Integration with a Web Application to Create Navigational Instructions for Locations on the Campus of Elizabeth City State University

CReSIS Center for Remote Sensing of Ice Sheets

ECSU ELIZABETH CITY STATE UNIVERSITY *Elevate Higher. Emerge Stronger.*

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Abstract

Mashups are an exciting genre of interactive Web applications that draw upon content retrieved from external data sources to create entirely new and innovative services. The purpose of the Mobile Applications Research Team was to create an interface mashup in which geographic information and meta data from buildings located on the campus of Elizabeth City State University (ECSU) can be presented to users via mobile platforms. The project includes HTML5 programming which referenced a database that housed information such as location, building establishment date, academic departments, and academic programs. The information was then compiled using a PHP Hypertext Processor (PHP) form to populate a MySQL database. HTML5 coupled with PHP programming was then used to render a mobile web page with both map and database information.

Using Google Map Maker paths, streets, and buildings were created in appropriate geographic locations on the ECSU campus. The Google Maps Application Programming Interface was then used to generate Uniform Resource Locator's to both retrieve user Global Positioning System coordinates and create walking directions to selected locations. The user then had the ability to generate walking directions to locations on the university's campus.

Research Questions

- How to add buildings, sidewalks, and streets to Google Maps?
- How to generate walking directions?
- How to extract geo-location information from mobile devices?
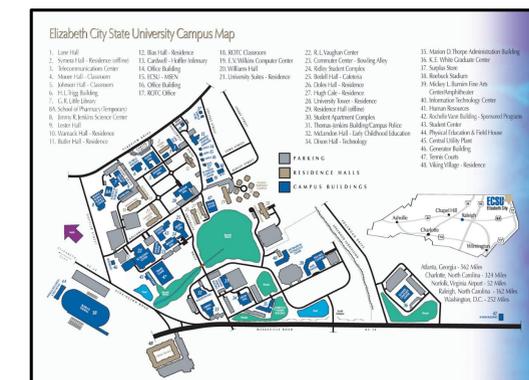
Figure 1: ECSU Campus Map

Purpose

There are a total of 48 buildings on the campus of Elizabeth City State University which covers over 154 acres of land [Figure 1]. Entering students often confuse the building abbreviations from class schedules (i.e. the Evelyn A. Johnson Hall is abbreviated as JH [Figure 2]). The purpose of this research was to provide an easily accessible way to navigate to buildings from a users location on the ECSU campus.
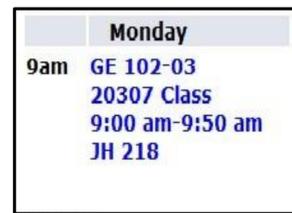
Figure 2: Example of ECSU student schedule

Methodology

Prior to modification, the campus of ECSU on Google Maps did not have any buildings, included incorrect street names/locations, and no walking paths [Figure 3].
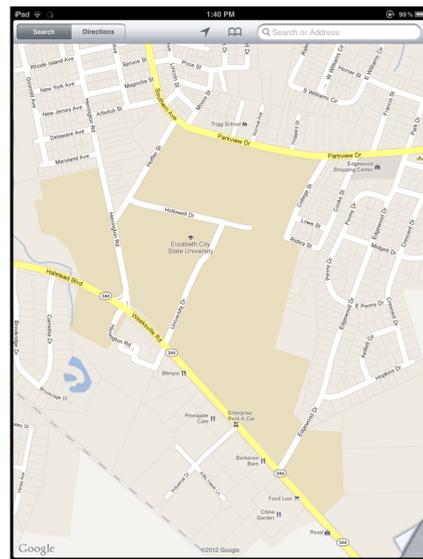
Figure 3: ECSU Campus in Google Maps prior to modification

Google Map Maker

Google Map Maker was used to generate buildings, correct the names and locations of streets and insert walking paths [Figure 4].
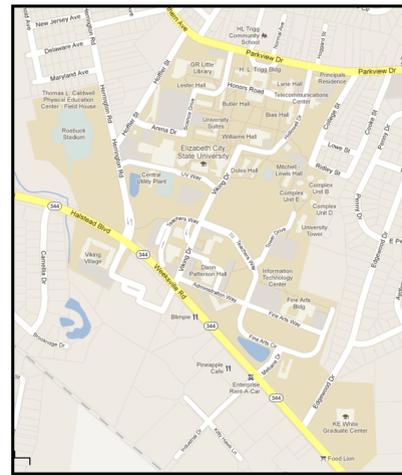
Figure 4: Google Maps after campus modifications

Google API

To retrieve walking directions, the Google Map API was used. The URL portion of the API had three main components. The first component was the latitude and longitude from the user starting address on the mobile device. The is starting address address option in the code began with "saddr=". The HTML5 function "initiate_geolocation()" was then used to activate the "position.coords" variables [Figure 5].

```
http://maps.google.com/map
saddr=position.coords.latitude,position.coords.longitude&daddr=
buildinglat,buildinglong&hl=en&&geocode=FbmlKQIdVQ91-w
%3BFTykKQId8Bp1-w&dirflg=w&mra=ls&t=m&z=17
```

```
HTML 5 Source Code
function initiate_geolocation()
{       navigator.geolocation.getCurrentPosition(ha
ndle_geolocation_query,handle_errors);
```

Figure 5: Starting address code snippet and HTML5 geo-location code snippet

The next component of the API URL was GPS coordinates of the building in which the user was navigating. The destination address was marked by the "daddr=" option in the API. PHP code was used to retrieve GPS coordinate data stored in a MySQL database that held information for the ECSU buildings [Figure 6].

```
http://maps.google.com/maps?
saddr=position.coords.latitude,position.coords.longitude&daddr=buildingla
t,buildinglong&hl=en&&geocode=FbmlKQIdVQ91-w%3BFTykKQId8Bp1-
w&dirflg=w&mra=ls&t=m&z=17
```

```
PHP Source Code
<?php echo $row_DetailRS1['LATITUDE']; ?>,<?php
echo $row_DetailRS1['LONGITUDE']; ?>
```

Figure 6: Destination address code snippet PHP code snippet

The last component of the API URL was used to define the language (hl=), area (geocode=), directions (dirflg=), route parameters (mra=), type (t=), and zoom level (z=) of the map. All parameters were separated by "&" symbols in the URL code.

Problems/Solutions

When selecting a destination to buildings, it was found that Google Maps did not use the newly created paths or streets. Only previously added streets outside the campus were used for directions. Figure 7 displays an example of of suggested walking directions between on campus buildings.
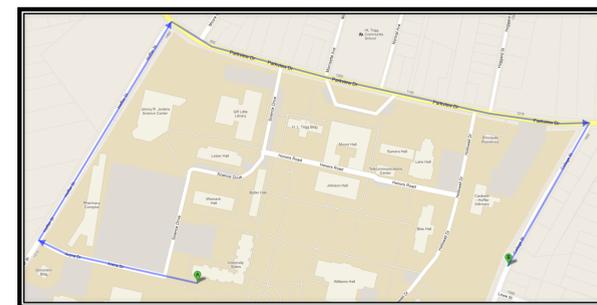
Figure 7: Google Maps walking directions error

The submitted a trouble ticket to Google representatives, saying that the campus needed a re-indexing to solve the problem. Google support responded affirmatively and conceded the map did need to be re-indexed. As of April 4, 2012, the campus of ECSU has working walking directions [Figure 8].
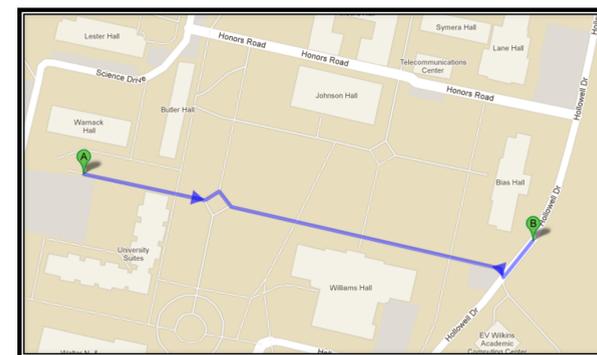
Figure 8: Google Maps walking directions after re-indexing

Conclusion

When the team first started, Google Maps did not have any paths/buildings, or correct streets. We used Google Map Maker to add buildings, paths and streets to generate walking directions. After the paths were approved and the campus re-indexed, Google Maps API was used to retrieve the GPS location from the mobile device. It was also used to retrieved the GPS locating from the designated building the user was navigating to.

Future Work

- Emergency Response Boxes (Blue Boxes)
- ECSU Shuttle Bus
- School Events
- Check In Feature

User Interface

References

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