2023

Wiser Imaging Services Internship

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Western Washington University

COLLEGE OF THE ENVIRONMENT

WESTERN WASHINGTON UNIVERSITY
MAKE WAVES.

Internship Title: GIS Analyst

Organization Worked For: Wiser Imagery Services via Actalent

Student Name: Tyler William Balthrop

Internship Dates: From 04/07/2023 to 06/07/2023

Faculty Advisor Name: Aquila Flower

Department: College of the Environment

STUDENT SIGNATURE Tyler William Balthrop

DATE June 5th, 2023

Analyzing Satellite Imagery Through GIS

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Introduction:

During spring quarter, I was given the opportunity to work as a paid intern for a company called Actalent. This company oversees filling important positions throughout the technology industry and other fields with skilled workers. They help bridge the gap that is often hard to bridge without this style of hiring agency. Because this company is so prestigious, it has established important relationships with many companies but specializes in government contracts. The company I am currently working for as a paid intern is called Wiser Imagery Services. They are in Murfreesboro Tennessee but employ remote workers from all around the country.

Actalent allowed me to work as a paid internship for Wiser Imagery Services as a GIS Analyst. As a GIS analyst day to day my job can be completely different every single day or it could be the exact same thing day after day. It just depends on the deadlines, the client we are working for and the task at hand. Often the contracts that Wiser receives are with the federal government. Many of the positions do require security clearances but not all. However, that is not to say that the information does not hold value to potential harmful actors. That's why as a GIS Analyst for Wiser, it is also my duty, as it is other analysts here to maintain awareness around information we share, and to mitigate potential unauthorized access to our systems. This is why for this report, and because of our current project, I will not be divulging any proprietary information, locations, or specifics on current projects.

Methods/Tasks Completed:

The position requires the use of current satellite imagery and the use of ArcMap to map multiple different features. This position requires immense skills at analyzing different geographical concepts and conditions to properly perform in the position. For instance, to differentiate between a cart track and a road there are cues you can read from the terrain to determine what it is. Such as, the width, the roughness of the terrain, the general location and more. You also learn to determine deciduous trees versus evergreen tree types for landcover based on cues such as texture, color, and geolocation.

Another example of using geographical cues to analyze data, is having a basic understanding of the hydrogen cycle, soil saturation, foliage patterns, and how water

flows through terrain features such as valleys. Digital Elevation Models are very effective for tracing water flow routes. You can use this knowledge to map water flow when the water isn't directly visible in imagery.

In this position one of my primary roles is to work together with my coworkers through a remote environment operated through a Virtual Desktop Infrastructure (VDI). While this can be problematic at times due to variations in operating speed, Wiser uses a fast and effective VDI service in contrast to others I have used.

At this position I work with LCLU (Landcover Land use), Transportation routes, Hydrography, Culture, and Utilities. We map points, polylines, and polygons to represent each feature we can come up with. Using a Project Specific Guidance (PSG), we must identify attributes that are needed for each and every feature and scale it appropriately as it meets certain criteria. This isn't always full proof, however. Sometimes there are instances where even though something meets all of the criteria, it may not contain what we believe to be there. Sometimes, its just a best guess and a judgement call by the analyst.

The image below (Figure 1) shows a progression grid square, a customized Digital Elevation Model (DEM), and water flow routes. The progression grids are used to track the percentage that has been completed in each tile. Because there is so much information, it can be easy to get lost or overwhelmed, so this helps a lot.

These next images (Figure 2 & 3) are snips to show how hydro can be fixed when it is inaccurate or needs adjustment. It shows me selecting an arc that does not appear to have natural curvature and is not following the elevation how a flowing body of water would. Typically, when reshaping these arcs, the analyst would try to make it appear natural without those sharp curves.

Figure 4 shows a section of my current projects AOI. While the image is a bit off from where I am working, this is representative of some of what I am doing. For trans routes, we will manually draw every road, cart track, and trail that falls within needed requirements. The PSG dictates how each thing will be classified. As an example, the typical requirements of a 500k road for my current project is that a road will be greater than 3000m in length, and greater than 2000m in spacing from another 500k road or is needed to establish connectivity, which takes precedent over spacing requirements. Otherwise, it is descaled to whatever class's requirements it meets such as a 250k which has a length requirement of 1500m and a spacing requirement of 1000m. Using a sketch halo and a ruler we check that spacing in multiple directions to verify it meets the requirements outlined in the PSG.

The PSG also lists the attributes we need to fill out for each arc we create. For example, if it's physically intact, the road width, lane counts, its composition, its road classification such as road, street, international, local and others.

Figure 5 shows all the tiles that are within this particular project's AOI. Usually, each person in a team is assigned around 9 tiles and expected to finish at least 2 tiles a day. Progression is broken up into phases (P1 and P2). These phases are comprised of different things the analyst needs to finish in each tile and is rated in completion from 0-100%. Typically, there will be waves of people assigned to different categories per tile so that people aren't too overwhelmed. However, occasionally analysts are assigned multiple categories such as Trans, Hydro, and Culture and are expected to complete P1 and P2 That isn't always the case though. If an analyst is falling behind, everybody will take on more tasking to help the team move forward. The great thing about this type of work is that everybody works together to accomplish the teams goals. It also helps a lot that everybody here is a lot of fun and really kind to work with.

Results:

During my internship with Wiser Imagery Services via Actalent, I was able to assist my team of 15 other analysts in classifying, densifying, scaling, reshaping, conditioning, and correcting errors for four different projects over the course of 2 months. These tasks included mapping entire river networks, local, national, and international road networks, creating and classifying vegetation surfaces and built-up urban areas. I was also responsible for mapping utility networks in areas. I was able to assist my team in organizing the excel spreadsheet that my team uses so we could improve productivity for scheduling. I have had a lot of good feedback from my supervisor about my performance and how I am helping to improve the company with constant feedback on potential improvements for efficiency sake.

Discussion:

Training was a rigorous two weeks of work that was in my opinion, two weeks too short to be effective. While yes, the training was wonderful and highly educational, there is an extreme level of information to know for this job. Imagine shooting a confetti cannon into the air and trying to catch as much as you can. Now imagine that confetti is all information you will retain after training. It's a lot, but the real experience comes from trial and error, and just working on the job. That being said, prior to training, I had virtually no experience working with ArcMap. My academic training focused on ArcGIS Pro which was very similar but also a different beast altogether. Still, the training I received in school made my ability to learn the program very easy.

Something I think that would be a huge benefit to the company to implement into their training regimen is to add training on customer reworks. A lot of times in this position if you're new, you often get stuck on two major classifications, hydro and trans. While these are great, and very time consuming, it can leave you isolated from learning some of the other important classes such as culture, vegetation, and utilities. These of which

can be more difficult at times. Customer reworks are when there are errors generated from quick checkers that find issues wrong in the map and you have to go back through and correct the issues. These calls as they are called can be anything from a misaligned edge to a missing or misclassified attribute for a single point, polyline, or polygon. It's not uncommon to have a few hundred to a thousand of these to fix. It can take some time, but it really is very good at diversifying your skill set and improving your overall production speed.

Reflection:

I learned a lot. Specifically, I learned to apply my geographical skills and become proficient as a GIS Analyst. Something I struggled to overcome was the sheer amount of information that is needed to successfully do this job. In the beginning, I was pretty overwhelmed but as time went on, things became so much easier, almost habitual in nature. I also struggled in the beginning to read the cues of how to classify something such as road composition strictly based on visual cues. I began to learn what to look for, and to use what I already know about my project location to answer the unknown and turn it in to working knowledge.

My time at Western has helped me immensely in being able to understand a lot of the environmental aspects of this type of position. It allowed me to foster an effective ability to work in an office type setting, and gave me general knowledge in so many different areas. I would literally never be where I am today if I had of not gone to college.

You can learn to do anything in the classroom, in theory. However, the true ability to learn something is from application in the real world through trial and error. You must fail a little bit before you can learn to succeed a lot.

Working as a GIS Analyst been invaluable experience. It has fostered an environment where my academic history, personal skills and future career goals have been so perfectly intertwined. I have learned how to use multiple types of computer programs that gives me a leg up in any remote position. I have also learned how to apply my geographical skills to my position of employment. One thing that has really set this job apart from others is that it allows you the chance to use your own personal set of knowledge and skills to deduct the answer to whatever you're mapping.

Thanks to my paid internship working at Wiser via Actalent, I feel as though my studies at Western Washington University have been adequately put to the test and paid off. Often people doubt their own abilities when untested. This experience has allowed me the opportunity to test my metal and feel good about what I am doing with my life and career.

My goals for the future are this, to break the poverty cycle that I grew up in, to have a family, a home of my own, a job that pays enough for me to be happy with, and the ability to give back to my community when I am financially stable. If it weren't for the ability to go to college, gain the skills I have learned, and given the opportunities I have been given, I don't even want to think of where I would be right now. Opportunities like

this paid internship have really helped me see just what I am capable of as I continue to allow myself to become a better, smarter version of my old self. I know that this is only the beginning of my journey to a successful life, and I cant wait to see where the next chapter takes me.

Figures:

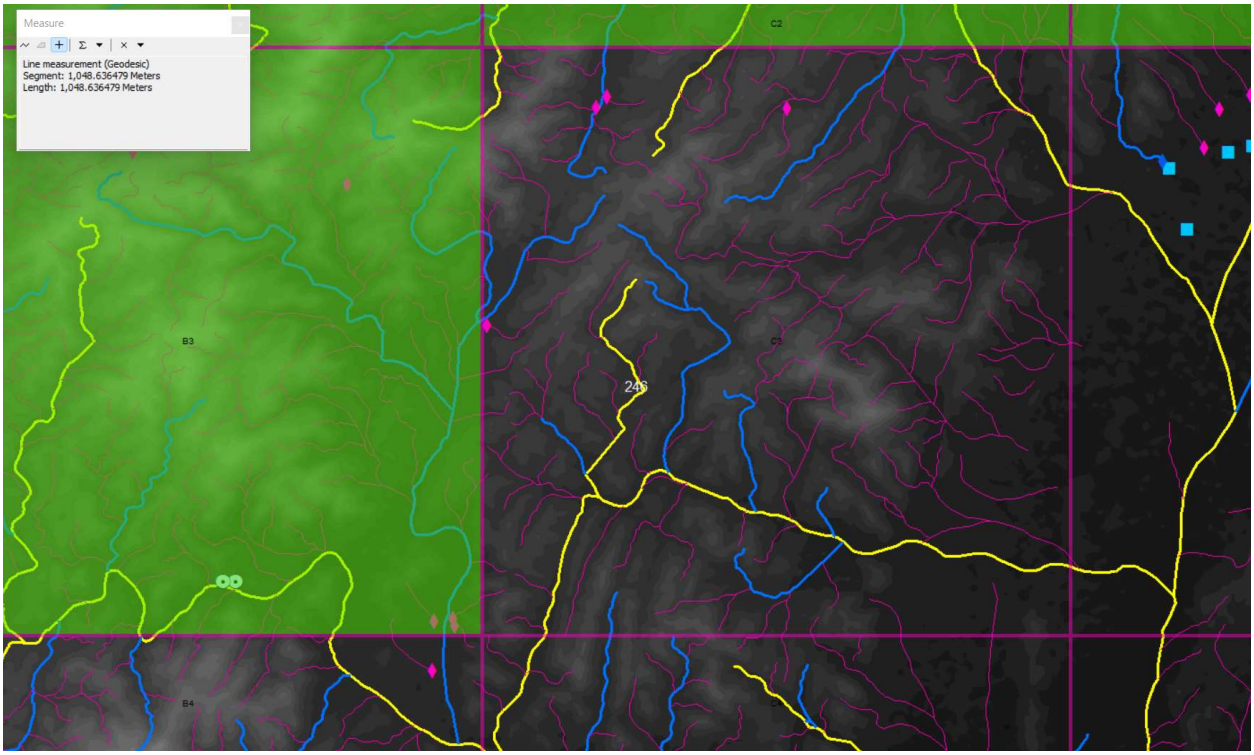

Figure 1: Image of Hydro routes and a DEM

Figure 2: A hydro arc that needs adjustment.

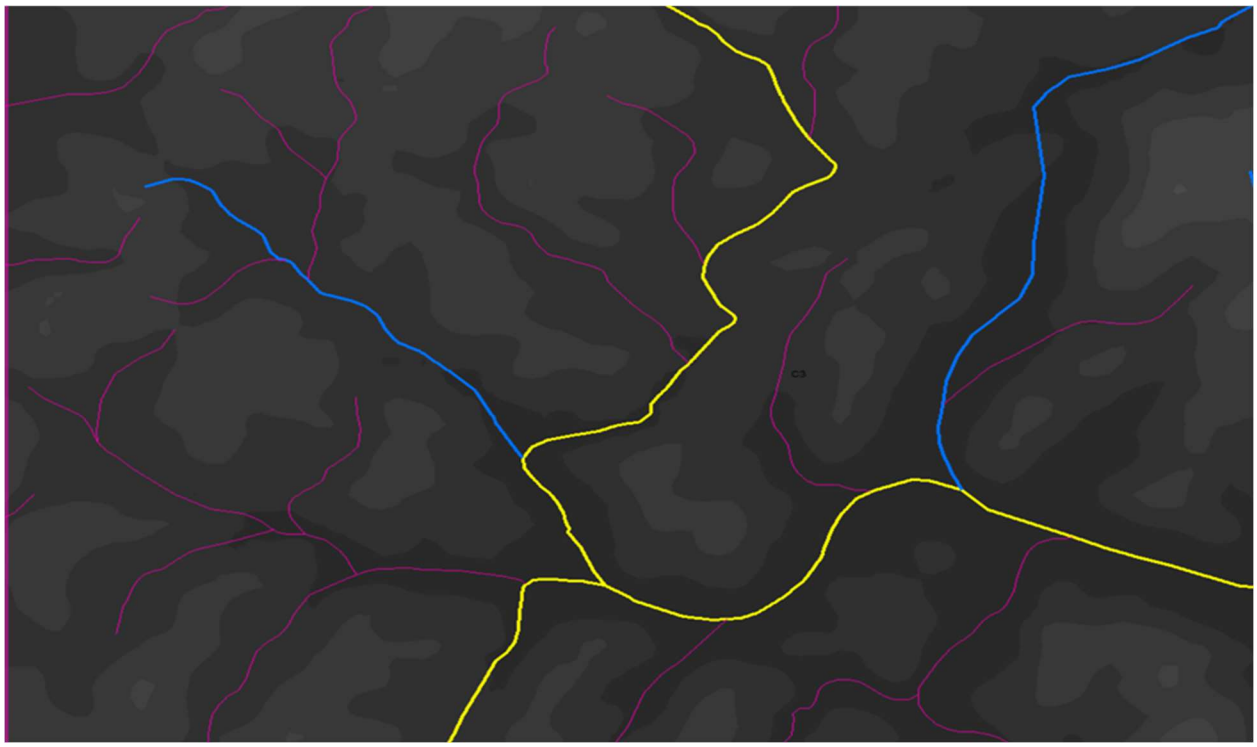

Figure 3: Hydrography arc is fixed

Figure 4: Satellite imagery at 1:4000 showing Transportation in progress.

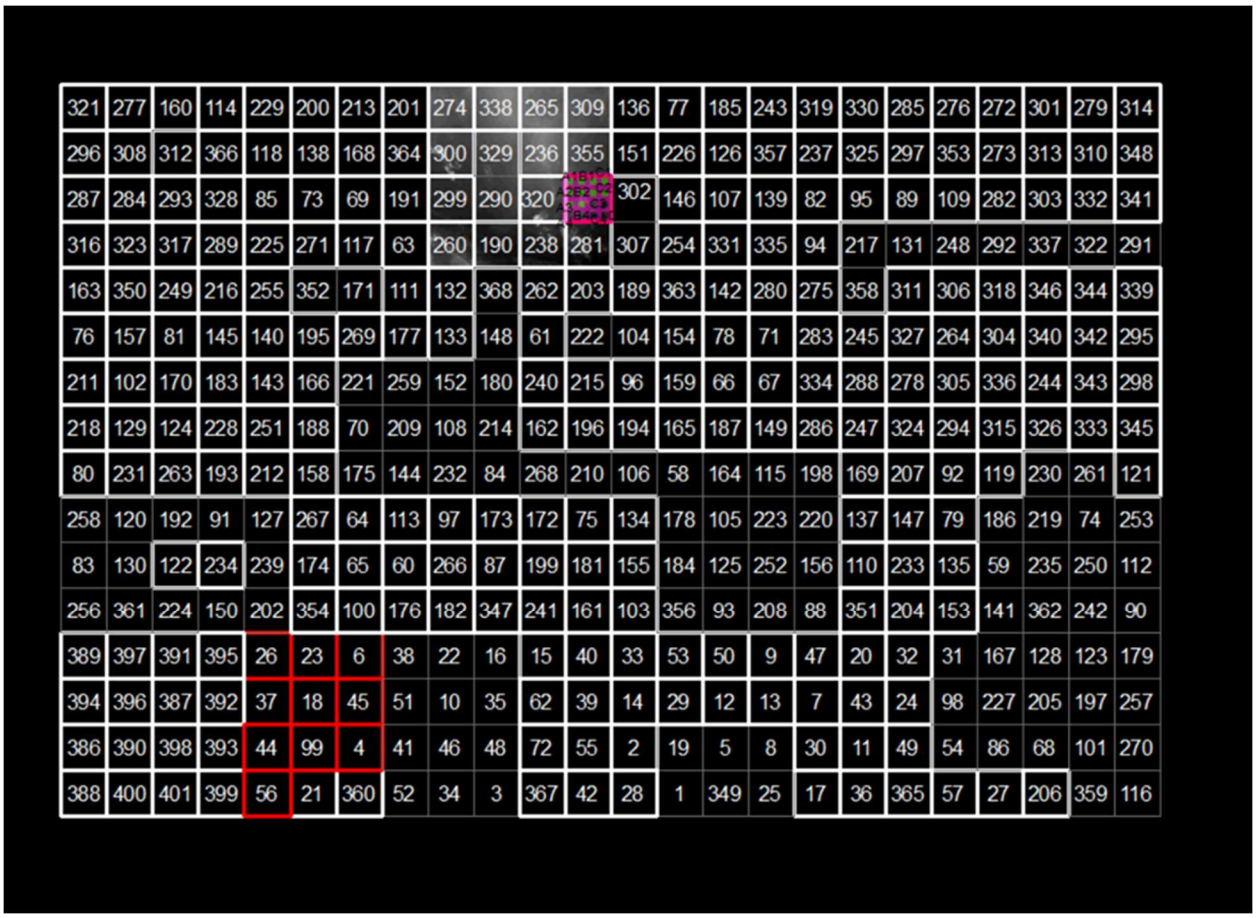

Figure 5: Entire AOI for the location we are working in.

Figure 6: Google Earth Pro