Chapter 7

Evaluation

7.1 Introduction

Previous chapter presented the information about tools and technologies used for the implementation of the system. It also mentioned the software technologies behind the development.

This chapter will provide the information about how the system evaluation has been planned and how it was carried out. Several approaches were taken during the evaluation process; this includes both functionality level evaluation as well as validation of the results.

7.2 Evaluation procedures

Evaluation of the system carried out in several levels. This consists of the evaluation and validation of agent behaviour which is the most difficult part of the evaluation process. On the other hand the most important part of the evaluation process is, the verification of the information validity which was carried out with the domain expert. System usability is also one of the important aspects of evaluation procedures which was also carried out with domain expert. Evaluation was done in three different ways depending on the module that is being evaluated.

7.2.1 Scenario based approach

Scenario based approach has been used to validate the functionalities of the agent system. Four different type of scenarios been used based on the agent behaviour during the problem solving.

a) **Scenario 1: Request was known to multiple agents**

This scenario evaluated the system based on how communication happens between several agents. Ideally once a request is received through the communication module,

message agent should transfer it to message console and display it where all other agent could see it.

When it comes to the evaluation process, a query was submitted which was known by multiple agents. Based on their knowledge, agents were communicated and negotiated between each other and at the same time unwanted agents (not related to the query) were removed from the system. Once the intra agent negotiation was over the final conclusion was presented to the user with suggestions.

b) Scenario 2: Request was known to a single agent

The objective of this scenario was to evaluate the behaviour of the system when the limited amount of knowledge available or no information available regarding the query. It also emphasised on how knowledge acquisition happened when given knowledge is insufficient in solving a problem.

Once the request is placed, minimal communication took place depending on the information availability. This minimal communication triggered message agent and knowledge acquisition process initiated asking expert user to alter the knowledge base to feed new information.

c) Scenario 3: Competitive behaviour of agents in rule processing

This scenario evaluated the behaviour of agents in a competitive environment. Evaluation carried out by stimulating a situation where several Market agents are competing with each other to sell inorganic nitrogen related fertilizer product.

7.2.2 Information validation

The objective of the AIS is to provide solutions and suggestions for a given query through intra agent communication and negotiation. Since it's a system response to a user query, the outcome results should be acceptable as if a human expert responding. In that case the acceptability of the system outcomes were experimented with proper validation procedures.

Information validation process totally depends on the domain expert therefore multiple problem scenarios were issued to the system and out comes were discussed

with him. It could be concluded as, for a given query, provided that information is known to the system both system and domain expert provided the same answer.

7.2.3 System Usability

Usability is one of the most important aspects of any system and it could be considered as one the most visible aspects. System usability was tested with the help of several ordinary internet users. During this evaluation process user concerns were gathered over several aspects of the system such as friendliness of the user interfaces, flexibility of user registration and farm registration process, and overall user friendliness of the system. Comments on the usability of SMS module also considered as an evaluation parameter. When system as a whole considered, satisfactory comments received for the user friendliness of web and SMS user interfaces and other system related user initiated process.

7.2.4 Agro product sellers

Seller agent requires the ability of competitive with each other. Rule analysing and processing is the best approach within this dynamic environment. Evaluation process has been carried out with the help of the scenario based approach.

7.3 Evaluation setup

Agricultural domain itself is consists of several sub domains with enormous amount of aspects. Therefore it is highly time consuming and very complex to capture all the system evaluation scenarios. When it comes to AIS evaluation, it was examined based on limited number of aspects of the domain because of this only few aspects of green chile and salad leaf cultivations were used in this.

7.4 Summary

This chapter presented the information on the setup of AIS evaluation and the methods and techniques were used during the evaluation process. Four different approaches were used to cater the different requirement of the separate modules and components.

First, scenario based approach was used to evaluate the agent system. Then validation process was carried out for the information received from the system. The validation of the system usability was carried out with the help of two general Internet users. Finally with the help of a scenario based approach, system behaviour was observed in a competitive environment.

The next Chapter will present the achievements of the system by considering the outputs of the evaluation process and observe the level of achievements of each and every objective.