

Wireless Networking at Furman

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Abstract: The wireless network connections available on campus are used frequently. However, the locations covered are known only by discovery. A formal map designating the areas covered was not in existence, rather a rough drawing created using Photoshop and a tour guide map. With the assistance of Computing and Information Services, an accurate set of maps can be created. The product will be incredibly useful to C&IS to assess current network status as well as propose future locations for antennas. This could also be a useful addition to students and faculty to possess.

Background Research:

- The general idea of the project was concocted among myself and my academic advisor Dr. Susan Dunnivant. Dr. Dunnivant and I were having a discussion about my classes, and she gave me the idea for the project. Dr. Dunnivant played a key role in the success of my project, because without her connections in C&IS, coordinating would not have been possible.
- The second part of preliminary research was to discuss with Dr. Richard Nelson the locations of the wireless antennas. Dr. Nelson was extremely helpful and amazingly named all locations from memory. Some of the locations were extensive in placement, while others are vague. For the areas with full coverage, exact antenna placement was vague. This data is the core data that I am using in this project.
 - Note:** Initially I planned to measure signal range as well. After experimenting with methods for capturing signal strength I realized that the variables that affect a wireless signal are endless. I did not possess the resources nor the timeframe to accurately map signal strength. However as a rule of thumb I found that each antenna emits a signal for at least 25-50 feet depending on what may obstruct the signal.

Data Collection Methods

The process for collecting data for this project involved three parts:

- Preliminary Placement** – Placing the points on a printed map according to the description Dr. Nelson provided for me.
- Joining the Network** – This aspect of collection was essentially going to each location and connecting to the network to receive the necessary attributes.
 - Example: SSID's are received upon joining the network
- Referencing** – In order to be accurate in the placement of these points, I needed some way of recording my position with the aerial photograph which is the map used for the project.

Project Methodology

- Gathered initial information as stated above.
- Test the connection:
 - Played with computer and PDA in these areas to get SSID's and a rough idea of range (although not exact)
- Transferring to ArcMap:
 - Plot points where antenna is based on data from Dr. Nelson
 - Experiment with views, data arrangement, properties, etc...until satisfied with appearance
 - Export maps of different areas

Note: With the aerial photo covering the entire campus, there were many locations that had no data input and were irrelevant to the project. Also, with such a large image, the detail is lost. The solution: export many different maps rather than one map.
- Create Poster:
 - The poster is one of the most important aspects of the project. Presentation is almost more important than what might be accomplished. Because if you present the information, then it might as well not be there.

My Experience

My experience with this project has been a humbling one. Staying up all night with not one hour of sleep can really beat you down. But I got it done, and I am pleased with the result. This is an example of what I can do when I get down to doing it. I want to thank everyone who helped me, especially Dr. Suresh: You're a GIS Guru. Using GIS throughout the term has been eye-opening. This field is going to be a very popular one in the near future. It holds massive potentials that haven't even been touched yet.

The Milford Mall



The Milford Mall is perhaps one of the most heavily used areas on campus. With the four main academic halls as well as the James B. Duke Library. This map also includes a little more on the back side of Milford: Hippi Hall and the University Center. This map as well as the Main Gate Area map both demonstrate how in order to show all areas with WLAN, we have to break it up into pieces. This map holds the most antennas of all of the maps, and also receives the most network usage.

Approximate Signal Range



While I stated earlier that determining an accurate signal range for these wireless points in this project, with the help of Dr. Suresh, I was able to create a mock up of the signal ranges. This is a first guess into what the actual signal range would look like. In the next five to ten years, there will no longer be a need for this map, because at the rate of development for wireless LAN on campus the whole campus should be covered in maybe a few years.

Main Gate Area



This map shows the area surrounding the main gate. There is no extraordinary coverage present here, yet these connections are vital to many of the operations here. For example: The dorms may not seem like a necessary place for a connection, after all, we do have plug-in LAN in every dorm. In the Townes/Judson parlor, students can access the internet from their laptops giving them more freedom for study location. Who knows when their roommate's significant other could show up and ruin your focus.

Montague Village



Montague village was once the site of student dorms before it was turned into administrative offices. Montague village has a total of five antennas. This particular area of campus is seldom voyaged by your average Furman student, yet it is always bustling with activity.

