

IPRO 305 – HawkTour – An IIT Campus Tour Application

1. OBJECTIVES

The Spring 2005 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 has been designed to run on Tablet PC's or other devices with similar computing capabilities, and provides 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 refine the application and come up with a new version with an optimized content database, a more sophisticated hardware interface, improve the mapping methodology, work on the user interface and scale of the application to simpler devices such as cell phones and personal digital assistants.

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.
- To replicate the application development process horizontally.

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 sub-teams, each led by an IPRO 305 veteran. These sub-teams 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 revised and sophisticated version of the HawkTour application and accompanying system by the end of the semester. The initial version has already been developed and tested. This semester the team will work on improvising the application's core features.

- The entire content database will be analyzed and new schemas will be developed so that the information is used to its fullest potential. Also, the application will allow customization based on a pre-tour questionnaire. (DATABASE TEAM)
- The hardware interfacing with the high definition televisions will be worked on. Significant results will include muting of the television's audio while playing hawktour's videos, automatic detection of the video display settings, streaming media, improve the interface application on the client and work on error codes. (HARDWARE INTERFACE TEAM)
- The mapping methodology of the system is going to be changed from rectangles to more generic polygons. (MAPPING TEAM)
- The application will be scaled accordingly to port it onto smaller devices such as cell phones and personal digital assistants. (MICRO TEAM)
- The user interface of the application will be revised to look more like the prototype. User surveys and user diaries will also be included in the application. (USER INTERFACE TEAM)
- The testing process will begin right away. Test cases and methodologies will be developed by consulting with each team and every build will be tested during the build after that. (TESTING TEAM)

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 April, 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

DMR Preliminary Parts List

PART NAME	BRAND	PRICE
Case	Antec Aria	\$120
Motherboard	Asus P4GE-MX	\$100
CPU	Intel P4 2.26GHz 533 Mhz FSB	\$137
Memory	2x Corsair 256MB PC2100 Module	\$67
DVD-ROM	Lite-On 16X DVD-ROM (SOHD-167T Black)	\$26
HD	WD 40GB 7200 ROM (WD400BB)	\$109
Internal BT	PCMCIA to PCI Adapter	\$28
Internal BT	Zoom Bluetooth PC Card Adapter	\$55
Flash Drive	Lexar 1GB Jump Drive	\$70
USB Extension	10ft USB Extension Cable	\$46
Ethernet Cable	15ft CAT5e Ethernet Cable	\$27
S-Video Cable	8ft IO-GEAR Hi-Def Video Cable	\$39
TOTAL		\$824

7. ASSIGNED RESPONSIBILITIES

The team is divided into five 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 sub-teams will be dynamic throughout the semester. The management team will be responsible for determining the necessary sub-teams, assigning and re-assigning members to sub-teams, and will also be responsible to ensure the success of the project as a whole. The following table gives a brief overview of the assigned responsibilities.

NAME	LEADER	BUILD-1	BUILD-2	BUILD-3
Database	Satish Thomas	Analyze current DB	Design new schemas	
Hardware Interface	Santosh Melepuram	Audio muting, Error codes, Dynamic window resizing	Streaming media, Improve HI on the client	Build a digital media receiver
Mapping	Robert Brozyna	Polygon mapping	Display mini map	
Micro team	Michael Sepcot	Feasibility	Display mapping	Content delivery
User Interface	Tyler Butler	Main User Interface	User Surveys	User Diaries
Testing Team	Tyler Butler	Prepare test cases and methodologies	Test Build-1	Test Build-2

Database Team	Rohit Murali, Sangmin An
Hardware Interface Team	Marcin Jastrzebski, Olumayowa Jenyo, Richard Kodamanchili
Mapping Team	Dave Dixon, Jodel Charles
Micro Team	Nicu Ilea