Applications of Intelligent Agents in Hospital Search and Appointment System

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ABSTRACT

Access to the correct healthcare facility is a major concern for most people, many of whom gather information about the existing hospitals and healthcare facilities in their locality. After gathering such information, people must do a comparison of the information, make a selection, and then make an appointment with the concerned doctor. The time spent for this purpose would be a major constraint for many individuals. Research is currently underway in this area on incorporating Information and Communication Technology (ICT) to improve the services available in the health industry. This paper proposes an agent based approach to replicate the same search operations as the individual would otherwise do, by employing an intelligent agent. The proposed agent based system has been simulated and also validated through implementation on an individual’s smart phone or a PDA using JADE-LEAP agent development kit.

Keywords: Agents, Appointment System, Healthcare, Information and Communication Technology, JADE, LEAP

1. INTRODUCTION

In the current environment, diseases are easily passed on from one person to another person, and also other events such as accidents at home, school, road, etc require the assistance of a healthcare professional. When an average person is in need of healthcare services, the concerned person goes through a process of identifying hospitals or healthcare facilities available within the locality. The individual then gathers data such as the proficiency/skill levels of the doctors available, the type of facilities, the civic nature of the environment and the cost estimate for services that would be offered. Based on the information gathered a comparison is then carried out and then an appropriate facility is selected. Consequently an appointment is fixed with an appropriate doctor in that facility. The task of carrying out such data gathering and subsequent analysis is not always a simple task; since the individual would have to first contact the various facilities during normal working hours which would facilitate speaking with a knowledgeable representatives available in that facility. Also gathering information from other persons who have already used that service

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at that facility would be a tedious job. After this only the individual can then make a good comparison of the information gathered and then select the appropriate health care facility. Usually, once an individual selects a facility he/she would normally use that facility whenever a healthcare need again arises. However, the need to access healthcare services can occur at anytime and at anyplace.

There are many possible ways to increase the quality of health care services and one such is through the application of Information and communication Technology (WHO, 2005). Intelligent agents (Bellavista, 1999; Serenko & Deltor, 2002; Suresh, 2006; Bailey & Suresh, 2009; Henry & Suresh, 2009; Miller & Suresh, 2009; Ryan & Suresh, 2009). Over the years, ICT has been successfully applied with benefits in areas such as m-commerce, e-commerce and Telemedicine. In the context, mobile devices have also gained popularity in usage over the years and many persons now own at least one mobile phone and also it is becoming cost effective. With these in mind, an intelligent agent based hospital search & appointment system has been proposed for Healthcare service search in this paper with Jamaica taken as an example to start with. This system proposed basically allows the user to set some preferences related to the attributes of the healthcare facility they would be looking for and would like to search and select the appropriate facility that matches the preference.

The system proposed also allows the user to make an appointment with an appropriate doctor available in the selected facility. The system has been implemented with mobile phones/PDA. The reminder of the paper has been organized as follows. Section 2 discusses about Health Care in Jamaica. Section 3 talks about ICT usage in Health care. Section 4 discusses Agent Technology application in Health care sector. Section 5 talks about the intelligent agent based Hospital Search & Appointment system. Section 6 provides the details of the implementation of an agent based hospital search using JADE-LEAP combination. Section 7 is concluding section.

2. HEALTH CARE IN JAMAICA

Health care in respect of the citizens of any country is very important. This is true for Jamaica also. It is seen by our experience and also as reported on web, that the quality of medical care in Jamaica is one of the main concerns. Presently health care in Jamaica (Sheila, 2000; Brice, 2001) is provided free for citizens and legal residents, at Government hospitals and Clinics, which also includes prescription for drugs. But the main drawback to the present healthcare system is towards waiting in long line with no prior appointment accepted by Physicians. There have always been concerns by people about going early in the morning and leaving the clinic late in the day and also not having seen a doctor. Also prescriptions for drugs are not easy to obtain. Although private doctors and clinics are widely available, one has to have enough money to pay to these doctors or depend on health insurance to cover the cost. In respect of the hospital pharmacies, more people congregate to receive the medicine they need. It is heard that some of these folks are even turned away because of either a lack of supply or the particular drug the pharmacy doesn’t stock. If the person really needs an unavailable drug they must go to a public drugstore and pay for it or stay without that (Health Care, 2009).

In the context it is also felt that facilities towards health care in Jamaica are not that good enough when compared with those available in other developed countries like USA, UK and Europe. It is also seen that the use of ICT Technology in health care business is also not that well developed and they still rely on paper based system. If we can reduce or schedule appropriately the number of patients that need to travel to hospitals by improving access to healthcare via ICT in clinics, especially in rural and inner-city areas, it is felt that we would have fewer patients per doctor at the hospitals and as such congestion could be avoided. Prevention is always cheaper than the cost of the cure, and improving access to regular checkups and appropriate scheduling, may thus increase the chances of catching
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