ABSTRACT

Educational system in general and the learning process in particular are heading for a rapid change in the next millennium. Computers and computer networks are becoming major sources of information for the present and future generations. The emergence of Intelligent Tutoring System (ITS) has opened up new avenues for the use of computers in education. ITSs are able to tackle difficult instructional problems and extend the usefulness of the computer as an instructional tool. This thesis presents the research work done on some aspects of the design and implementation of ITSs. An attempt has been made to design the tutors with dynamic adaptive behavior. A multilevel hierarchical model has been developed for the representation of domain knowledge based on various aptitude levels of students. The work also describes student modeling principles using aptitude and action level identification and overlay methods. Three ITSs have been designed on these objectives and principles. Performance evaluation was carried out on the three tutors which forms part of the study.

This thesis consists of nine chapters. An extensive review of the principles and methods of domain knowledge representation and student modeling is presented in the Chapter-1. Chapter-2 provides a review of the field of Intelligent Tutoring Systems. Among the various systems developed during the past two decades, few significant systems are selected and classified for the review. In Chapter-3, the objectives of the work is given. The methodology followed in this work is explained in Chapter-4. Chapter-5 represents a mathematical model of ITS. Chapters - 6, 7 and 8 describe the design and implementation of the three ITSs designed out of this research work-namely ITNM, ITGT and ITPP. The design principles of the domain module and the student model module of the systems are given primary importance in the discussions presented in these chapters. The summary and conclusions are given in Chapter-9.