Location Based Application for Accessing Emergency Pharmacy Services over the Mobile

By B.G. Premasudha
B.E.,M.C.A.
Asst.Prof. and Head,
Department of Master of computer Applications,
Siddaganga Institute of Technology,Tumkur,India.

Co-Authors

- Dr.Shiva Kumar Swamy

Prof. and Principal, Mallige College of Pharmacy, Bangalore.

- Dr.B.Suryana Adiga

Consultant Supervisor, Embedded Systems Group, Tata Consultancy Services,

Bangalore.

Abstract

- *The mobile device is enabling a broad range of new applications that dynamically obtain information that is relevant to their current location. We propose an application Emergency Pharmacy Service to help the patient in finding the nearest pharmacy to get required emergency medicine in time from his current location.*
- *This concept uses customer's mobile devices to find the Address, Tracking Service, Route service, and Travel Advisory Services to nearest pharmacy by using localized location based services.*
- *The paper describes a model for associating location scopes with services, architecture to support the discovery of location-based services on the Mobile Internet, and a prototype infrastructure for emergency pharmacy services.*

Keywords

- ***Location Based Services,***
- ***Client/Server,***
- ***GPS,***
- ***Dijkstra's algorithm,***
- ***GIS.***

INTRODUCTION

- Use of mobile device is spread rapidly, and information service provided to mobile clients carrying small, battery powered terminals, such as Personal Digital Assistant (PDA),cellular phones or Laptop equipped with wireless connection, become increasingly necessary [1]. In this proposed emergency service, the kind of information requested is generally location dependent; that is mobile clients location is relevant to the query like finding nearest pharmacy to get required emergency drugs by using Location Based Services (LBS) concept.

- Emergency Pharmacy Service (EPS) is a System, which helps the city visitors to locate the nearest pharmacy from his current location, where the required drug/s of desired quantity is available. The system takes the user's id and health problem of the user for which the drug is required as inputs from their Mobile. This service in LBS is called pull-style services [3]. If the user is validated the system displays the drug/s list of the user from his doctor's prescription list and Over The Counter (OTC) drug/s list on their Mobile. The user is allowed to select the required drug/s from the list/s and then a search button is clicked. We assume that current location of the user can be obtained by using Global Positioning System (GPS) [3].

- Once the user press search button the system display the current area map on user's mobile with the current location icon. If the user clicks on that icon the system searches for required drug/s with all the nearest pharmacy in that locality where the required drug/s of desired quantity, not exceeding the expiry date is available and it also reply about the working hours, The traveling direction, address, and traveling time (approximately) to reach the nearest pharmacy to the user as an output. The system provides a continuous access to The pharmacy drug availability information for a new visitor (24 hours a day) in to the locality, through Mobile device.

- This application finds its critical use for old aged people, women, physically disabled, tourists and for persons requiring emergency medication in conditions like accidents, cardiac arrest, snake bite, epilepsy, etc. as well as general medication requiring Over The Counter (OTC) drug/s for conditions like diabetes, hypertension, fever,cold,cough, etc. Thus it enables common people to utilize the services of pharmacy care and aims to bring about a considerable improvement in their health status.

Literature Survey

- We find another variant of this system at the URL http://www.nyc.com/pharmacy. This system does not account for providing the exact location of the nearest pharmacy.Our system checks the availability of drugs with required quantity,shows direction, address,traveling distance and the time to reach the nearest pharmacy.

Garmin StreetPilot c340

The StreetPilot c340 provides in-car navigation that is simple for anyone to use directly out of the box. After selecting a destination from the user-friendly touch screen interface, Garmin's text-to-speech feature tells users the name of the street, when to turn, and in what direction. If you miss your turn, the c340 automatically calculates a new route to the destination.

But It is not useful to check the nearest pharmacy's data base for availability of Drugs and the user needs to specify the destination Pharmacy.

Our system finds and decides the drug available nearest pharmacy with traveling directions.

II. STRUCTURE AND FUNCTIONS

- Consider the situation in which a user approaches a new city and is looking for a nearest pharmacy from his current location. Initially, the current location map is displayed on their mobile and user follows a route that leads in the direction of the nearest pharmacy, as indicated on a large-scale map. Then, as the user enters and navigates the city, a more detailed map is presented to the user.

DESIGN

- We have used the Cartesian coordinate system to draw this map over an applet. In this, each pixel is identified by its x and y coordinates. Here we are reading the user's location dynamically; to give him the route from his current location. We assume that each mobile is capable of self-location using GPS. GPS provides specially coded satellite Signals that may be processed by a GPS receiver, enabling the receiver to compute position, velocity and time [13]. The users of the system take advantage of special purpose GPS receivers to convert the signals into position [4]. This position is converted in to pixel value in the map as user's current location. The pixels lying at the road corners are chosen and named.

- These named pixels are stored in point table. Here the pixel name is the point name. And its x and y coordinates are stored. If there exists a direct connection between any two points, then these two points are stored in the line table.
- Pharmacy information is stored in the Pharmacy table.Pharmacies are also identified by x and y coordinates in the pharmacy table. When the user clicks on his current location, a mouse event reads the x and y coordinates. Since this user location may not be stored in the point table, nearest point in this table is assigned as a source node for the algorithm.

- But at the time of giving output, distance between exact user location and assigned pharmacy node is taken into account.
- To optimize the computation, radius around the user location is considered.
- To find the nearest pharmacy, all the pharmacies within this radius are selected. Then the working hours of pharmacy, drugs availability and expiry date of available drugs are checked at these pharmacy's servers.
- In the sense that, every selected pharmacy is examined whether it has user-desired drugs. If not, that pharmacy is discarded. If no pharmacy within this radius satisfies the drug availability condition, then the radius is increased.

- In this project we find the shortest path from the user's current location to the nearest pharmacy by Dijkstra's algorithm. This algorithm is Single Source Shortest Path algorithm.
- It finds the shortest distance from single source to multiple destinations [5].
- Since more than two pharmacies may be selected, we need to find the shortest distance to these pharmacies from the user location which is the single source.
- In first iteration, a node nearest to the source is identified. Then direct distance between these two nodes are set as the distance of the selected node. The distance between these two points is calculated by using the Phythogorous formula

$Dist(A,B)=SQRT((x1-x2)^2+(y1-y2)^2)$

This distance is updated in the matrix.Otherwise it is infinity.

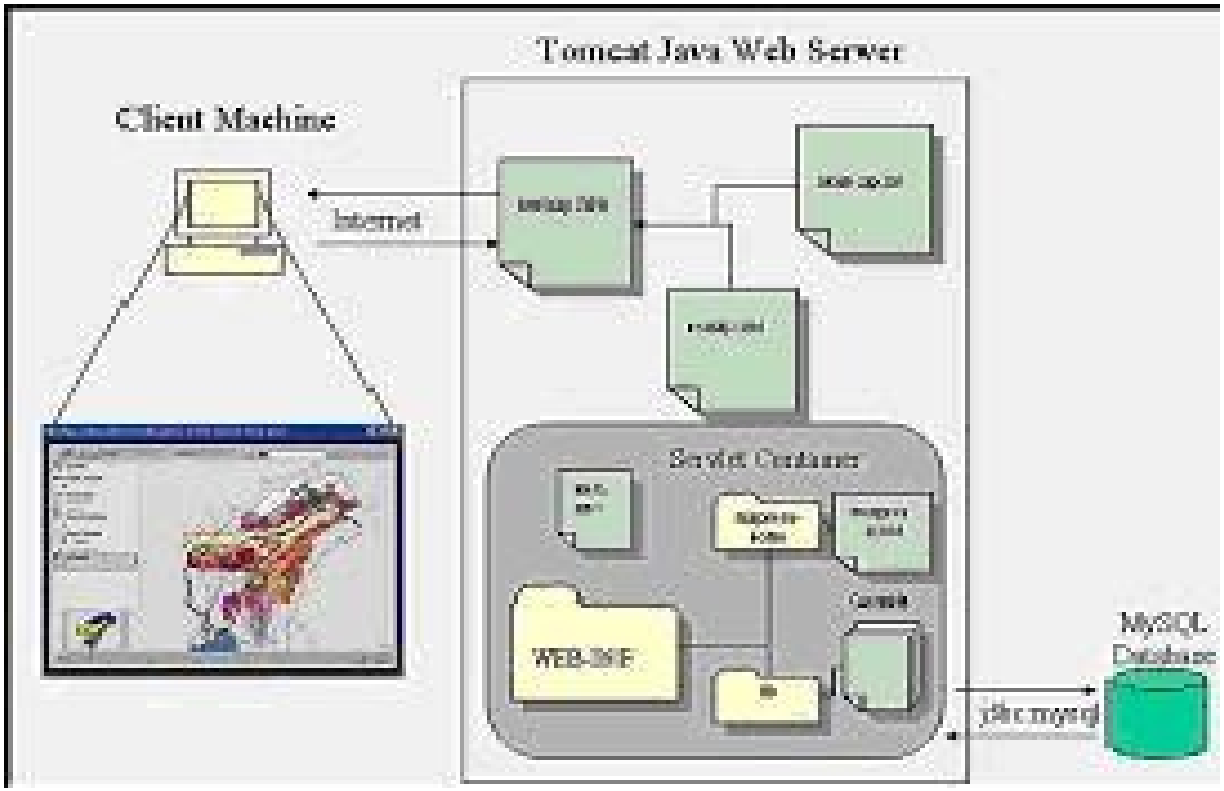
IMPLIMENTATION

The Internet is Client/Server based where the client sends a request for service and the server processes the request and returns information to the client. The map data is handled by a set of JAVA Servlets and making request to the map server makes user interactivity through a Map- Applet that can be downloaded to any client machine. The system described here aims to provide information on implementing a Client/Server based Internet GIS through a web-based platform. Designing and implementing Internet GIS with freely available software tools can be successfully done with little care[11]. To obtain map data in standard formats we have to depend on commercial products like ArcView, MapInfo etc.

Therefore, small investments are required for the generation of basic Geographic Information Services (GIS) data, but the cost will be almost nil by using products like ALOV Map (free Internet GIS software)[9], the Java Development Kit (JDK), Tomcat Java Web Server, MySQL RDBMS etc for developing a Client/Server based Internet GIS. ArcView software is used to generate shp and dbf files and that is the only commercial product used here. ALOV Map is free portable Java® application for publishing vector and raster maps on Internet and interactive viewing through Web browsers.

ALOV Map/TMJava is free, portable Java® application for publication vector and raster maps to Internet and interactive viewing on web browsers. It supports the complex rendering architecture, the unlimited navigation and allows working with multiple layers, thematic maps, hyperlinked features and attribute data.

The below shown figure illustrates the structure of the system comprised of ALOV Map, Tomcat Java Web Server and MySQL relational database.



Simple steps to build ALOV Map based Internet GIS

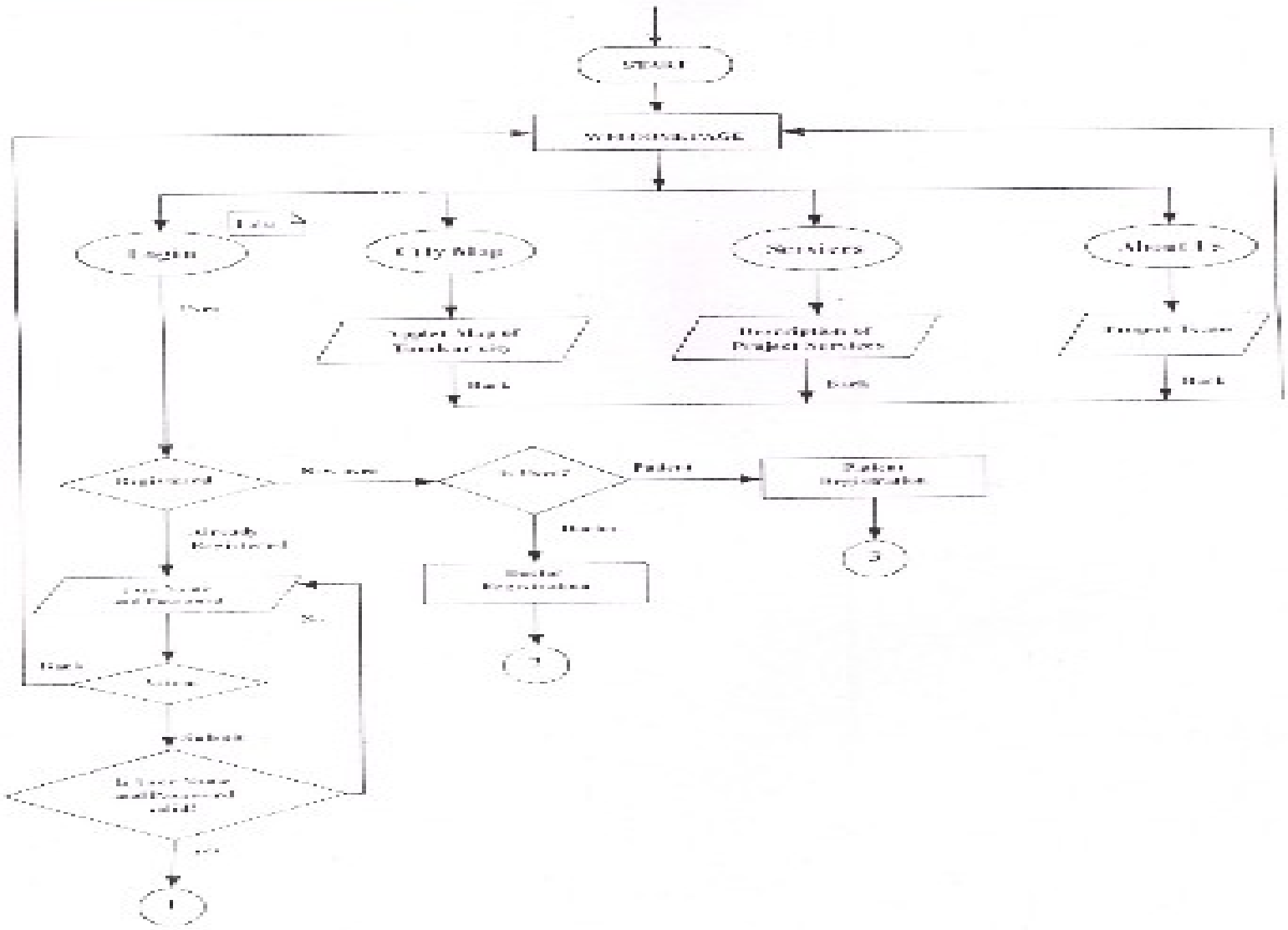
Step 1: Creation of map layers (shp) and attribute tables (dbf)
Step 2: Creation of database clearinghouse in MySQL
Step 3: Creation of map folder in Tomcat \Webapps directory and placing the required files (Java. class & other files) of ALOV Map.
Step 4: Pumping of map data (shp and dbf files) to map database in MySQL using UpLoadServlet. It creates a project xml file automatically.
Step 5: Editing of the project xml file with required parameters
Step 6: Testing the program

Maps are shown with decimal geographic coordinates in the applet. Web links have been given for some layers to be connected with related web sites. The flexibility of the system is that modification or updating of map data can be done at any point with the help of UploadServlet interface.

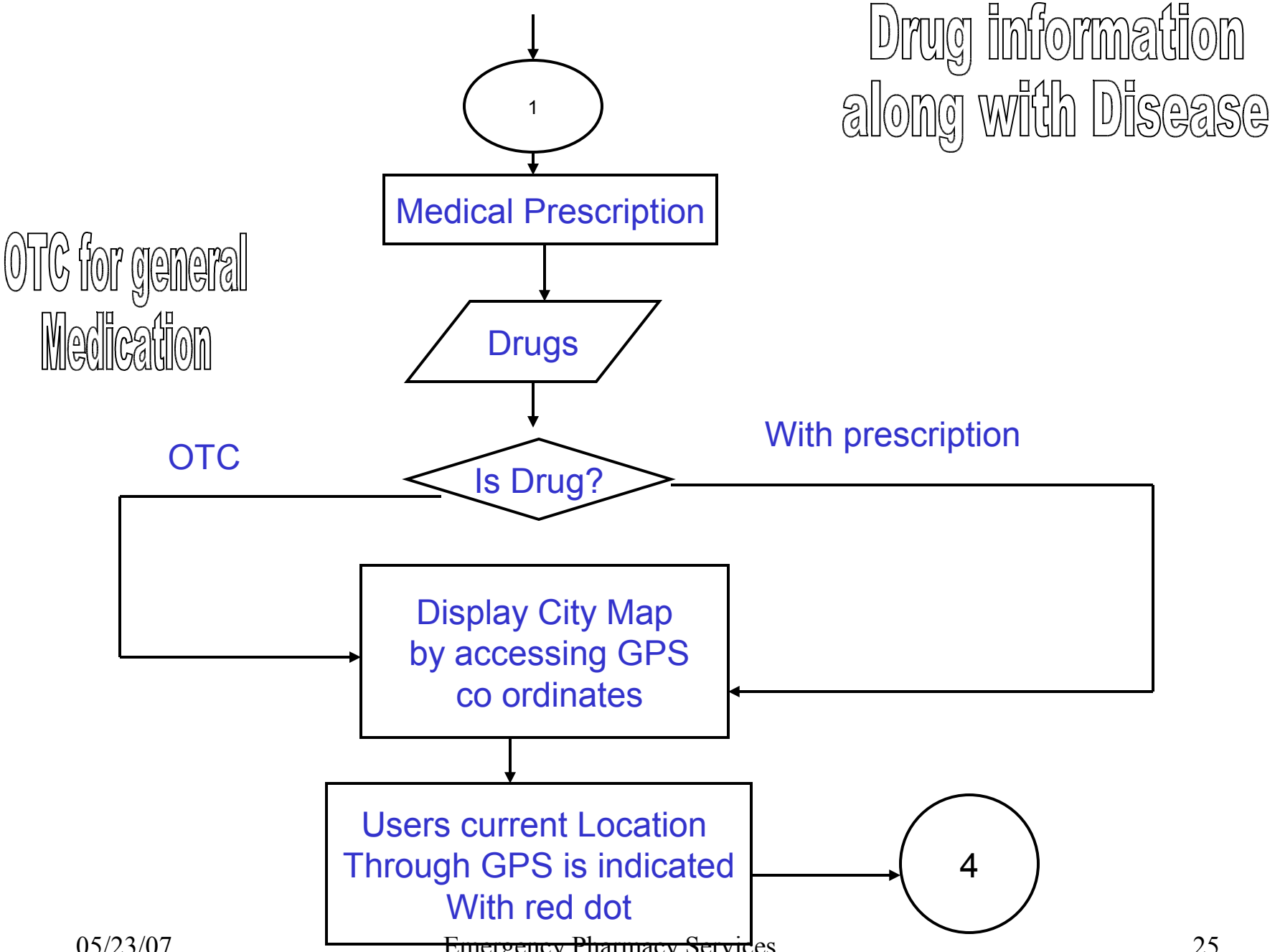
We have done experimental test bed in our college lab, with Pentium-based PC as server with wireless adopter. Our mobile host, carried by the user being tracked, was a Pentium-based Laptop computer running Microsoft WindowsXP. Mobile host was equipped with a Digital RoamAbout ™ Network Interface Card (NIC), based on WaveLAN ™ RF LAN technology. Using this we have made registered user to access pharmacy service by entering the required drugs through browser on laptop and viewed the route, address, traveling distance and traveling time to reach the nearest pharmacy with Laptop.

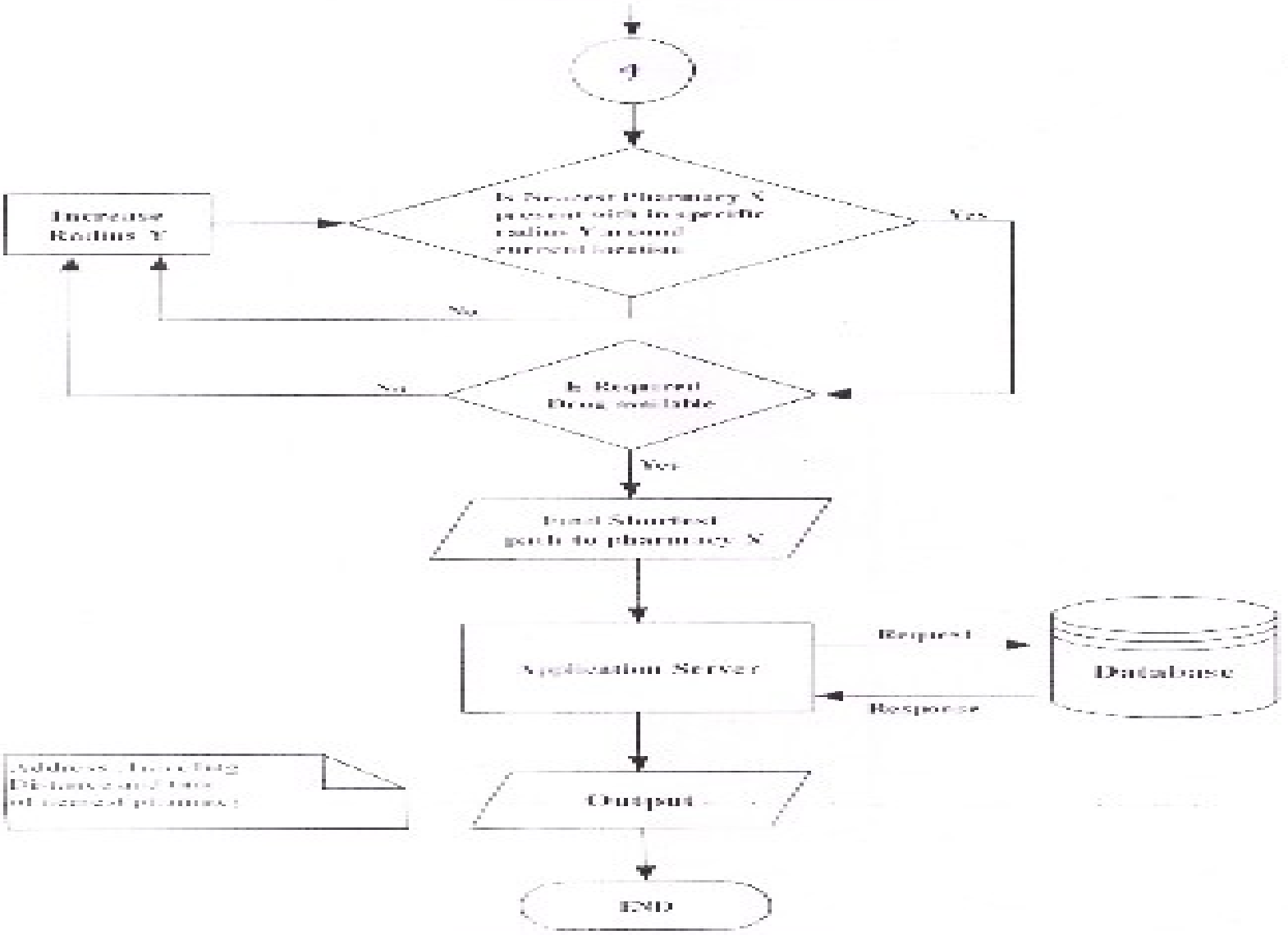
E-R Diagram

5.2 Data Flow Diagram



General Flow Diagram (Fig 5.1)

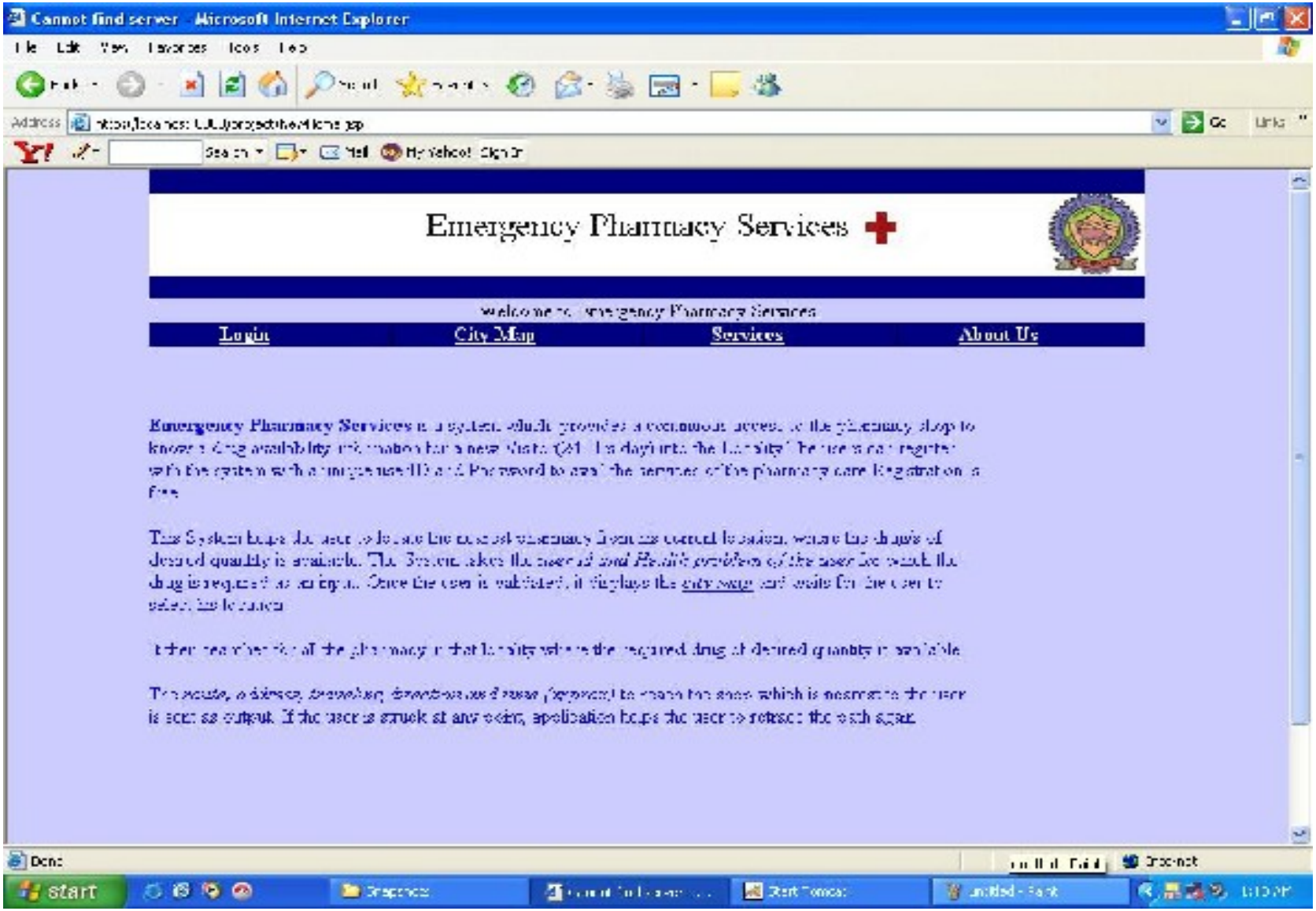

Drug information along with Disease
OTC for general Medication
1
Medical Prescription
Drugs
Is Drug?
OTC
With prescription
Display City Map by accessing GPS co ordinates
Users current Location Through GPS is indicated With red dot
4



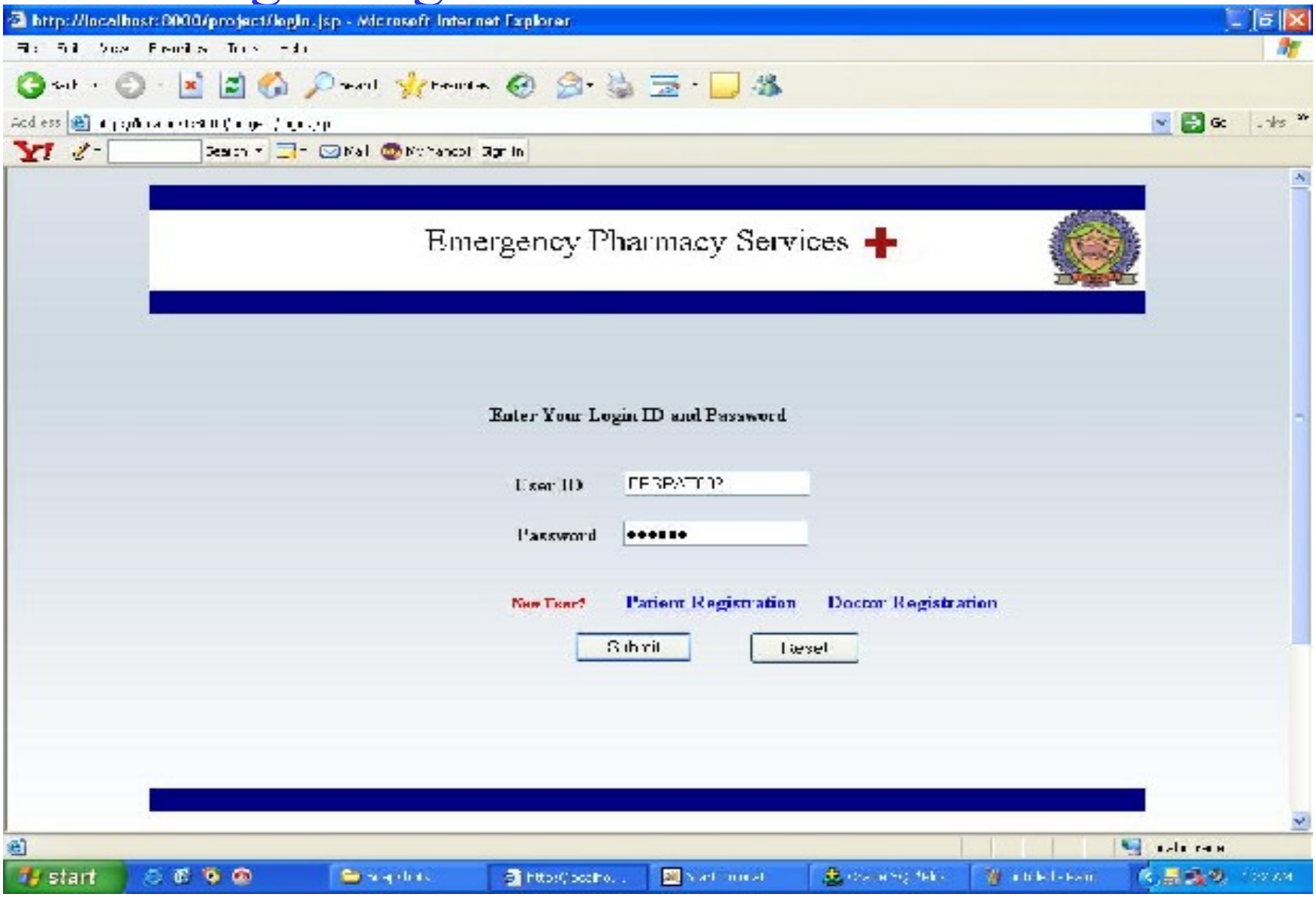
Output Flow Diagram

User Interface

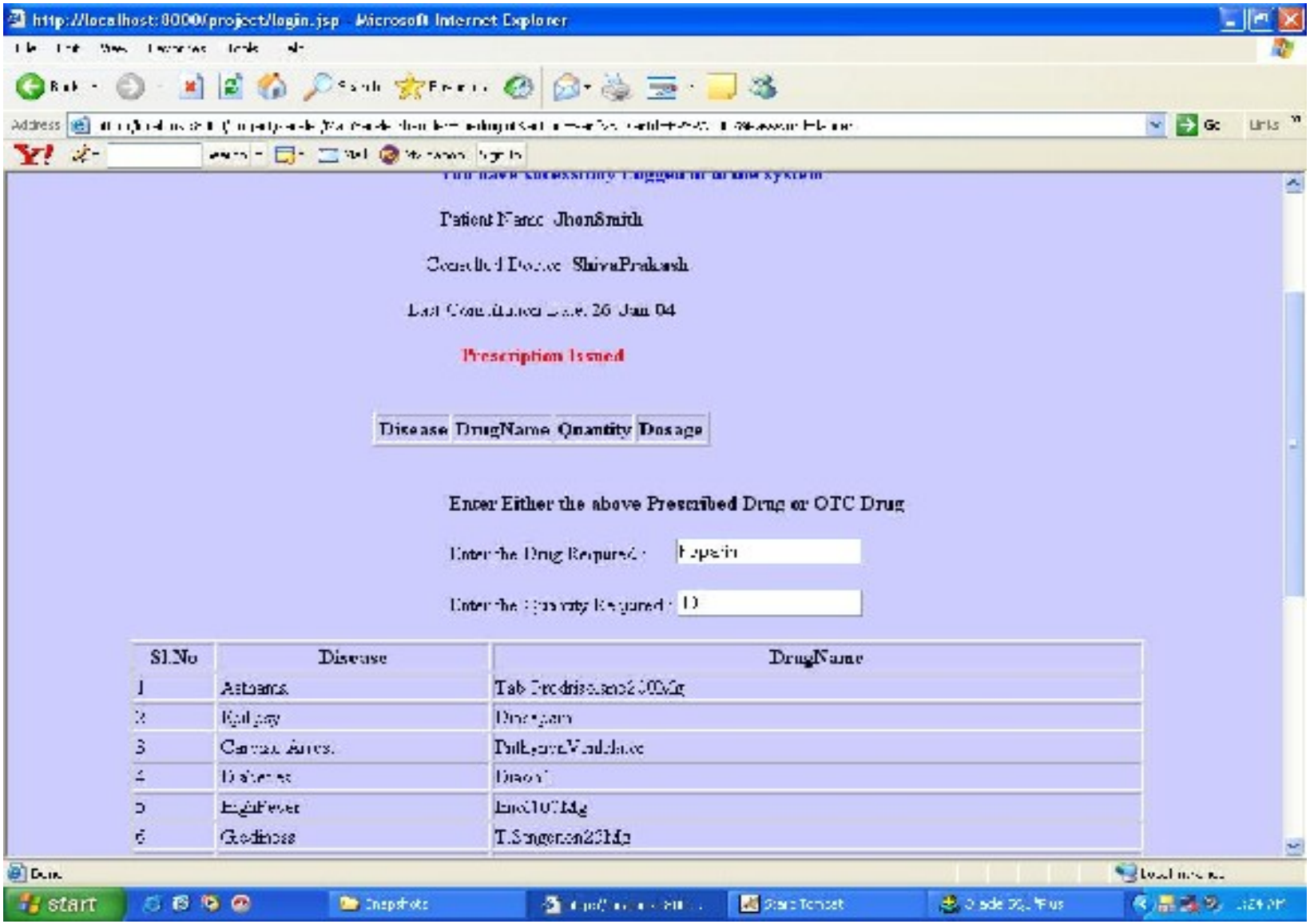
Welcome Page



Login Page For Doctor and Patient



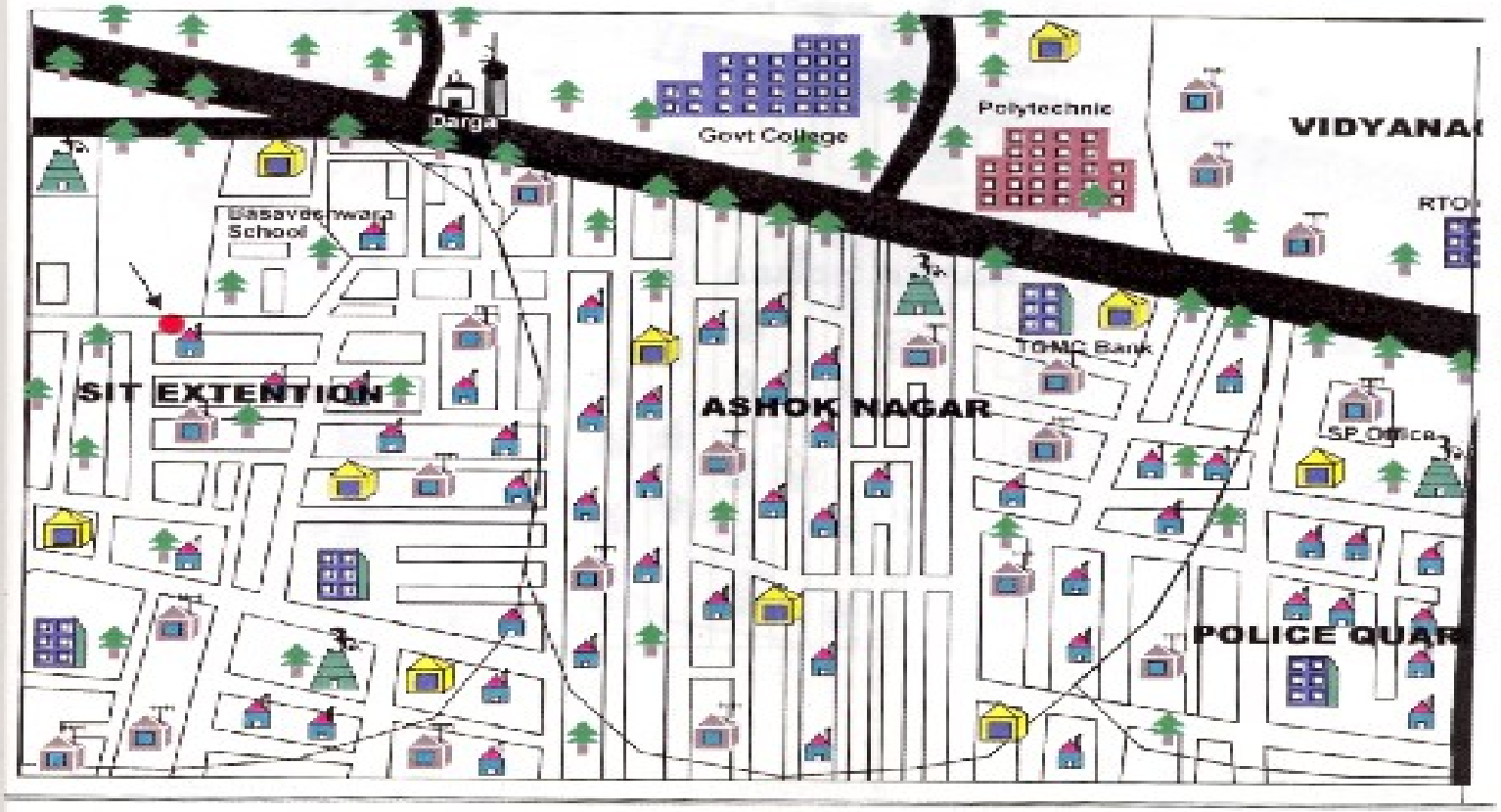
Drug selection



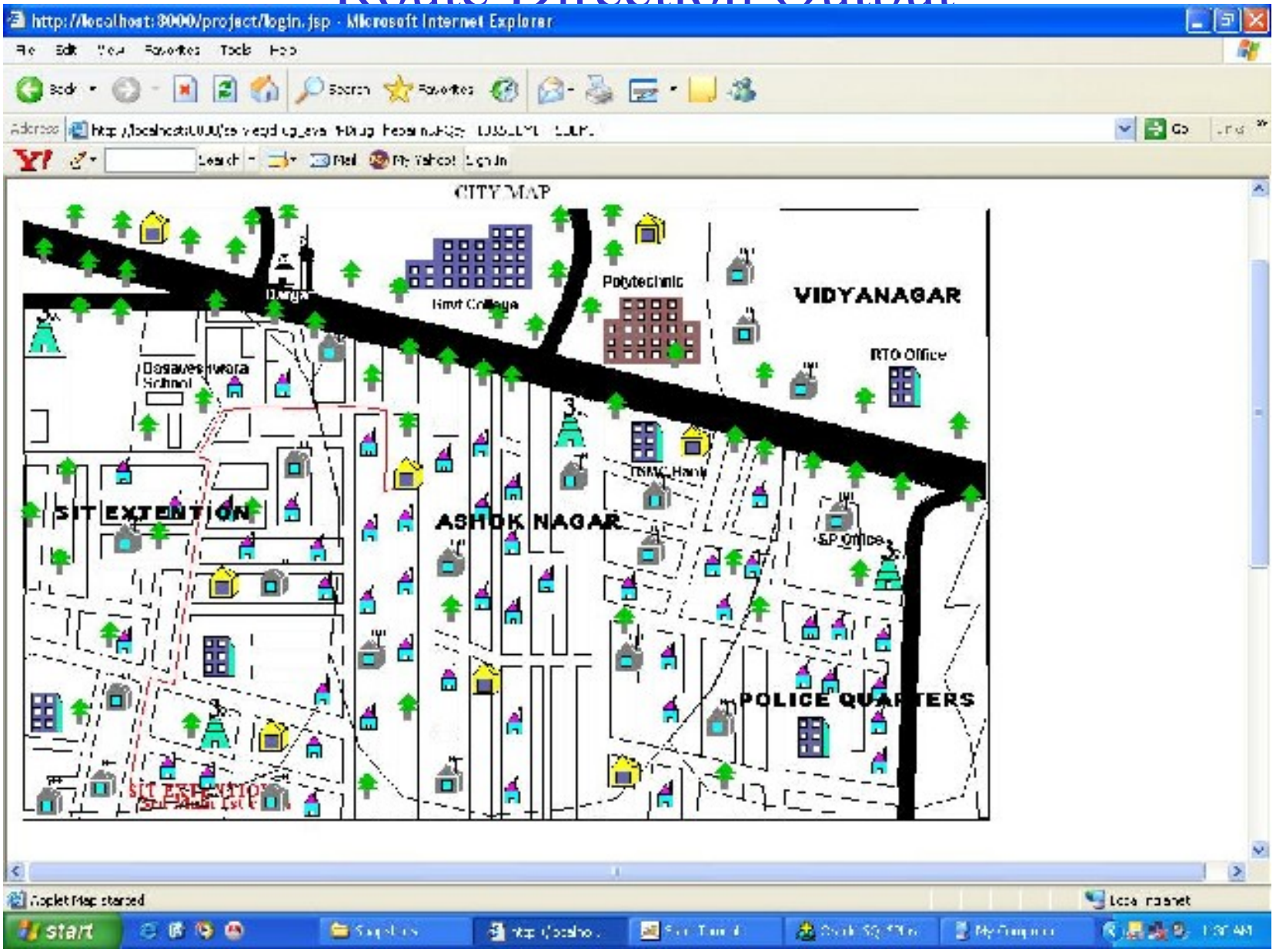
Red dot to Indicate current location

City Map:

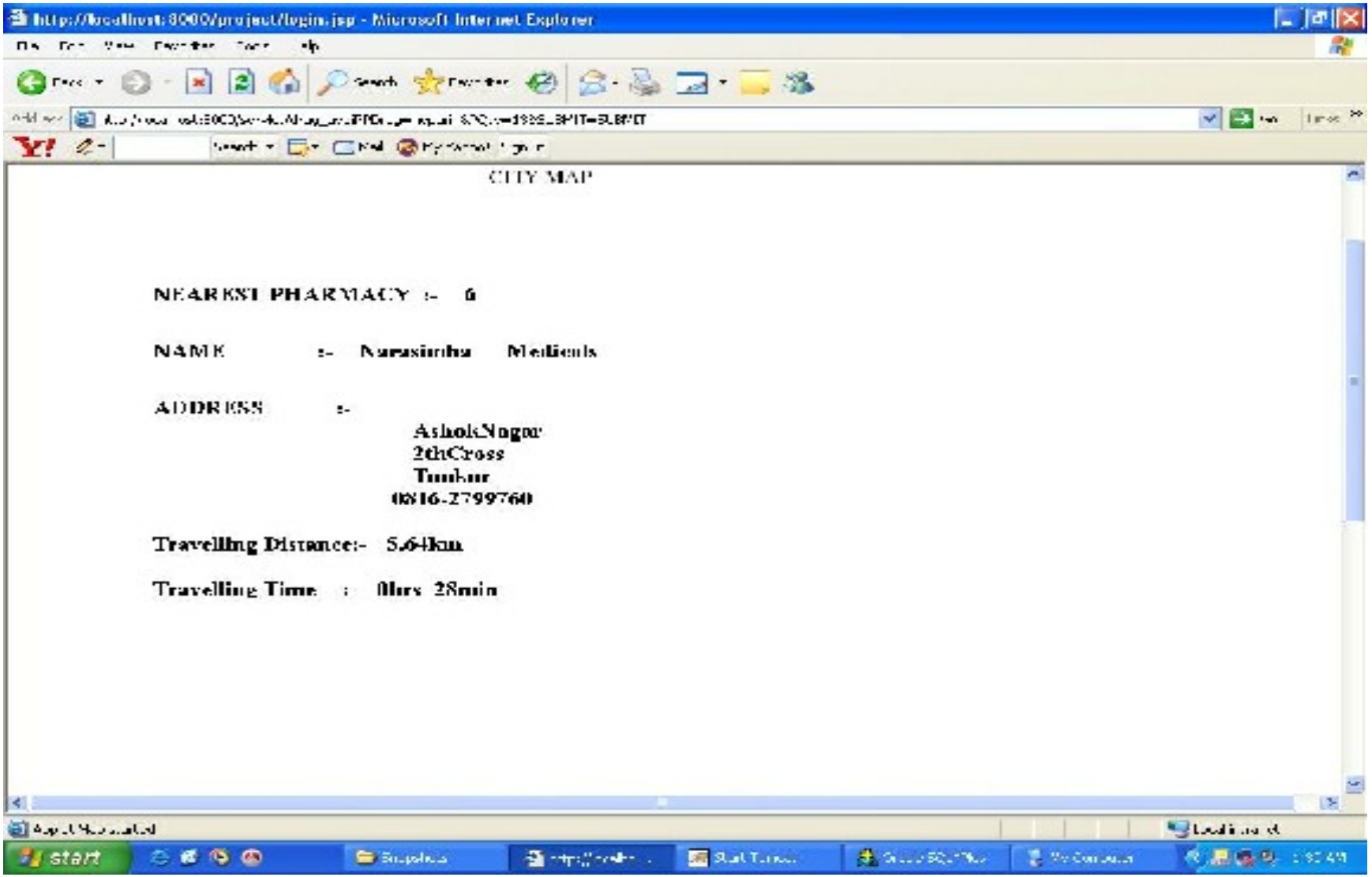
The user has to select his current location by clicking over the point as shown in the below figure (Red Dot)



Route Direction Output



Route Description



SUMMARY

- LBS is a new service along with the development of wireless communication and GIS. Under the driving of requirements and technology, LBS will have much more widespread application area. In this paper, we have conducted an EPS system's simulation on mobile Laptop and studied the key techniques of implementation. The application of Pull technique provides a friendly service mode to this EPS system. The proposed Emergency Pharmacy Services over the Mobile will become a new application in LBS to serve the society in finding emergency medication.
- In future we have a plan to implement this services on hand held mobile devices with text-to-speech feature tells users the name of the street, when to turn, and in what direction..

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Thank You