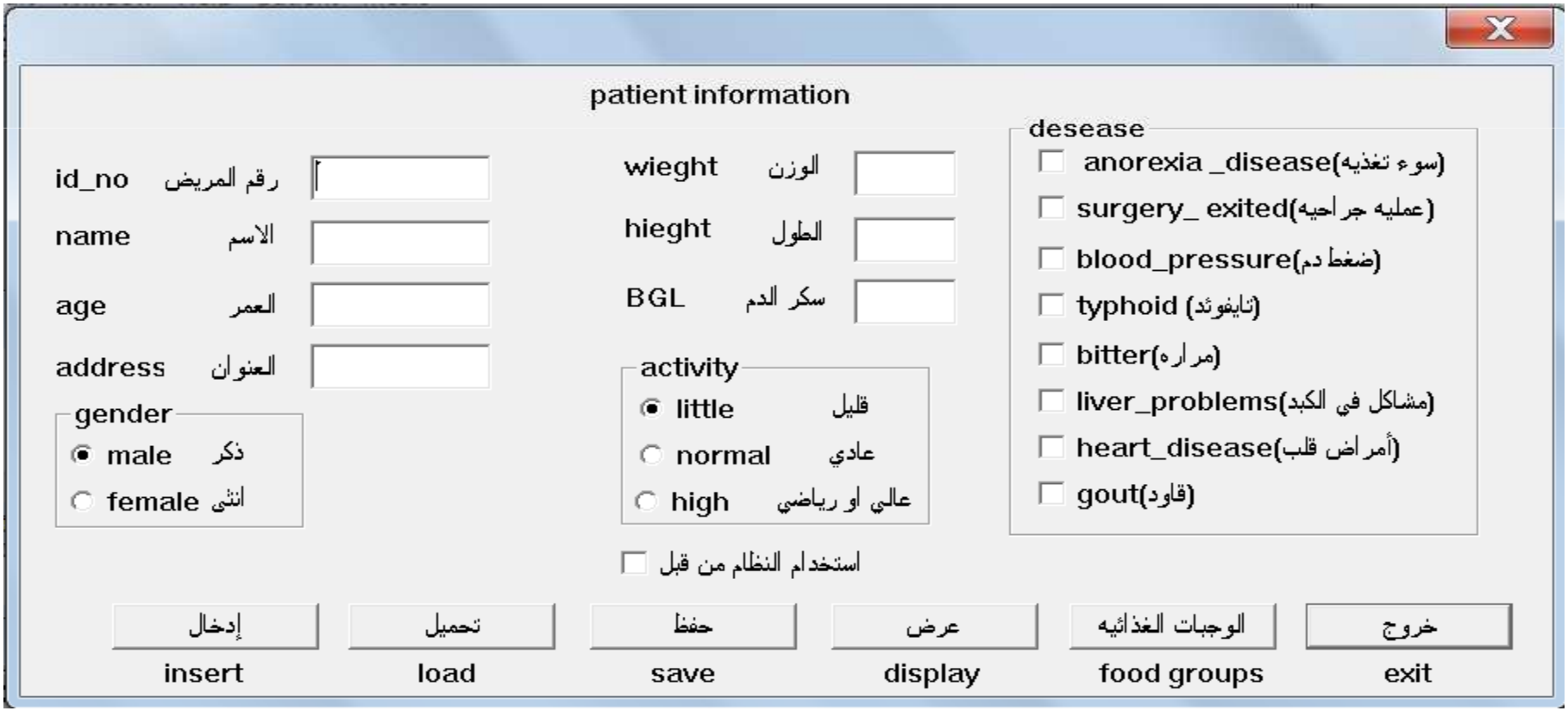


Meal Planner

4.Design

The systems used a command driven, dialog type user interface, Increasingly windows and menus.

Patient information dialog



Meal Planner

4.Design

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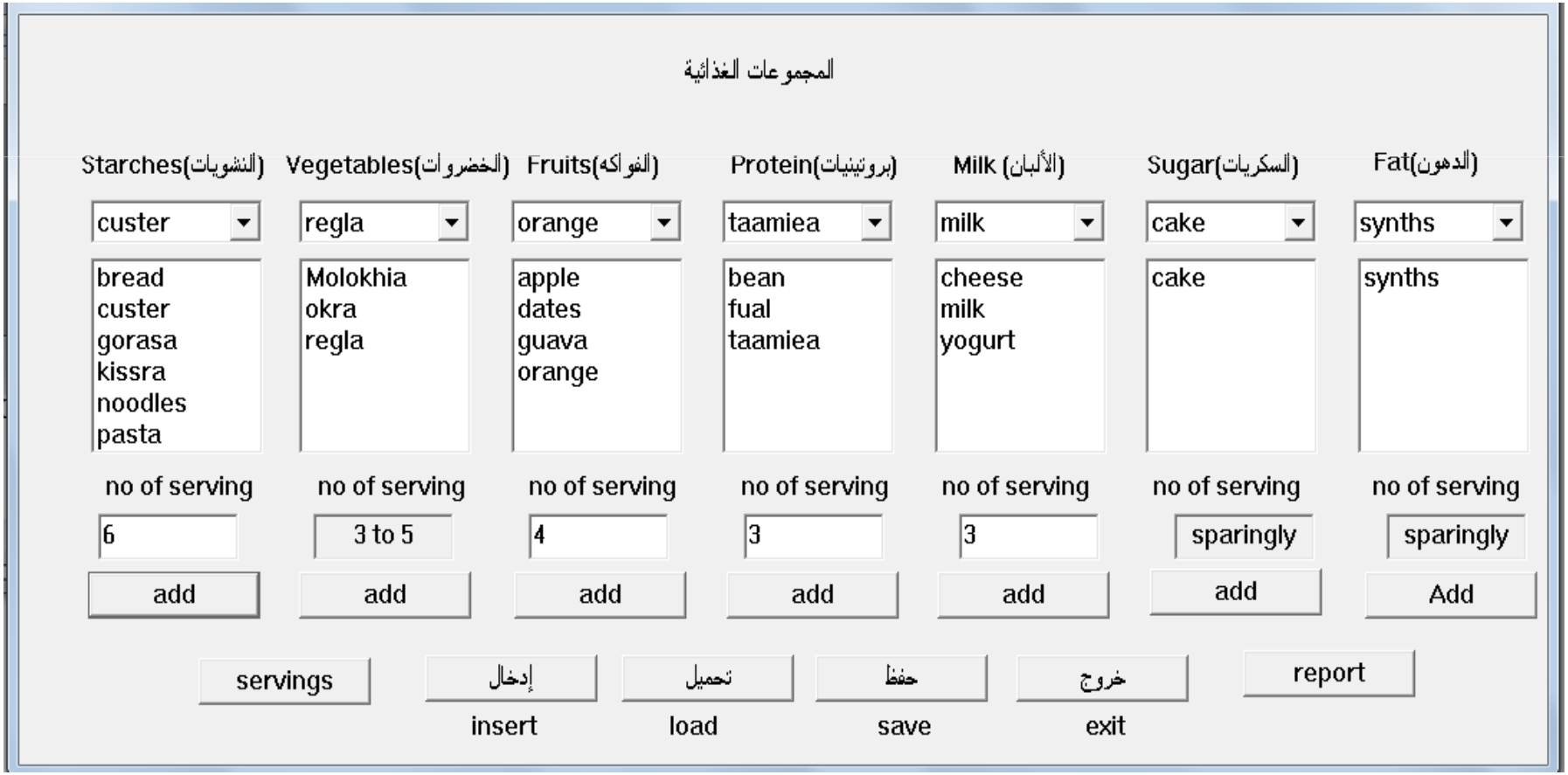
Food group dialog



Meal Planner

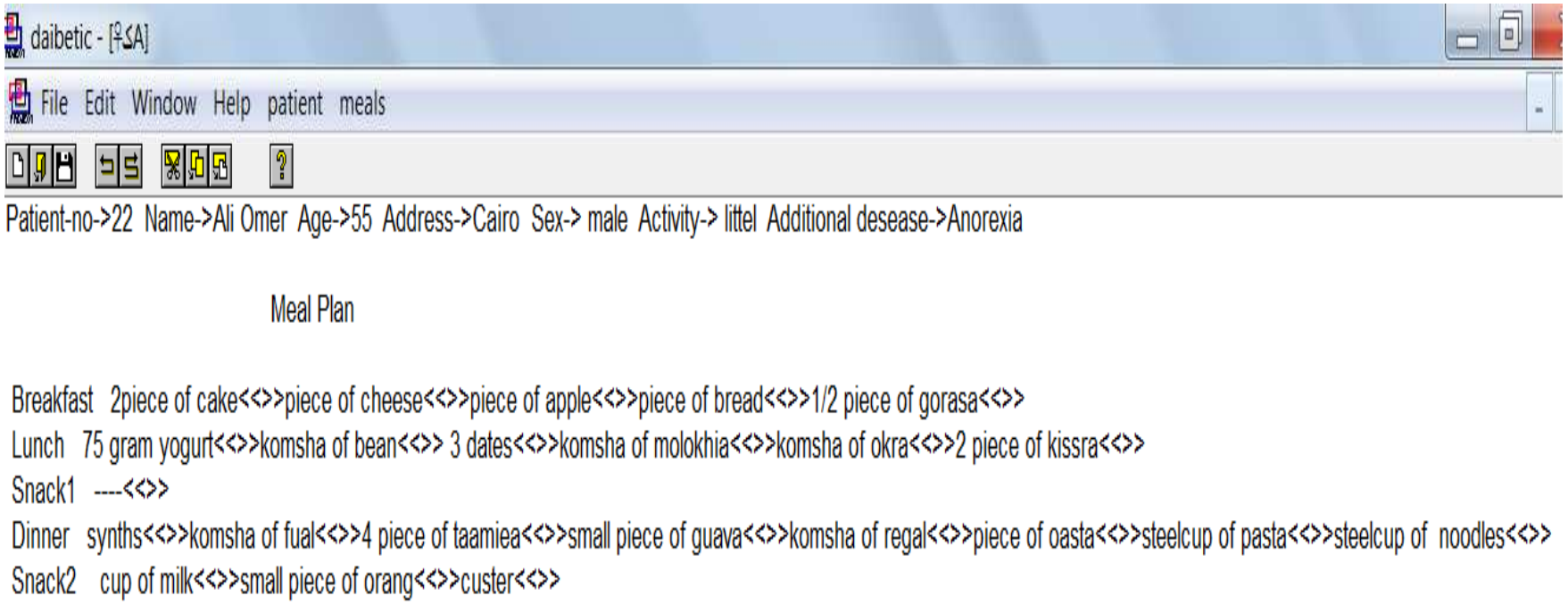
5.Implementation

writing of the Prolog commands that run the system

- inference engine backward-chaining
- **The** representing knowledge in a rule based

Results

The system connect all gathered information and performs inferences through its knowledge engine process to output a recommended five meals for every patient per day.



Conclusion

1.This paper described the design and implementation of a medical expert system for diabetes diet that intended to be used in Sudan. recommending five meals for every patient per day, **breakfast, lunch, snack1, dinner and snack2.**

2.The development of the proposed expert system **went through** a number of **stages** such problem and need identification, requirements analysis, knowledge acquisition, formalization, design and implementation.

3.Visual prolog was used for designing the graphical user interface and the implementation of the system components using **rule based** for knowledge representing and **backward-chainin**g for inference engine .

4.The proposed expert system is a promising helpful tool that **reduces** the **workload** for physicians and provides a **more comfort** for diabetic patients.

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Thank You