

IPRO 305 – HawkTour – An IIT Campus Tour Application

1. OBJECTIVES

The fall 2004 IPRO 305 team will be continuing the efforts of ongoing research at IIT in the realm of Pervasive Computing. The team will be focusing on the challenge of integrating Pervasive Computing into a specific aspect of the IIT campus. The overall vision of the IPRO 305 team is to continue efforts to develop an application called HawkTour – a virtual Illinois Institute of Technology tour guide. HawkTour will provide a completely new approach to the campus tour at IIT. The application will be designed to run on Tablet PC's or other devices with similar computing capabilities, and will provide the user with general campus information while guiding the user around campus and maintaining complete awareness of the user's current location and intent, thereby adapting the tour to the user's own personal preferences. The objective for this semester's team is to build on the framework designed during the Spring 2004 semester, and increase the test bed of the system to include not only location awareness within buildings, but also outdoors. In addition, several new software features will be added, including the ability of the software to interface with hardware devices wirelessly.

Major design goals:

- Understand the current location and provide surrounding campus information. This includes respective building information and history about the building.
- Provide campus information on demand and at all times.
- User-friendly interface in navigation through the campus and in the campus buildings.
- The application should be easily extensible so that new campus tour features can easily be added.

2. BACKGROUND

Pervasive computing is a broad, new, research topic in Computer Science that focuses on the applications of technology to assist users in every day life situations. It seeks to provide proactive and self tuning environments and devices to seamlessly augment a person's knowledge and decision making ability, while requiring as little direct user interaction as possible. Research in the area of Pervasive Computing has been going on for the last two years at IIT. During the spring 2003 semester the Pervasive Computing IPRO team began to look at the possibilities for Pervasive Computing on IIT's campus. Development of the HawkTour application is an ongoing initiative to give new direction in campus life.

3. METHODOLOGY

A top-down problem solving approach will continue to be utilized in designing and implementing HawkTour. The problem is characterized by well-defined objectives and nearly independent functional components.

The components are:

1. Location Awareness – Provide the current location information, both indoors and outdoors.
2. Content Generation and Organization – Provide information about surroundings, and store that information in such a way that it is easily accessible to the application.
3. Map Data Organization – Provide a uniform method to create and add maps to the system, and store this map information so that it is easily accessible by the application.

Students are divided into semi-independent subteams, each led by an IPRO 305 veteran. These subteams are responsible for various tasks, and can complete these tasks independently. All progress is reviewed by the team as a whole so that feedback can be given, and questions can be answered.

4. EXPECTED RESULTS

The IPRO 305 team expects to have a working version of the HawkTour application and accompanying system by the end of the semester. The application will be location-aware, using triangulation from wireless access points while indoors, and GPS when outdoors, to clearly show the user his or her location with good precision. In addition, the system will provide relevant information to the user based on location, such as architecture, building history, locations of important offices, etc. The system will have an easy-to-use interface that will include graphic displays such as maps and pictures, and room for textual information, as well as options for the user to select what types of information he or she is interested in. The application will also be capable of interacting with other hardware devices in the environment wirelessly. The team expects this semester's project to demonstrate a technology that is useful and practical, not only for campus tours, but which can be easily extended for use in other applications.

5. SCHEDULE OF TASKS AND MILESTONE EVENTS

At mid-term a presentation will detail the group's progress on the project as a whole. By this time, major updates to the functional requirements of the software from the fall 2004 semester will have been made, and the implementation of new core functionality will have begun. The user interface will have been examined and studied, and any functional or aesthetic improvements will be underway. By the first week of November, both

functional and user testing of the application will begin. On IPRO Day, the finished application will be presented to the public.

6. BUDGET/LIST OF ANTICIPATED EXPENCES

- Digital Media Controller:
 - Intel Desktop Main board: \$500
 - Intel Pentium 4 Processor: \$400
 - Heat Sink: \$40
 - 256 MB RAM: \$100
 - 40 GB Hard drive: \$100
 - TV PCI Interface Card: \$500
 - Microcontroller for sensors: \$400
 - Bluetooth PCI Card: \$100
 - PC Case w/ Power Supply: \$100
 - Sensors(2): 2 x \$80 = \$160
 - Ethernet cable: \$30
 - A/V Cables: \$30
- G3 Cell Phone: \$500
- Domain Name Registration/Transfer: \$30
- Presentation Costs: \$150

TOTAL: \$3140

7. ASSIGNED RESPONSIBILITIES

The team will be divided into at least three and as many as four groups that will each focus on different aspects of the project. Responsibilities are defined both on an individual level and also for subgroups as a whole. The subgroup leaders are veteran IPRO 305 team members, and are responsible for delegating tasks among the subgroup members, and ensuring assigned tasks are accomplished. The subteams will be dynamic throughout the semester. There is a management team, consisting of Tyler Butler and Jonathan Holley. This management team will be responsible for determining the necessary subteams, assigning and re-assigning members to subteams, and will also be responsible to ensure the success of the project as a whole.