

Design of a diagnostic tool to improve the quality of functional size measurement

COSMICXpert

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Presentation

- Introduction
- Expert System
- Presentation of the Diagnostic Tool
- Next Steps

Introduction

Characteristics of software functional size measurement:

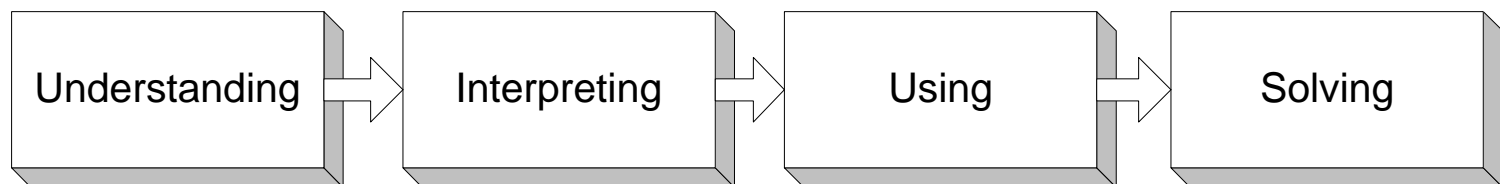
- The application of a software functional measurement method, as described within the ISO 14143 standard and COSMIC-FFP (ISO 19761), is an intellectual process carried out on a complex set of abstract artifacts
- this process includes:
 - **a mapping phase between the measurement model and a model of the software,**
 - **and a measurement phase for the instantiation of the measurement rules to the derived model of the software to be measured**

Introduction

To get a good measurement result i.e. to insure the accuracy of measurement and the repeatability of the results of measurements:

- the parameters of the “problem” need to be clearly identified,
- adequately interpreted,
- then and only then the “problem” can be solved
- using appropriate rules.

The following figure presents the measurer’s cognitive path for solving the “problem”:

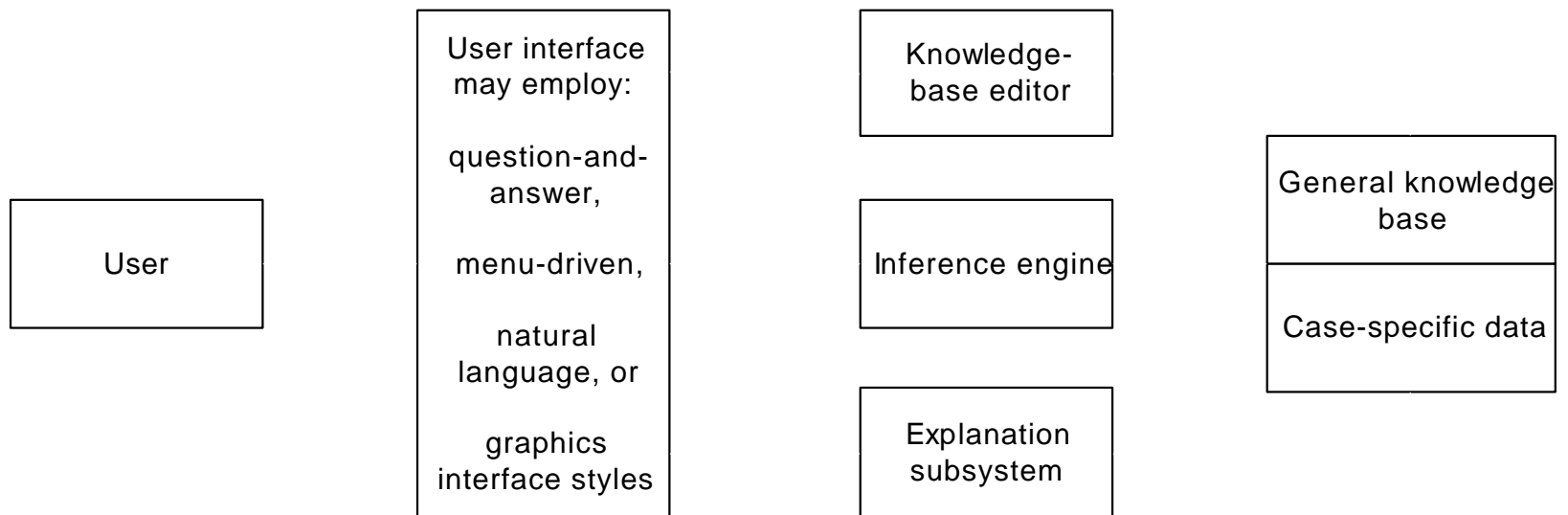


Expert system

The Encyclopedia Britannica Online gives the following definition of an expert system:

"An advanced computer program (instructions set) that mimics the knowledge and reasoning capabilities of an expert in a particular discipline. Its programmers strive to clone the expertise of one or several human specialists to create a tool that can be used by the layperson to solve difficult or ambiguous problems. A chief advantage of expert systems is their low cost compared with the expense of paying an expert or team of specialists."

Generic Design of an Expert System

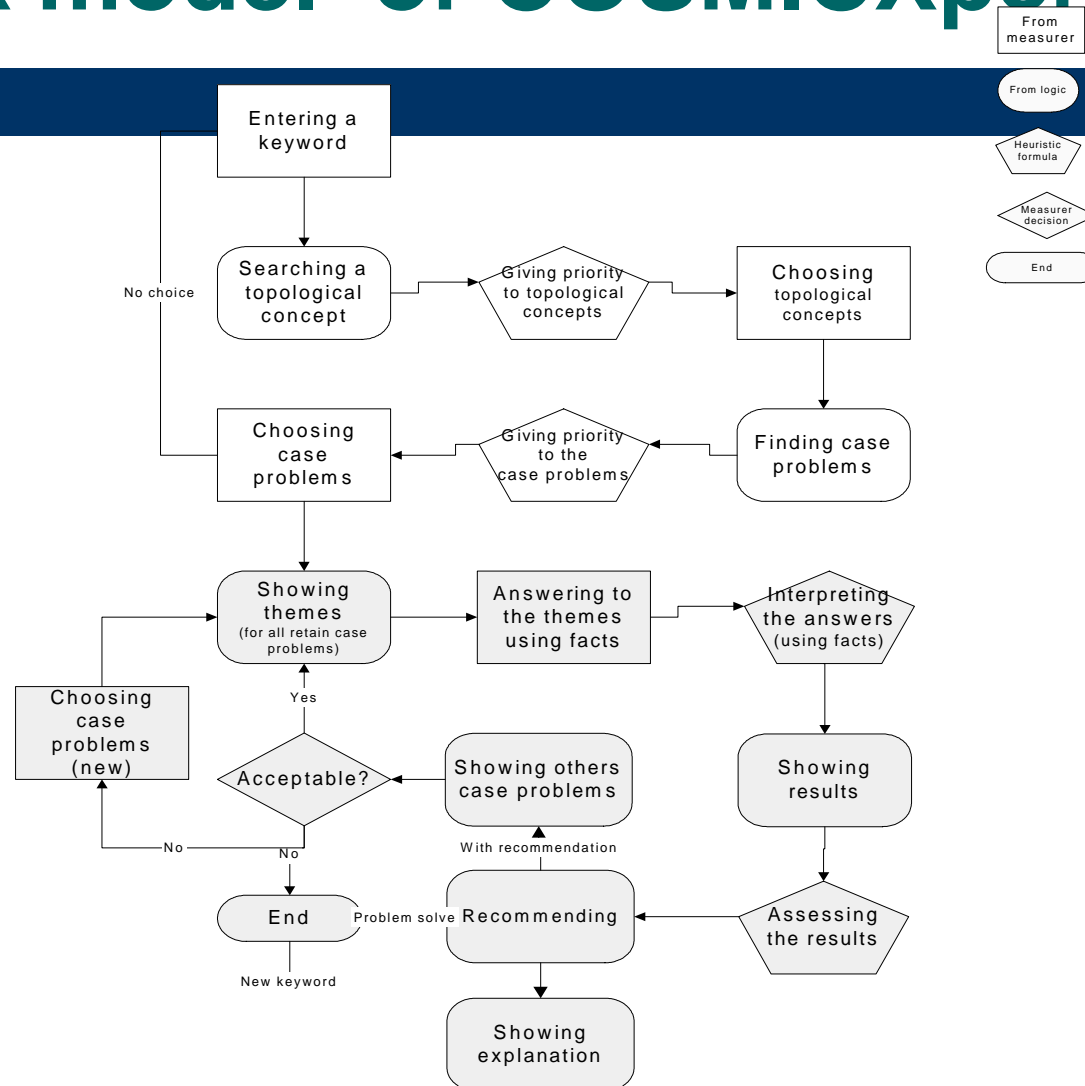


Knowledge Modeling

Van Heijst suggests the following approach for building a knowledge model:

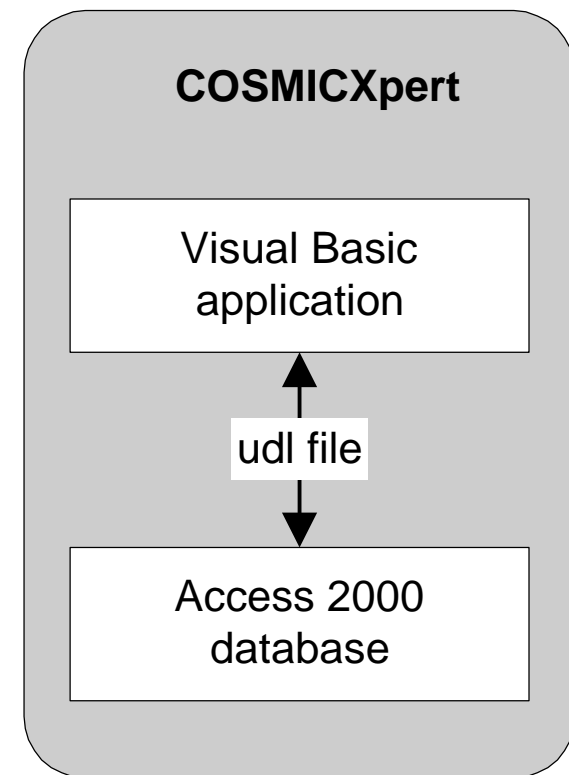
- Construct a task model for the diagnostic tool;
- Select and configure appropriate ontology, and, if necessary, refine them;
- Map the application ontology onto the knowledge roles in the task model;
- Instantiate the application ontology with domain knowledge.

Task model of COSMICXpert

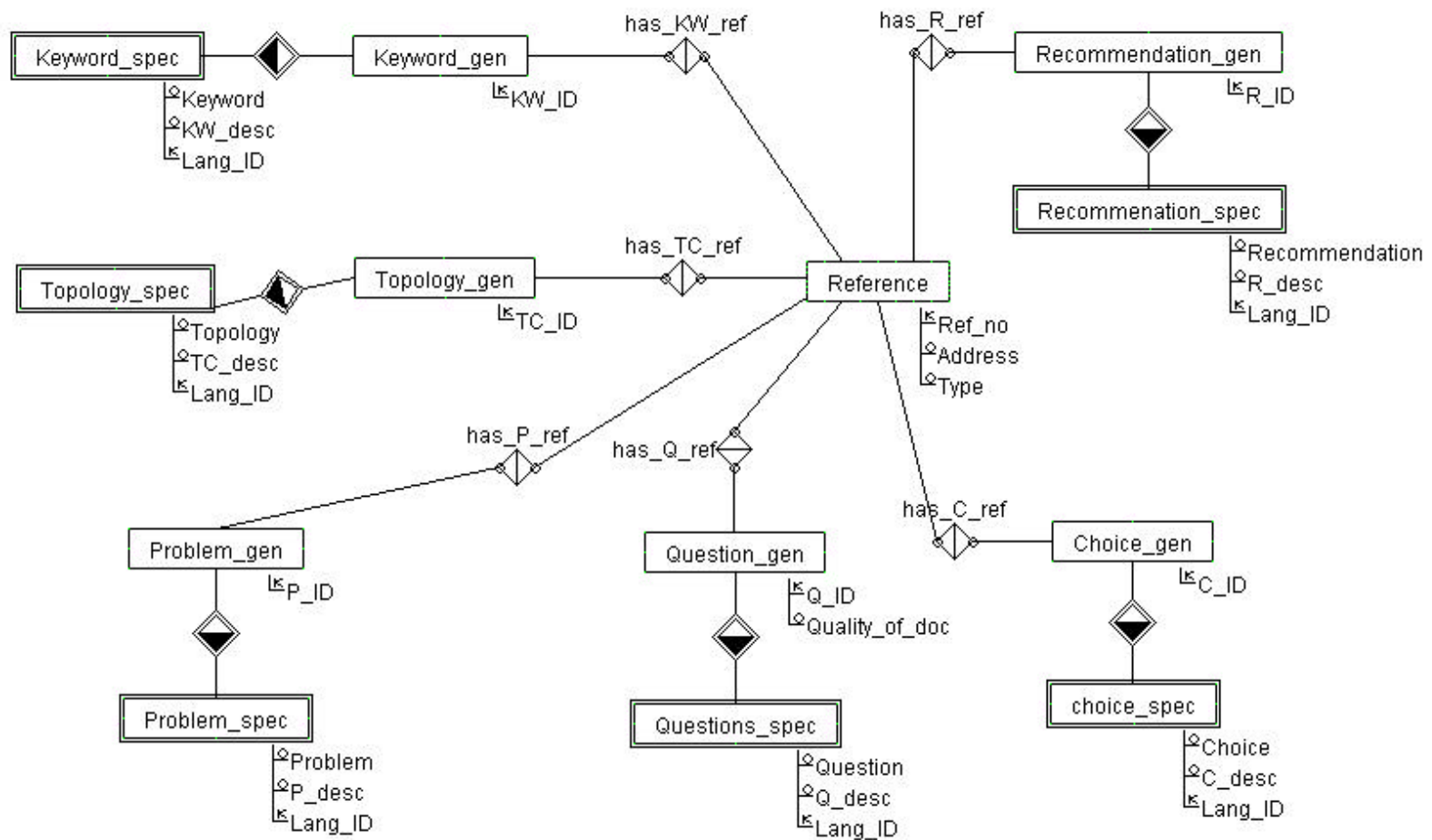


Architecture of the diagnostic tool

The diagnose tool COSMICXpert consists of MS Access2000 database (back-end), a Visual Basic application (front-end) and an udl-file (universal data link) to enable the communication between them.



Data model



Interfaces

Measurer Interface

Solve a specific „measurement problem“

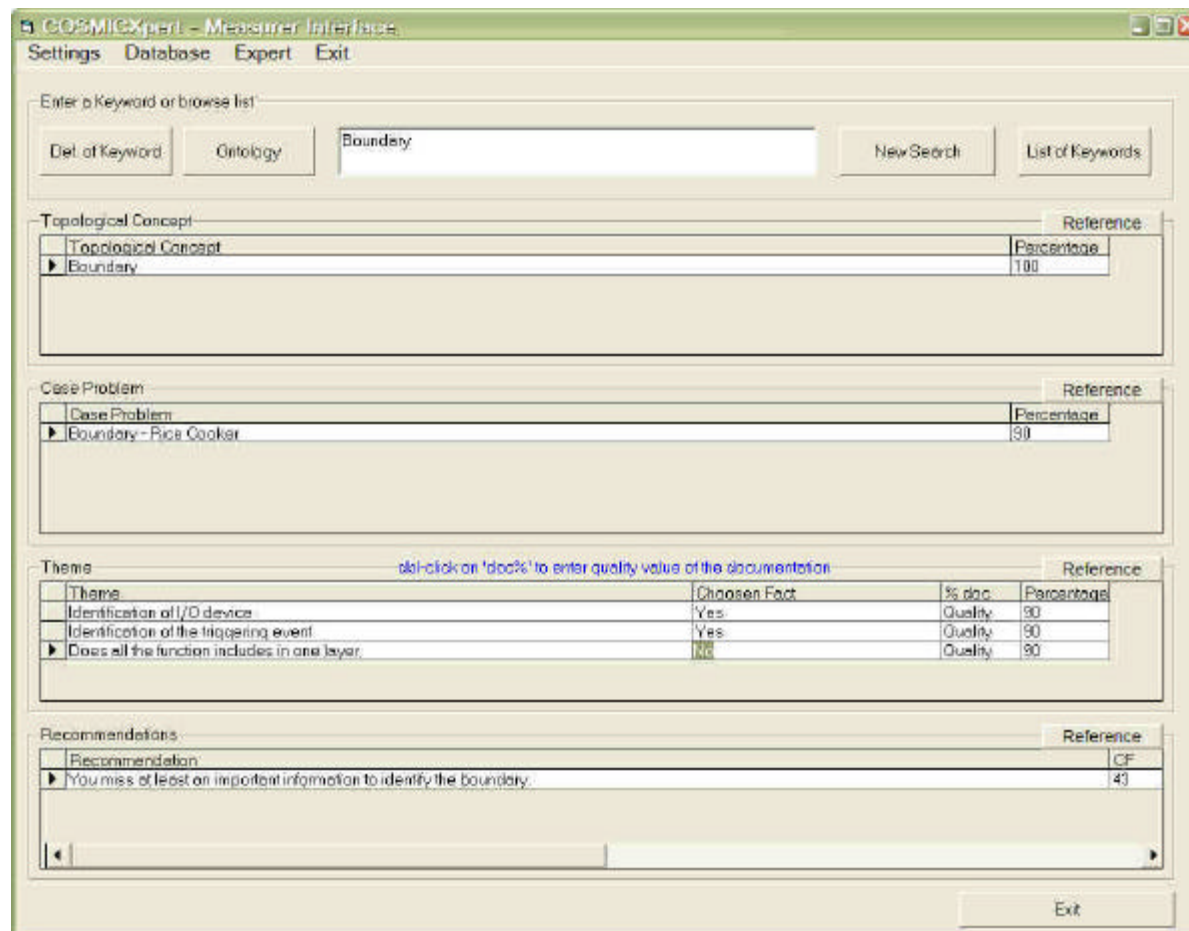
Expert Interface

Managing knowledge (add, delete, modify, ...)

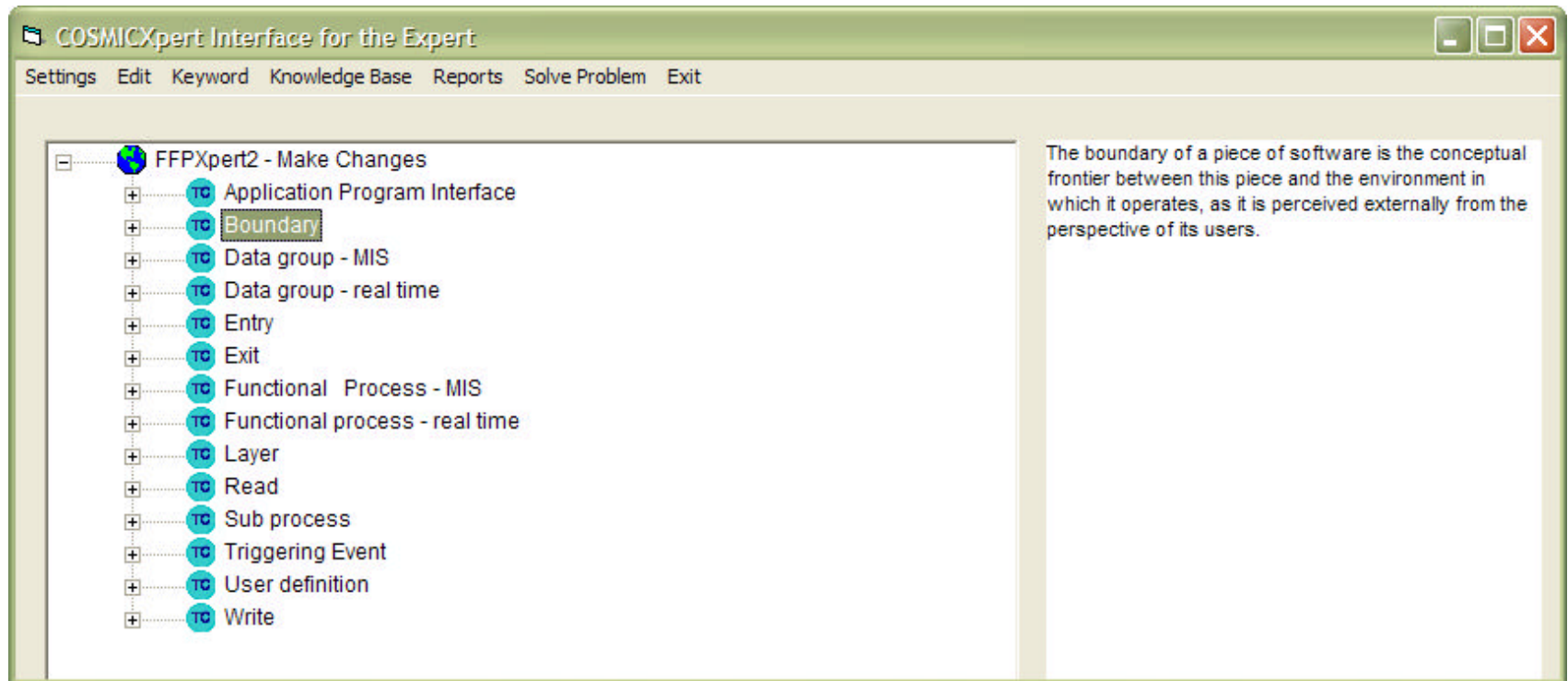
Administrator Interface

User mangement (grant rights, add, delete)

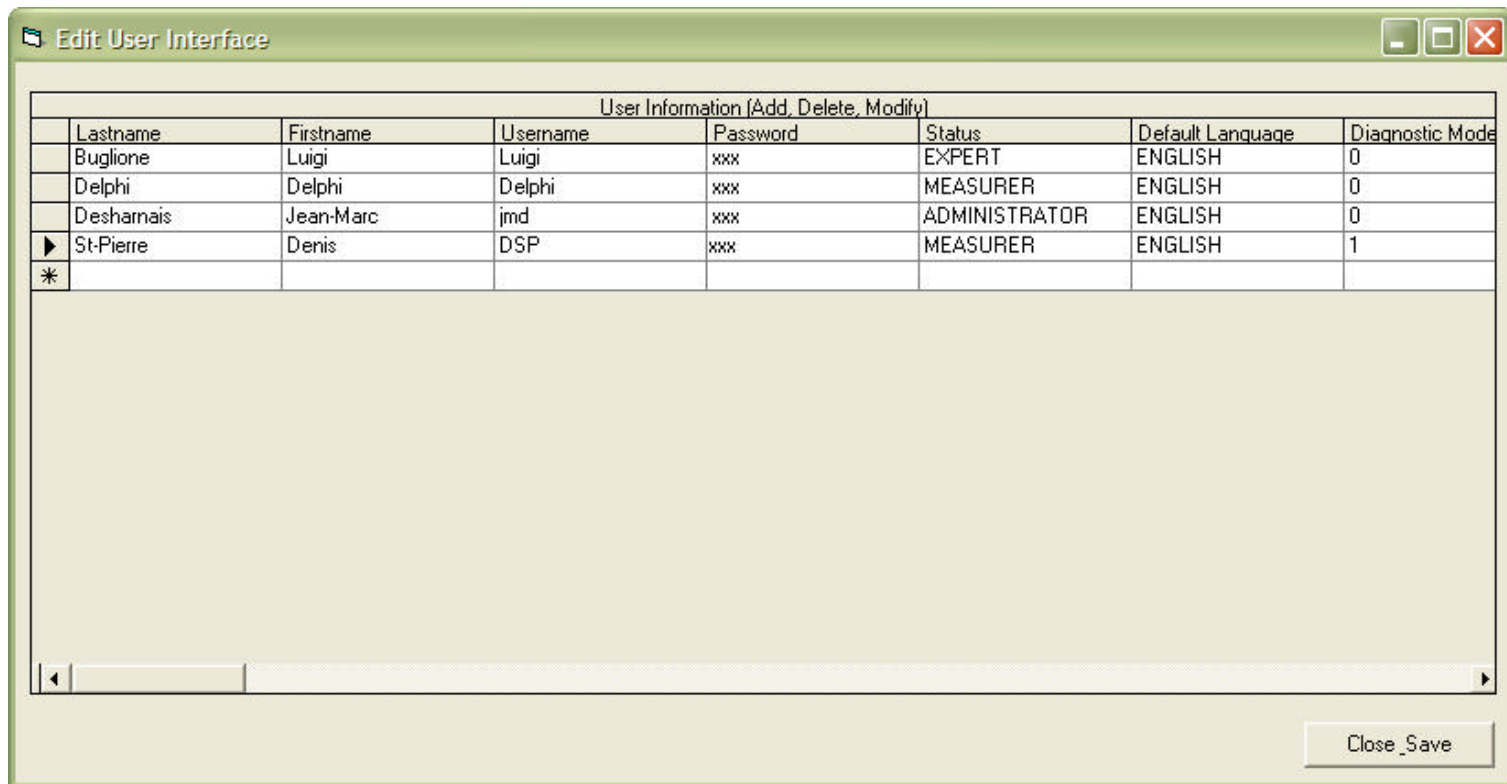
Measurer Interface



Expert Interface



Administrator Interface



The screenshot shows a window titled "Edit User Interface" with a table of user information. The table has columns for Lastname, Firstname, Username, Password, Status, Default Language, and Diagnostic Mode. The data rows are as follows:

| User Information (Add, Delete, Modify) | | | | | | | |
|--|------------|-----------|----------|----------|---------------|------------------|-----------------|
| | Lastname | Firstname | Username | Password | Status | Default Language | Diagnostic Mode |
| | Buglione | Luigi | Luigi | xxx | EXPERT | ENGLISH | 0 |
| | Delphi | Delphi | Delphi | xxx | MEASURER | ENGLISH | 0 |
| | Desharnais | Jean-Marc | jmd | xxx | ADMINISTRATOR | ENGLISH | 0 |
| ▶ | St-Pierre | Denis | DSP | xxx | MEASURER | ENGLISH | 1 |
| * | | | | | | | |

At the bottom right of the window, there is a button labeled "Close_Save".

Future Research

- The Diagnostic Tool with 34 case problems was submitted to different experts in the past three months
- Based on initial feedback, the case problems are systematically being revised by two graduate students (September 2002)
- At the end of this revision, new case problems will be added
- At the end of October 2002, two different novice teams (16 novices for each will use COSMICXpert in a controlled experiment
 - **To compare the results of those who will have access to the Diagnostic Tool with those who will not have access to the Diagnostic Tool.**