

## A jade based healthcare system

Sharmila Rathod<sup>#1</sup>

Computer Engineering Department, JIT University

Chudela, Jhunjhunu, rajasthan, India

Sharmila\_rathod@yahoo.co.in

**Abstract**— Due to the fast increasing growth of technologies in mobile networks and the Internet, mobile and more in general distributed computing are two basic research areas of Information Technology. These technologies plays an important role in our existing life start from education, social, healthcare, career and many more. The existence of these technologies in our daily life has by far changed the way we learn, work, communicate, seek information and organize our lives.

The Intra networks atmospheres in which a organization monitors and governs all points. In order to provide an increased flexibility between clients and servers, Mobile agents can be used even in case of impaired network. From a central system a MA can be dispatched in order to control real-time devices.

**Index Terms**—Mobole agent, Jade, Heterogenous, database.

### I. INTRODUCTION

New Technologies have facilitates the formation of network application in day to day life. Mobile agent is a program to work on a users' behalf. <sup>[D97]</sup> <sup>[D98]</sup>. Over the years, it has been a region of significant research for decision building in the field of mobile agent and a hospital emergency scenario.

In case of a critical situations, it becomes very difficult for making appropriate decision about selection of a hospital, these real-time situation most of the time require a real time data to access so that appropriate decision to be made. In such a situation making improper decision while selecting the hospital, allergic information's, doctors, may cause to a death. All the record and information in such a catastrophe environment must be complete and up to dated.

A JADE based Multi-Database decision making in catastrophe healthcare system (JMDCHS) focuses on knowledge and understanding of the surrounding

environment like available bandwidth, device capacity, patient's last transactions, and Central repository of the patient and hospital current information. A time-decisive problem for making decision in emergency situation needs to establish system structure that allows wireless connectivity and multiple source of information are processed parallel.

In this paper, it is a collection which demonstrate heterogeneity, situation alertness, mobile agents, agent oriented software engineering and making right decision, on an exceedingly lively, unpredictable catastrophe medical domain. Particularly the thesis demonstrates the use of Java Agent Development Environment, mobile agents to support the hospital searching services in immediate. The specific requirement of the JMDCHS application, functional and quality aspects are presented in this study using agent oriented software engineering concepts. This hypothesis explains an urgent situation to demonstrate the soundness and viability of the JMDCHS model. The study discovered most important technical pros and cons of mobile agent technique.

### II. PROBLEM DEFINITION

At the current situation in India, if a person meets with any kind of accident then the onlookers take him to the nearby hospital. Without the knowledge of the patient's medical history it becomes difficult for the hospital staff to give a first aid to that patient. Hospital may have to carry out all the formalities like informing to his relatives, carrying out the basic medical test which is required. In such a situation the allergic information of the patient might go unseen; this may result in harm to that patient. In addition to this where the patient is brought at the eleventh hour all the medical facilities might not be available or the specialist doctor is not available. In such a disaster situation a person might have to scarify his life. To understand and locate the problem area of an Indian healthcare system's handling of the accident catastrophe situation an author have designed maze diagram which is

shown in the following Figure 1. in this maze green arrows show patient movement toward a successful rescue and red shows the direction if occurred then the patient might have to scarify his/her life due to some reasons as shown in the Figure1.

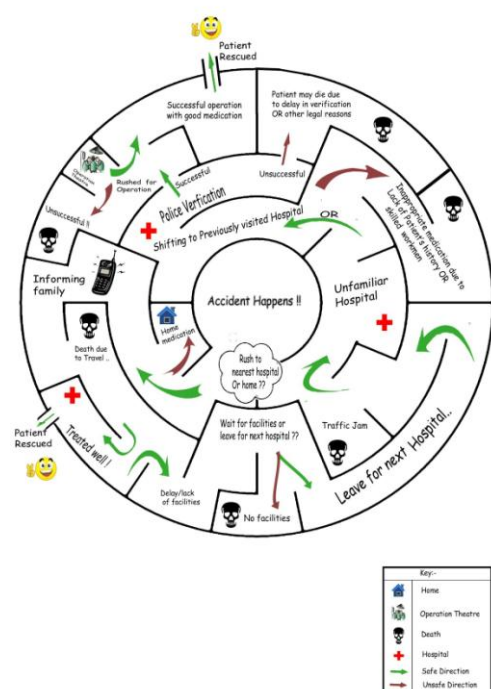


Fig. 1 Problem with the current healthcare system in India

### III. BACKGROUND AND MOTIVATION

An agent is nothing but a software program which is talented for adapting autonomous action in active, unpredictable environment. Multi-Agent systems interact in dynamic and heterogeneous environments, span organizational limits as well as adapt the dynamic changes and operate efficiently. [FA12] MA is a program which helps user to complete their work task on their behalf. [D97] [D98]

“An Agent is an autonomous software element with a degree of intelligence, mobility, while being able to communicate efficiently with others for examples other MAs, Systems and users”. They can handle responsibilities without constantly consulting the user with a dedication, on their

behalf. They can effectively co-ordinate among agents, users and software hosts. A searching agent that is competent to retrieve preferred information on behalf of the users. The agent is sent away to carry out the look for off-line as well, after being told what to search for. Eventually, the agent can move back with needed output. [C98]

With the use of mobile agent, it becomes a reduction in network traffic, because a mobile agent transfer itself with a state information, which is often very small than a data so reduces the network traffic. In case of disconnected operation mobile agent can perform in an asynchronous autonomous, as an agent can act on behalf of the user when the user is not present. It is possible for a mobile agent to interaction in real-time systems, which may prevent delays caused by network failure. MA can execute on single node at a time, CPU consumption is limited thus it saves an Efficiency. Mobile agent always Support for heterogeneous environments. Mobile agent can be exchanged virtually, so it is very easy software upgrades

The agent-based view comprises of many tools and method for concept development and implementation of complex systems. Agents equip with tools and infrastructure for developing and designing an autonomous, communicative components. Ambulance agents fetches information about hospital and patients and with this learning about the healthcare environment, elicit patient information, finding ways to search appropriate hospitals and collaborate with different hospital agents, and developing correct way of maintaining the hospital relevant information [L06].

### IV. PROBLEM SOLUTION

The research illustrates the Jade-based Multi-database decision making in a catastrophe healthcare system model with similar critical circumstances. Imagine catastrophe condition, an adulthood man, during his way to office, meets with an accident (or cardiac arrest) on road. In this thesis it is assumed, the person walking on a road see this catastrophic condition of that patient and immediately call to a transmit center, with the information's about the accident's location the type of mishap, together with several type of identification card and if possible a name (this thesis work imagine that the patient will identification card like his driving license, aadhar card with him). The most appropriate ambulatory service, gets a message from the transmit centre for dispatching an ambulance on the accident sight. The person present on the ambulance node called as paramedics

makes use of PDA or a laptop in the ambulance to find out the list of near proximity hospitals from the accident position.

Paramedic uses a details about the patients like patients aadhar ID, name, gender, type of treatment needed for that emergency position, which he acquire from a dispatch center. After doing this, the person in ambulance side utilizes the travelling time to reach the accident location by launching two mobile agents namely hospital mobile agent and a repository mobile agent. As per the characteristic of mobile agents, these two agents also posses feature such as autonomous and asynchronous, with which they gather the important information for a paramedic on his behalf. Lastly all their result are collaborated and displayed on a PDA on ambulance. The hospital mobile agent salvages the most recent information about all the hospital recourses, among the listed hospital given to it. The Short listing a set of hospitals is done by a paramedic derived from the patient's location. If it is not specified then agent might visit to all the associated hospital in an application, regardless of its physical location from an accident scene.

In this research is it assumed that every hospital is a distributed, individual medical institution. The mobile assistant migrates to each of the hospitals, which was assigned to it one by one, once it is launched. On arrival, to the destination hospital node mobile agent start interacting with that hospital locally to gain the recent recourse details of that hospital. Through the collaboration with the stationary agent the agent retrieve following information.

## V. RESULT SCREEN SHOTS

Hospital data displayed on the ambulance node. In other hand the mobile agent which is launched for fetching patients medical history will also get a patients detail information about what is his allergic information, deceases, doctor conceited in past are displayed as shown in the following screen shot Figure.

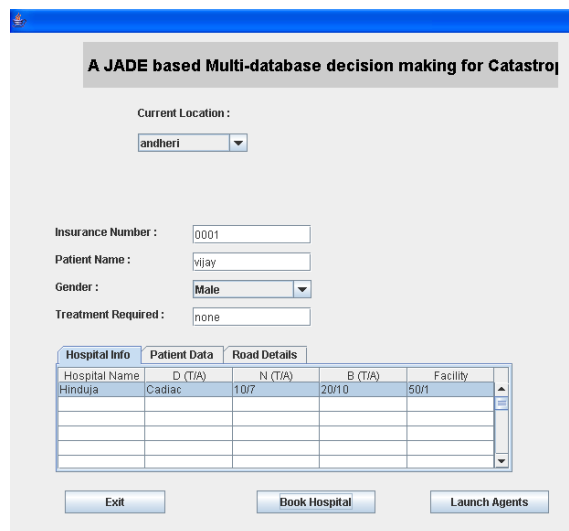


Fig. 2 Hospital data screen of a JADE based Healthcare system

In order to retrieve, a record of an individual patient the proposed architecture makes use of a unique identification of a patient (in this thesis an aadhar card number). The healthcare repository module also supports an agent system so that a coordination and communication can occur in an entire system. The data assistant node already has logic to retrieve the relevant patient information so repository agent becomes just a static node who serves the mobile data assistant.

The stationary repository node is nothing but a database which gives connection to all database tables, for storing the necessary details. The mobile agent makes use of this information to recover the patient's medical details.

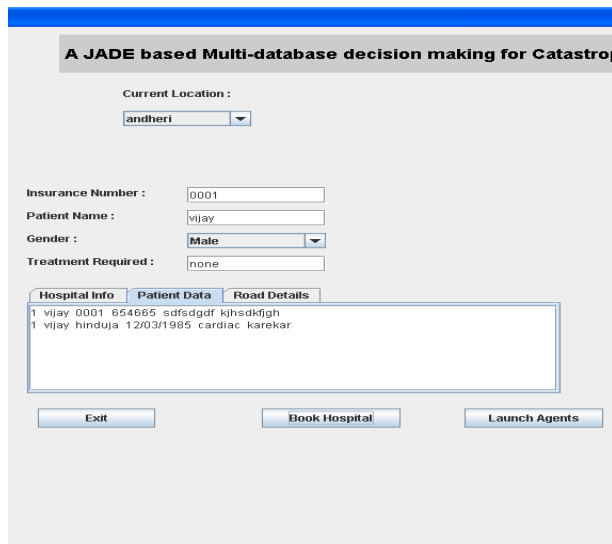


Fig. 3 Patient data screen of a JADE based Healthcare system

## VI. TESTING

Testing in Jade based Multi database decision making in catastrophe healthcare system with a unit test approach, is illustrated in the thesis, in which each agent starting from an ambulance agent, hospital agent, repository agent all perform a different roles. As and when an Ambulance agent initiated in the environment, is gets register to the directory facilitator service with the name "Ambulance Agent", launch two agents with the name repository agent and a Hospital agent. The movement the launch button pressed two more agent s gets initiated in the environment, namely hospital Agent and Repository Agent. They search for a directory as Ambulance agent and then send a message to the previously registered agent.

The test case table for an Ambulance agent is given below in the Table 1. Containing the role of ambulance agent like an ambulance on board devices. It interacts with the ambuSearchAgent, HospitalAgent, RepositoryAgent. In case of a successful scenario AmbuSearch agent will be launched. And in case of an Exceptional Scenario, Ambulance node will not be launched. This test gives a positive result showing the exact working of the node called AmbulanceAgent

Table 9.1 Test Case for Ambulance agent.

Agent	AmbulanceAgent
Roles	Ambulance Agent
Interacting Roles	AmbuSearchAgent, HospitalAgent, RepositoryAgent
Successful Scenario	AmbuSearch agent will be launched
Exceptional Scenario	Ambulance node will not be launched

Table 2 Test Case for RepositoryAgent.

Agent	RepositoryAgent.
Roles	Central Repository system
Interacting Roles	Data assistance agent
Successful Scenario	All the information about a particular patient will be collected and given to the ambulance node.
Exceptional Scenario	Agent is not able to migrate itself

The table below depicts a test data, expected result, actual result and status of the test whether pass or fail for the ambulance node in Table 3.

Table 3 Test table for ambulance node.

Step	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	Navigate to Ambulance node page		Users should get patient name and id details	User is navigated to patients details	Pass	
2	Provide valid Patient Information	Patient name: Sharmila (From the table patient name is matching)		dashboard with successful details of patient sharmila	Pass	

The Evaluation of JMDCHS based on the feedback given by experts of technologies. This research is also gone through evaluations from some technology experts. Base on the points like whether the purpose of JMDCHS is clearly stated or not, whether the target audience patient's and medical staff are identified or not. The JMDCHS is also evaluated for its depth and the stating of scope for catastrophe medical situation.

The author also evaluated the JMDCHS based on its features like Usefulness, Context awareness, handling of information, whether the application is user-friendly or not and how it will be accepted in general in an Indian scenario. The forms were distributed to some technical skilled persons and how they rank the entire application is also evaluated. Many of them come up with an appreciation and some suggestion for the future enhancement of the JMDCHS. Many of the experts find its little difficult to adapt this inn an Indian scenario without help from a government body.

Author have also plotted the evaluation for features of JMDCHD and depicted that in the following charts. The following charts describe about the evaluation on the usefulness of the jade based Multi-database decision making in a catastrophe healthcare system.

The following Table 4 gives a detail about the features of JMDCHS and its evaluation done by the various people who gave a feedback of JMDCHS. 71% of the population found it very useful for the society and the healthcare system of the India. 57% population agrees that the information handling in JMDCHS if good. 71% of people say the context awareness of the JMDCHS is good whereas 43% found it user friendly. As per the actual deployment and general acceptance of the application is concern 43% of the population accept it is difficult.

Table 4 Feature of JMDCHS

Features of JMDCHS	Good	Average	Worst
Usefulness	71%	29%	0
Information handling	57%	43%	0
Context awareness	71%	29%	0
User friendly	43%	43%	14%
General acceptance	29%	29%	43%

## I. CONCLUSIONS

The Paper is an effort to improve the quality of health care in an Indian situation. This research demonstrates the use of Java Agent Development environment JADE mobile agent in a highly mobile and dynamic distributed environment for the ambulatory services, showing its competency and effectiveness. There are various assumptions made in the research like all the citizen of India is registered with the organization. This is assuming because the



healthcare medical domain is very sensitive. There could be some extensions, which could be applied to this model to deploy a model in a real world.

The most important goal of this thesis is to provide a solution for the patients and propose an intelligent decision making at the emergency time; this can save a patient's life even in a catastrophe situation. To achieve this aim the rigorous review of literature was carried out to.

A JMDCHS questionnaire was prepared according to the systems requirements to know more about the existing system in Indian healthcare. That questionnaire was circulated to 10 citizens of India, few are staying in India at present and few are resident of some foreign countries at present. The questionnaire, studied for the statistical analysis in order to achieve the actual outcomes.

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