WEB BASED INTELLIGENT APPOINTMENT SYSTEM

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ABSTRACT

Nowadays, the trend is clear which along the rapid development of computer technologies, most encountered management problems in the organizations can be solved using computer-aided technologies. This paper presents the development of web-based appointment system by integrating with Intelligent System techniques. An appointment is a time reserved set by students for any academic-related activities such as discussion and weekly meeting with lecturers. The main orientation of the prototype is to manage appointment and calendar updating. An Intelligent Agent is placed in the prototype and the role of agent is to respond the user request in ad hoc. It allows both students and lecturers to easily access the system in any terminal connected to the Internet while in a time constrain. The exploration prototype methodology is use to develop the prototype. This on-going prototype is expected to execute in a web-based environment, then Open Source technology is an option to develop the prototype. The web server used is Apache Web Server and PreHypertextPreProgramming (PHP) as web-based scripting language and MySQL as database. Finally, the testing on user acceptance test has been performed and, thus the system has been accepted by both student and lecturer to manage an appointment online.

INTRODUCTION

The variety of information sharing and dissemination in teaching and learning methods which is used within a course is an important ingredient to make it smoothly. Most teachers approach the Internet with a certain degree of apprehension. Many academicians have access to the Net through their institutions. The Web is the primary means by which tutors deliver online materials to students. However, the use of this web can be enhanced to serve several needs in the environments. Moreover,

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the Internet provides an infrastructure that supports unprecedented communication capabilities and opportunities for collaboration. Many models of interaction for information dissemination in teaching and learning have been contributed but mostly are on content flow. Besides content flow, teaching and learning also include class organization.

The purpose of this paper is to concentrate on the process of making appointment through online system. An appointment system allow students and lecturers interact through web to arrange an appointment. Appointment is a time reserved for something such as a doctor visit, business deal, and much like a reservation. Recipient appointment agents accept appointment message on behalf of recipients then respond to the appointment applicant.

While in education field are concerned the difficulties of conventional appointment system. Some of these problems are dealing with unsolicited and unwanted appointment, confirmation and notification to the appointment that have been made. A rather ordinary, but gradually more important, problem is searching for an empty slot for the arrangement of an appointment according to the timetable of lecturers individually. All these are, amongst many others, typical areas of application for intelligent agents.

Agent is a computer program that assist user with a routine computer task and represents on behalf of human agents. The user interacts with the agent at a user interface while the agent senses and acts autonomously in a work environment such as an operating system. The agent performs a given task using information taken from its environment. Intelligent agent is software that is design to make computing and other tasks easier by assisting and acting on behalf of the user.

Some of the advantages of intelligent agents are higher efficiency in work such as less time used, work autonomously, and can search huge amounts of information and filter out important things that would be impossible for humans. This opens new opportunities like an arrangement of appointments inclusive of searching for the empty slot for an appointment and respond to whom it may concern.

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RELATED WORK

An online application especially for communication purpose has become a very important and rapidly evolving technology as it allows users to communicate with each other. This study tackled the communication in terms of student-teacher appointment arrangement through online application. Advances in software technology, ubiquitous devices and the increasing volume of digital knowledge offer the opportunity for more sophisticated and user-friendly online services.

The use of artificial intelligence (AI) technique may assist tremendous the real world problems and being an ultimate embedded personal assistant. Agent-based systems technology is one of the AI generation has generated lots of excitement in recent years because of its advantages and opportunities for embarking new concept of conceptualizing, designing and implementing software systems (Sycara, 1998). The ability to assist in searching through all the data is the most valuable characteristic of intelligent agent.

The wide range application of agent-based in other domain such as business, medical, or network, agent application in teaching environment also had created its avenue (Jafari, 2002). While learning organizations offers various way of student-teachers communication, agent-based technology systems are assume to involve AI and include a degree of autonomous problem solving and communication ability. Negroponte (1995) also agree that agent should react as a perfect helper.

Razek, Frasson, and Kaltenbach (2003) proposed the application of software agents to provide distance-learning students with timely and useful information on a group discussion. The software agents can observe conversations among a distance learning community.

Developing intelligent communicator systems that incorporate these agents will offer some challenges (Jafari, 2002; Baylor, 2001). Understanding these challenges and the merging opportunities will help educational technology administrators prepare to take

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advantage of the next generation of communication in teaching and learning environments.

HSC Medical Center Appointment System

Nowadays people do not need to queue for a long time anymore when they are waiting to consult with a medical officer. There are few alternatives to make it more efficiently by booking through the reception, either by phone, or by email. Besides that, there is another method to make an appointment that is being used by HSC Medical Center online appointment system. This appointment system is used to made appointment between patient and doctor for medical purpose.

This system does not have any ID and password to log-in before makimg any appointment, but the appointment is valid within 24 hours only. The user has to complete the form and click the submit button to finalize the appointment.

Figure 1: HSC Medical Center Appointment System (http://www.hsc.com.my)

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Takaful Appointment System

Takaful Insurance owns Takaful Appointment System. It was developed to decrease the higher cost by using phone and impractical. In this system, the user can enter the time of appointment at anytime depends on the user's free time. There is no ID and password to use this system, the user only has to enter the details and submit the form

Figure 2: Takaful Appointment System (http://www.takaful.com.my)

Xpert Fitness Center Appointment System

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Xpert Fitness Center Appointment System has been developed to make an appointment with the coach or trainer. This system offers an interactive environment especially during the time and date selection for each session in a week. A weekly schedule will respond depending on the calendar selected by the user. The Client has to log in before allowing to use the system, so the ID and password is needed.
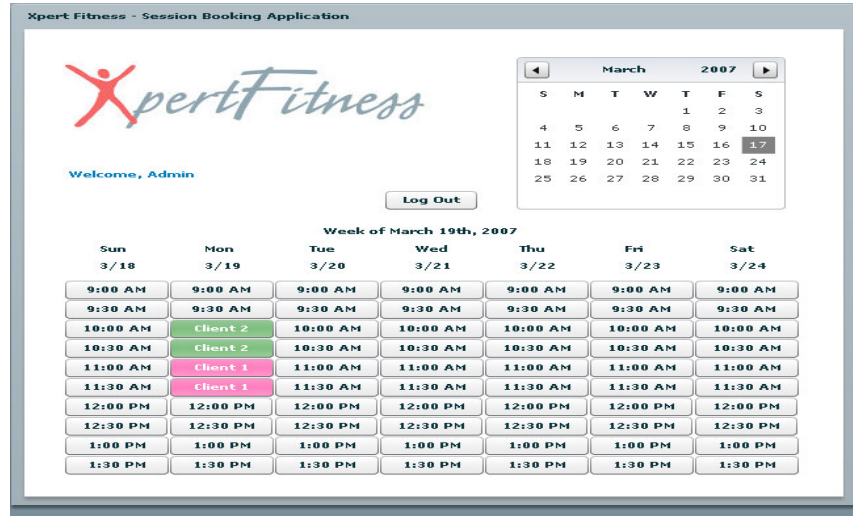
Figure 3: Xpert Fitness Center Appointment System (http://www.getacoder.com)

METHODOLOGY

The methodology that has been used was adopted from Dennis and Wixom (2003) known as Prototype Methodology. This methodology performs the analysis, design, and implementation phases concurrently. The three phases performed repeatedly in a cycle to complete this project as shown in Figure 4.
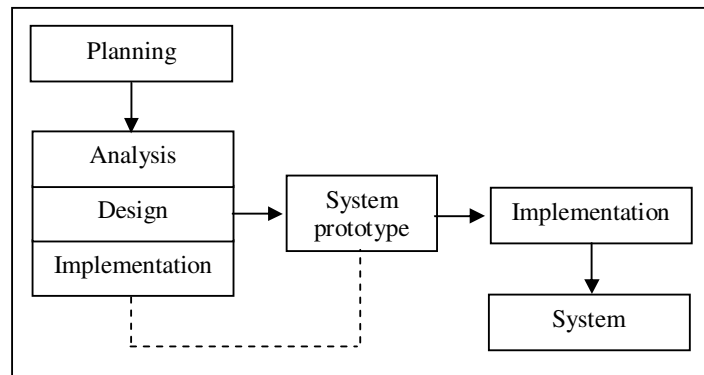

Figure 4: Prototype Methodology

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DESIGN AND IMPLEMENTATION

This section describes the design and development of web-based intelligent appointment system which concentrate on i) database design ii) context diagram and iii) interface design.

Database design

Database is the platform for most information systems which stores the data. It is considered as a "heart" of most systems. There are several steps in database design as described by inflow schema that consists of i) process event ii) function links and iii) directed communications(King, 1985). Structure representations of entity and attributes illustrated in Entity Relationship Diagram (ERD) as depicted figure 5.

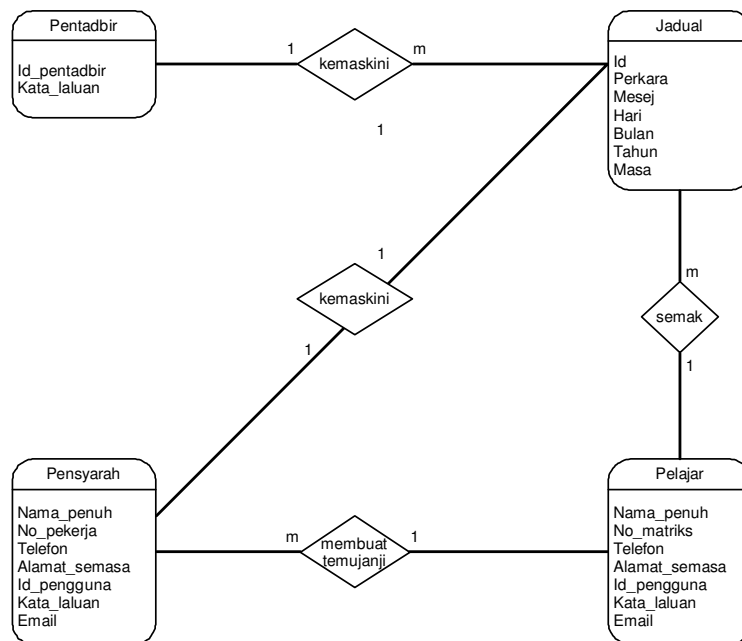Figure 5: Entity Relationship Diagram for Web-based Intelligent appointment system

Context diagram

Context diagram demonstrates to whom the system interact with and response to. Through this mechanism, developers could identify the level of user with authority features to operate is the systems. The context diagram for Web-based Intelligent Appointment system is depicted in Figure 6.
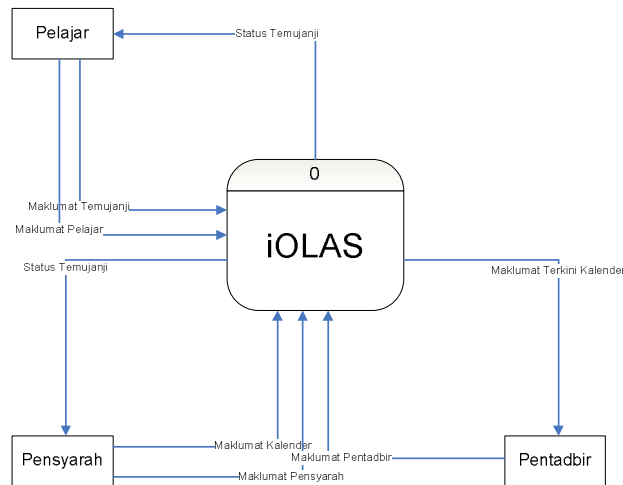
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Figure 6: Context Diagram

Figure 6 illustrates three entities that directly contact the system. From these three entities: students, lecturers and as well as administrators would have a different access mode to ease the administrator to keep on monitoring the usage of the system. Since this is a web-based system, an access log is enabled to keep any transactions that is recorded during the system is active. An arrow from entity to the system indicate the interaction of the user within the system while the system response to users' request indicated by arrow towards the entity.

Interface Design

Graphical interface design provides an interfacing between the user and systems. During the development of the web-based system, integration with databases as well as any object or agent involved on this mode of development. Thus, providing with a very friendly interface determine the increasing number of user with interest to use the system. The roles of the agent in this system provide a background communication especially in passing data and provide a response. There are several screen shots to indicate a picture of an overall system looks like. Figure 7 – 10 are system interface, which display an appointment timetable, online form, lecturer's timetable mode, and interface for new user registrations.

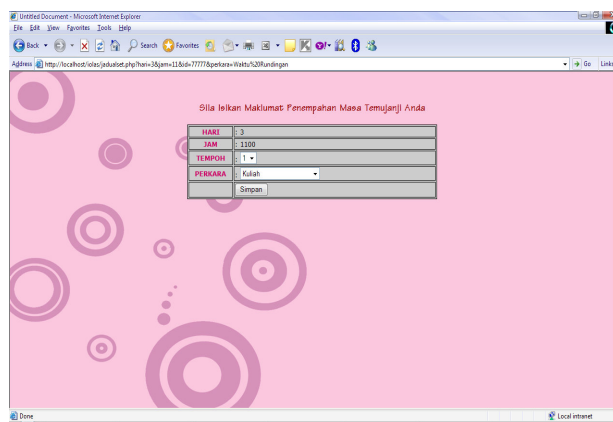Figure 7: Interface of Appointment Timetable
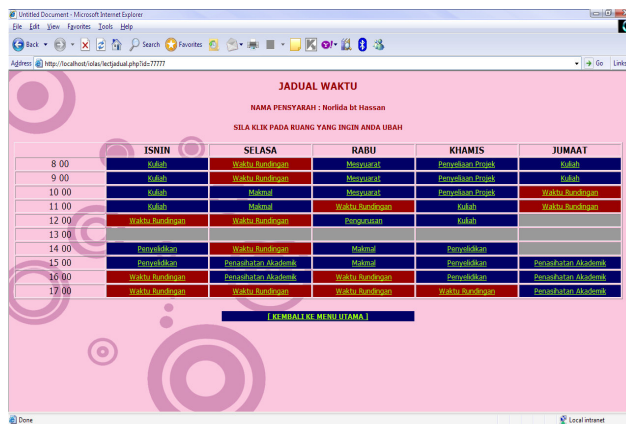

Figure 8: Interface of Online Appointment Form.

Figure 9: Interface of Lecturer's Timetable in the Lecturer's Mode

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Figure 10: Interface of New User Registration

Intelligent Agents

Utilizing agents in developing a system is a new way towards developing complex software applications. Agent-based computing has taken place as "the next significant break-through software development (Jenning and Woodridge, 1998). There are many types of agents with different role based on the definition in the requirement specifications. As in this system, the role of agent to manage information in databases and provide a status by comparing it with inputs provided by the users and capable of autonomous action to meet its design objectives.

By flexible, an agent in the system must be responsive that perceives its environment and response in a timely fashion. An agent also should be proactive or in other words an agent not just perceive and response but requires to exhibit opportunistic and take initiatives when appropriate. An agent also must be able to socialize or provide interaction with other agents in the systems. Figure 11 demonstrates the implementation of agents in appointment systems.

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```
<?
$id=$_POST['id'];
$hari=$_POST['hari'];
$jam=$_POST['jam'];
$tempoh=$_POST['tempoh'];
$perkara=$_POST['perkara'];

include ('db.inc');
for ($i=0;$i<$tempoh;$i++){
      $sql=mysql_query("Select * from jadual where hari='$hari' and
jam='$jam' and id='$id'");
      $row=mysql_num_rows($sql);

      if ($row==0){

            $add=mysql_query("INSERT INTO `iolasdb`.`jadual` (
            `id` ,
            `jam` ,
            `hari` ,
            `perkara`
            )
            VALUES (
            '$id', '$jam', '$hari', '$perkara'
            )");

      }else{
      while($data=mysql_fetch_array($sql)){
            $perkara2=$data['perkara'];
      }
            if ($perkara2=="Rehat"){

            }else{

                  $edit=mysql_query("UPDATE `iolasdb`.`jadual` SET
                  `perkara` = '$perkara'
                  WHERE
                  CONVERT( `jadual`.`id` USING utf8 ) = '$id' AND
                  CONVERT( `jadual`.`jam` USING utf8 ) = '$jam' AND
                  CONVERT( `jadual`.`hari` USING utf8 ) = '$hari' LIMIT
1");
            }
      }
```

Figure 11: A fragment code of agent implementation in appointment system

Figure 11 illustrates a fragment of code of implementation of agent-based system in appointment system. This fragment codes performs interaction with the databases which insert new data to database and automatically update based on the information provided by the user and databases.

CONCLUSION

As an ongoing project, we can conclude that the effect of increasing volumes and sizes of online application can be significant auxiliary enhance by using mobile

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phone. Rather than facilitating the perform user to make an appointment for students and lecturers, this system also performing flexible autonomous action, reactive, pro-active and social behavior. The great challenge and main work remaining is to make sure that the system will behave with many independent participants.

This appointment system is possible and ease user to organize and manage their daily schedule efficiently via online for parties, lecturer and student. People today are carrying with them the means to access information stored on the Internet and for their daily schedule. As for enhancement, mobile devices can be used to make it portable and will become extremely prevalent in the near future because it is instantly accessible and also, it is always activated and always with the user.

REFERENCES

Beard, D., Palaniappan, M.,. (1990). A Visual Calendar For Scheduling Group Meetings. In Proceeding 1990 ACM Conference on Computer Supported Cooperative Work. Los Angeles, California, United States. 279-290.

Dennis, A and Wixom, B.H. 2003. "System Analysis & Design." 2nd. ed. John Wiley & Sons, Inc.

Dennis, A., Wixom, B. H., and Roth, R. M. 2003. Systems Analysis and Design. 3rd Edition, John Wiley & Sons Inc.

Harrison, A. T., 1988. "Appointment Systems: Evaluation of a Flexible System Offering Patients Limited Choice." *British Medical Journal.* Vol. 296. pp. 685-686.

HSC Medical Center Appointment System. URL: http://www.hsc.com.my/

Jafari, A.,. (2002). Conceptualizing Intelligent Agents for Teaching and Learning, *Educause Quarterly*, Vol. 25. No. 3.

King, R. (1985). A Database Design Methodology and Tools for Information Systems. *ACM transaction on Office Information Systems*. Vol. 3 Issue. 1, pp. 2 – 21.

Koh, S. Y. (2004). A-Calenduler: Sistem Kalendar Dan Penjadualan Mesyuarat Staf Akademik Institusi Pengajian Tinggi, Skudai, Universiti Teknologi Malaysia: Master thesis.

Landry, M., (1976). "There Are Good and Bad Ways To Set Up An Appointment System." CMA Journal.Vol 115 (2). pp. 160-161, 178.

Mohd Helmy Abd Wahab and Norlida Hassan. (2007). "A Web – Based Appointment System Through Gsm Network." *Proceeding of First Regional Conference on Computational Science and Technology (RCCST-2007)*, Kota Kinabalu, Sabah, Malaysia, 29-30 November 2007.

Negroponte, N, (1995). Being Digital, London Hodder and Stroughton, pp. 152-156.

Razek, M.A., Frasson, C., and Kaltenbach, M. (2003). A Context based Information Agent for Supporting Intelligent Distance Learning Environment, In proceedings of the 12th International World Wide Web Conference
.
Sycara, K.P. 1998. Multiagent Systems, AI magazine Vol. 19, No.2 Intelligent Agents Summer.

Takaful Appointment system. URL: http://www.takaful.com.my

Worrall, G., 1974. "Assessing an Appointment System." *Journal of Royal College General Practitioner*. Vol. 24 (149). pp. 876–879.

Xpert Fitness Center Appointment System URL: http://www.getacoder.com