Student Interactive Campus Map at Marshall University

by

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Abstract

Marshall University is a state-funded university in Huntington, West Virginia. Like many universities, it is a large organization with multiple and diverse units (colleges, departments, centers, etc.) and depends on data to run efficiently. Much of this data is used by multiple entities. To better manage the needed data collected by the university, the Marshall University Geographic Information System (MUGIS) has been developed.

MUGIS will address several needs of Marshall University's principal stakeholders. Stakeholders include the university administration, faculty, and students.

One of the first applications developed for MUGIS was an interactive campus map. This Web-based application is intended to help students quickly find the location of buildings and services on the Huntington main campus.

Marshall University will become a model and set the standard for the state, as no other state university has undertaken a project of this scope.

Introduction

Marshall University, located in Huntington, West Virginia, is a state-funded university. Marshall offers 2-year and 4-year undergraduate and graduate programs. Marshall University enrolls approximately 14,000 students including 4,000 graduate and medical students. The University offers 23 associate programs, 44 baccalaureate programs and 46 graduate programs.

In March of 2005, the Marshall University Geographic Information System (MUGIS) was started. MUGIS was needed to begin the process of pulling data together from around the university and provide the ability to view campus maps, building layouts, resources, etc.

MUGIS is managed by the Center for Environmental, Geotechnical, and Applied Sciences (CEGAS). The Center for Environmental, Geotechnical, and Applied Sciences was established in May 1993 through a cooperative effort between Marshall University the West Virginia Graduate College, which have since merged. The goal of the center is to forge close relationships among the business community, higher education institutions, and government agencies, in technology-based endeavors. CEGAS uses an approach that includes providing educational offerings, research, services, and long-term planning for regional development.

When the work began on MUGIS, it quickly became apparent that much of the work would be devoted to database development and/or data integration. While working on these issues, CEGAS wanted to develop an application that showed the advantages that MUGIS will bring. The application that was developed was the interactive campus map. The tool met four purposes:

1. To help students quickly find the location of buildings and services on the Huntington main campus
2. Create a foundation that can be a basis for future student, staff and faculty applications.
3. Create a prototype of what GIS tools can provide.
4. To test hardware and evaluate software tools.

To determine the requirements for the campus map, we met with Dr. Jan Fox, Vice President for Information Technology/CIO, during the summer of 2005. Dr. Fox was interested in providing an application that would help new incoming students find there way around campus. She was familiar with the needs of new students and the services that they and other students often asked about.

It was decided that the application meets the following requirements:

1. Covers only the main campus (Marshall has several campuses around the state)
2. Provide a list of buildings where students can select an entry.

3. The building names should also have the abbreviation that corresponds to the student's schedule
4. Provide a list of main university services like the registrar office or the bursar.
5. Show a interactive map of the campus with the ability to do basic navigation (zoom, pan, turn layers on/off)
6. When a building or service is selected, highlight the applicable building and/or buildings
7. When a building or service is selected , provide additions information and web links

Technical Aspects

This section will give the basic technical aspects of the application.

The tools behind the interactive campus map included ArcMap, ArcIMS, IIS webserver, Asp.NET, Visual Studio and AutoCAD.

Layers used in the application:

- Roads – Edited from US Census Tiger files to better match up with aerial photography

- Aerial Photography – Provided by the West Virginia Statewide Addressing and Mapping Board (2 foot resolution photography)

- Buildings Layer – Converted from AutoCad drawing file to shapefile by closing the building outline polygons and isolated them on a separate layer and then converted them to a shapefile

- Parking Lots – Digitized from the aerial photography

- Point-Of-Interest Locations – Point features with the respective icons, those include (bus stop stations, food places and cafeterias, restrooms, emergency phone stations, disability entrance …etc)

The application uses Microsoft© SQL Server to host the building database. This database includes information about the building and services available in those buildings. Adding new service and attaching it to one or more building is a very easy process that any user can do with minimal training. After the new service is added, selecting it from the drop-down list will highlight the buildings where that service is available.

An ArcMap file was created with all the layers mentioned above. The building shapefile was joined with the building database that includes an identifier of each building (Primary Key).

ArcIMS was installed and configure on Windows and IIS web service was configured. ArcIMS administrator was used to create an image service. An ASP.Net application was constructed using a customized version of a template provided with ArcIMS. This was done to utilize the image service and to be able to match the look and feel of the university website and color scheme.

Building web pages were created showing the building picture with information and links. The ASP.Net app was connected to the SQL database and JavaScript was used to retrieve Building webpage though Ajax like methods.


Figure 1 Screenshot of Interactive Campus Map website

Application Use

After the application was developed, it was desired that the student body be made aware of its existence. Therefore a link was placed in several locations on the Marshall website. Also, three kiosks were set up in high traffic areas on campus.

The website was announced to the student about 10 days before classes start, and those days saw the high hits on the web server (See Figure 2).
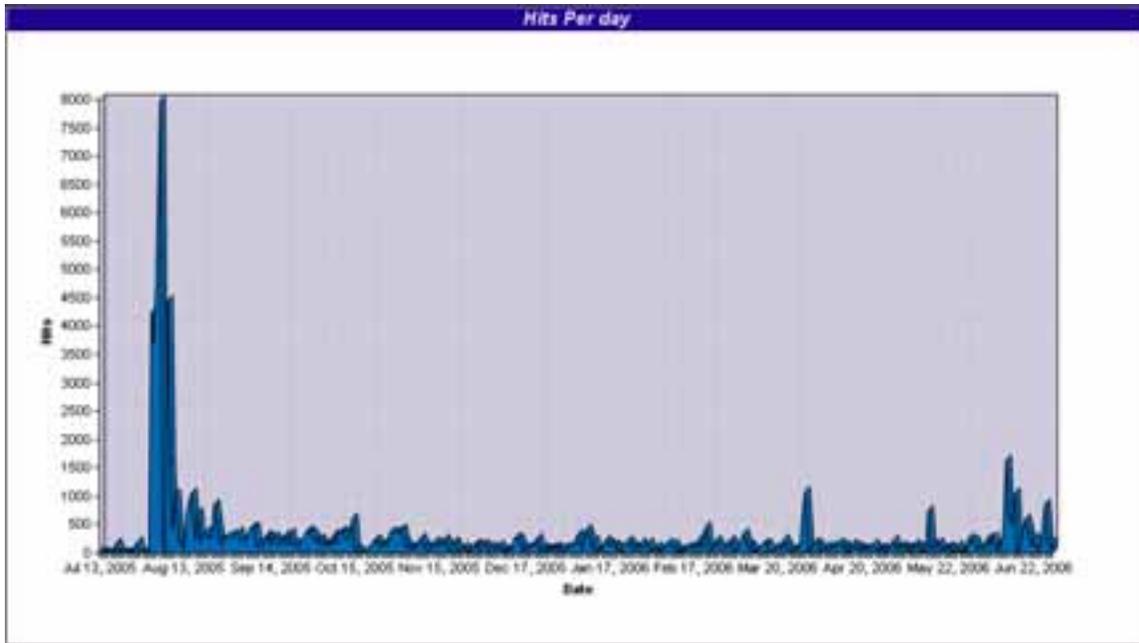
Figure 2 Utilization chart showing high usage the week before school start

This application is the first of its kind in West Virginia among the state's higher education institutions. Most universities and colleges have campus maps in static tiff or pdf format. These serve a purpose; however, they have limitations. For example, if new buildings are built or old ones demolished, a new map needs to be created. If services change locations, are added, or are eliminated, the map will need updated. The interactive campus map allows the flexibility to make these kinds of changes quickly.

Future Development

With any GIS application, new capabilities and refinements are continually discussed. Examples of some of these are:

- Would like to add the capability to point and click the building.

- Better aerial photography transfer to webpage.

- Allow granular queries, like selecting all buildings which contain computer labs, or select all the buildings where a student has classes.

- Link with the university staff/employee directory, where students can lookup a person (teacher or staff member), and the map will show the person's information, including room number, and highlight the building where that person's office is located.

- Maintain changes.

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