A B S T R A C T

The work carried out in the thesis utilizes the two modeling approaches, Object Constraint Language (OCL) and Real Time Constraint Notations (RTCN). The Finite Sate Machine (FSM) and Push Down Automata (PDA) are used for the formal verification of the problems identified in the thesis.

The first problem is the formal verification and simulation of Finger Print Recognition in ATM Transaction. The sequence diagrams and respective Finite State Machines are developed for the problem. Also, the Real Time Constraints are developed corresponding to sequence diagram using Object Constraint Language. The above developed model has been simulated using software tool ‘umltocsp’. The simulated results are found satisfactory with class diagrams and executed constraints conditions.

The second problem is the design of Mobile Data Logging Framework. A Push Down Automata based formal model for mobile call logs has been developed which are stored in clustered way. The Push Down Automata Transitions and Instantaneous Descriptions (ID) are also developed for incoming call updation. Object Constraint Language has
been utilized to verify this Push Down Automata based model. This model has been simulated using software ‘emftocsp’ and the simulated results are found satisfactory in the form of developed class and object diagrams.

Finally, the thesis introduces the novel solutions for the problems, Finger Print Verification in ATM Transaction and Mobile Data Logging Framework. An amalgam of various modeling and formal verification languages, like Real Time Constraint Notation, Object Constraint Language, Finite State Machines and Push Down Automata has been utilized for the modeling and formal verification of the proposed problems. Also, ‘umltocsp’ and ‘emftocsp’ are software used for the simulation of the problems.