ABSTRACT

In all over the world, the Open and Distance mode of learning is becoming more and more popular day-by-day. The modes of learning are now directing towards this mode which is basically online. In case of modes of learning, there are different concepts which are coming-up. One of such concepts is “Blended Learning” which combines the face-to-face teaching methods and Online Learning methods. This instructional model is proving highly effective for the educational institutions for meeting the challenges of student achievements with limited resources.

Beside ESOA, also a number of literatures are found in Agent Technology. The Distributed Database Repository (DDR), Java-based Interoperable Mobile Agent Framework (JIMAF) etc. are some implemented and suggested agent based systems. Also some comparisons and evaluations regrading the different agent are reviewed some architectural models of agent based systems. But in case literatures in Agent Technology in Expert System, a very few numbers are found.

Distributed Environment itself is a term which covers all types of environments where distribution is done over any of the functional or non-functional parts are distributed or over the whole system. It may be distributed systems, client/server system, distributed database management system, distributed computing, remote execution etc. In my work the term “Distributed Environment” is used as I have emphasised on the distributed database system which is non-homogeneous (i.e. heterogeneous).
Agent technology is a relatively new and immerging field of applying artificial intelligence (AI). Agent is an artificial agent and its works in a software environment.

Agent platforms can be considered as the place where the agents of different types can be managed and can be able to interact within themselves and outside as necessary. Agent platforms can be implemented as the layer over the hardware devices with the help of container concept which makes the platform independent from the underlying operating system. Mobile agents, an agent type, have the capability of migrating from one container to another where the source and the destination container may be within the platform or may be in different platforms. This thesis also discusses the different concepts regarding Agent Life-Cycle, Agent Environments, Agent Communications etc.

Expert system, shortly ES, is a branch of Artificial Intelligence. It is basically useful for solving problems at the level of human expert by extensively using the specialized knowledge. An expert system can be defined as computer program that emulates the decision making ability of a human expert. This thesis contains brief discussions on the architecture of Expert System and the Expert System Shells.

JADE (Java Agent Development Framework) is a software development framework. It supports the FIPA standard and also has supports for development of multi-agent systems and applications. It basically includes: a runtime environment, a library of classes agent for development and a
graphical suite of tools that give an easy way for administrating and monitoring the activity of running agents.

JIPMS (JADE Inter-platform Mobility Service) is a service which allows Inter-platform mobility support to JADE. It is an extra module, which does not come with JADE package and can be downloadable from the net.

Agent based Expert System for Online Assessment System in Distributed Database Environment is a relatively new area of research. The main idea of this research is to design a framework for agent based expert system and on top of the framework develop a prototype expert system to assess student learning. The designed system is named as EESOA (Extended Expert System for Online Assessment). Here, I have used the term "Distributed Environment" because here I want to mean the servers with different Database Management Systems but with same structure of the question databases. Also here we do not have any central Distributed Database Management System. Here the system will get question set from the various databases using agent technology.

In the implementation of EESOA, I have considered a few numbers of rules, where the rules are fired depending upon the student model. i.e., each time the inference engine has to search for the student model for the assessment history of the students and accordingly the questions are presented to the student for each attempt.
The following software tools are used in the design of EESOA.

- J2SDK 1.5.0,
- Apache Web Server 2.2,
- Apache Tomcat Server 6.0,
- MySQL Server 5.5,
- PostgreSQL Server 8.4,
- Mysql-connector-java-3.1.12,
- JDBC3 Postgresql Driver, Version 9.3-1101,
- JESS 7.1P2,
- JADE 4.3.0,
- JIPMS 1.2

The system is tested and evaluated with a dummy student model and a dummy question bank, distributed among three database servers.