GeoBC - Practicum
Final Report

BCIT Geographic Information Systems - GIST 8126

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Morsal Niyaz, A00938510

Sponsor -GeoBC GIS Department

Faculty Advisor - Rob Hewlett

ABSTRACT

My practicum is with GeoBC - Province of British Columbia, Government of BC and what our main goal for the practicum from April 20, 2020 until June 19, 2020 was to help GeoBC's Demographic features team to track their progress in updating their Digital Road Atlas (DRA). The deliverables are to be able to provide the organization by the end of this practicum a dashboard summarizing these changes and updates created using Esri's ArcGIS products such as ArcMap and ArcGIS Online. Demographic features refer to any features that are man-made such as a road network.

Due to COVID-19 this practicum has been entirely working from home with multiple virtual meetings to discuss progress and updates on the deliverables. The data was provided by GeoBC's Demographics features team and the main software used was ArcGIS Pro to clip the BC DRA to the project boundary layer, which was the Kamloops area. We worked with data from March 2019 until May 2020 and clipped each month separately then put each month's dataset into a combined dataset called target_dataset. We then exported the target_dataset along with the project boundary layer onto ArcGIS Online, where we put them into a web application. The items that were required to add on the web application were suggested by our sponsors at GeoBC. What was essentially made for them is a web application that shows the DRA changes in each month for clients to see using a time slider and having the option to query certain fields. At the top right of the web application, dependent on what time range the client or user selected, it will show the amount of changes that were made in that time period. When clicking on the polylines of the DRA, a pop up window will appear that will give the user more information on that particular section that was edited in that time period.

TABLE OF CONTENTS

INTRODUCTION

This report with GeoBC - Province of British Columbia, Government of BC practicum outlines the Management and Organization, Technical aspects of the practicum, Assessment done throughout the time period of April 20, 2020 until June 19, 2020. The result of the deliverables is a working web application that showcases the Digital Road Atlas (DRA) across British Columbia but has been focused down to the Kamloops regions to showcase the changes that have been done on each of the roads in each month. Each month had some road sections that have been modified and included the previous road sections as well but our task was to take only the changes made in each month's dataset and export all the changes of every month into a new dataset. The new target dataset that consisted of all the changes was then exported to ArcGIS Online for the web application to be made. The web application consists of a time slider where the user can select which time range they want to see changes in the DRA. At the top right of the web application, dependent on what time range the client or user selected, it will show the amount of changes that were made in that time period. When clicking on the polylines of the DRA, a pop up window will appear that will give the user more information on that particular section that was edited in that time period.

MANAGEMENT AND ORGANIZATION

GeoBC produces and maintains a diverse roster of tools and applications that can be used to discover, view and manipulate spatial information. I worked in the Demographic Features Team to track GeoBC's progress in updating their Digital Road Atlas (DRA). Our final outcome is to provide to the organization by the end of this practicum a web application summarizing these changes and updates created using Esri's ArcGIS products such as ArcMap and ArcGIS Online. The Demographic Features refer to any features that are man-made such as a road network.

We have not had a chance to experience the work environment in person to get to see all the different departments but most of the other department team members can be seen in AGO in the organization tab. There are 147 members and we can see the different Roles they have. Some examples are Administrator, Proxy - (Level 1) Viewer, Proxy - (Level 2) Editor, (Level 3) Advanced.

Organization Structure

Data Management -The data for our practicum will be accessing data through specific datasets sent to us by our sponsor or accessing them through AGO on GeoBC's organization. The data is managed by the GIS department at GeoBC.

Software Management - The software being used in this practicum is AGO with a GeoBC organization managed by GeoBC and also ArcGIS Pro, which is managed by the IT department at BCIT.

Workplace Management - The workplace is currently from home due the COVID-19 restrictions and it is following the regular work schedule from 9am to 5pm, Monday to Friday.

Role of GIS/Standards and Software

The deliverables are to be able to provide the organization by the end of this practicum a dashboard summarizing these changes and updates created using Esri's ArcGIS products such as ArcMap and ArcGIS Online. ArcGIS Pro was also accessed using BCIT''s Citrix Workplace.

Planning and Managing

The work was divided between me and another classmate of mine, where each week we would have a new task to complete. We would have weekly meetings with our practicum sponsor outlining the work we have done and what could be changed in order to meet their standards.

Supervision

We had 2 practicum sponsors that would supervise us during this time period and would assist through email or Microsoft Teams during our weekly meetings.

Technical Setup

Worked from home and was using my own technology for the practicum, which is a MacBook Pro (Retina, 13-inch, Mid 2014), with a Intel Core i5 processor and 8GB memory. The work that I have been doing at GeoBC has been mainly using ArcGis Pro and ArcGIS Online so my computer has been able to handle it. There have been some instances when I tried to do some analysis on the data and it took some time but it has still been manageable.

Role

My role is a GIS Practicum Student at GeoBC. They have assigned me to the Demographic Features department, where I have been assigned to create a web application for the team where future clients can have access to.

TECHNICAL

Data, Standards and Software Used

The data was provided by GeoBC's Demographics features team and the main software used was ArcGIS Pro to clip the BC DRA to the project boundary layer, which was the Kamloops area. We worked with data from March 2019 until May 2020 and clipped each month separately then put each month's dataset into a combined dataset called target_dataset. The deliverables are to be able to provide the organization by the end of this practicum a dashboard summarizing these changes and updates created using Esri's ArcGIS products such as ArcMap and ArcGIS Online. ArcGIS Pro was also accessed using BCIT''s Citrix Workplace.

There was also an opportunity for us to code what we have done in ArcGIS Pro as a python script that we have not fully completed yet because the priority was to complete it using the geoprocessing analysis tools and then exporting the results into a web application.

Tasks Performed

- Task 1 - Orientation
    - 10 hours
    - Talked about what the end goal of the practicum is: Creating a web app that showcases all the edited road segments around the Kamloops areas
    - Told us about what functionalities they would like to include in the script

- Task 2 - 4 meetings
    - 10 hours
    - Had meetings to screen share to show our code along with results after clipping to the project boundary and another meeting for checking up on each other's progress
    - In the meeting we also shared our current web application to see if the features that we had are what they had envisioned. They gave us their feedback and we have been working on editing the way it queries attributes and what it represented in the charts.

- Task 3 - Getting familiar with data
    - 20 hours
    - Gave us BC and Kamloops data to play around with so we have a sense of what datasets they are using and what is inside each of them
    - Focussing on only certain fields in the data to perform the SQL statements on and to use in our code
    - Have become familiar with the attributes required for the dashboard and are playing around with which fields make the most sense to include in the final product

- Task 4 - Understanding queries to understand data
    - 20 hours
    - Testing different queries with different fields with the data
    - Getting all the changes from each month's dataset

- Task 5 - Signing up to our AGO account along with writing an introduction
    - 5 hours
    - They had given us ready made usernames where we had to set up our password and write an introduction for our profile

- Task 6 - Organizing large files given into appropriate folders
    - 20 hours
    - With the data they have given us, it was our responsibility to put them in appropriate folders so that when we run the code it will be easier to extract the data from the files
    - Clipping a total of 13 datasets to the project boundary and appending the changes from each dataset to one target dataset

- Task 7 - Experimenting to see if large data can be brought into AGO
    - 50 hours
    - Clipped and edited the data in ArcGIS Pro and exported to AGO
    - The dataset was fairly large but since we only wanted the attributes that showed changes in each month we didn't export them all, however it still takes a while to show up when a new query is made

- Task 8 - Clipping data into boundary
    - 50 hours
    - Clipped the 13 datasets to the appropriate project boundary, which is around the Kamloops areas

- Task 9 - Writing pseudo code and code for looping through each month in dataset
    - 60 hours
    - We have been asked to write a script that would loop through the datasets that they have given us and perform specific SQL statements

- Task 10 - Experimenting with web app
    - 30 hours
    - Creating test web apps to see how the data will look like

- Task 11 - Customizing web app for project purpose
    - 50 hours
    - Add and taking away certain widgets to see which ones would be appropriate for our purpose

- Task 12 - Finalizing App
    - 10 hours

- Task 13 - Management
    - 10 hours

- Task 14 - Report Result
    - 10 hours

Problem Solving

One major problem faced with the practicum was having the old practicum cancel and having this new one just a couple of weeks before it began on April 20, 2020. The problem occured because of the COVID-19 virus that has put many people in vulnerable positions as social distancing became more predominant and working from home became mandatory. Luckily, GeoBC was able to provide a practicum and the only other obstacle is that we are not able to interact in person. They have provided us with an AGO account that gives us access to their content and will allow us to post content made from home. We have resolved the issue of not being able to see each other by having weekly meetings, where my sponsor gives a list of tasks that need to be completed and if there are any questions between that time and the following week, they encourage us to contact them.

We also faced a problem during the beginning of the week of April 26, 2020 was that GeoBC wanted us to write a script that would be imported to ArcPro. However, since there are two of us from BCIT at GeoBC, the script needs to be the same. We each have been working on the code separately and have been approaching it in a different way and we sent it to our sponsor for feedback. Our sponsor has been giving really good feedback on each of our code but we both realized that it would be best if we were to combine both of our code into one so that we can help each other out. It actually benefited us because I had been working on parts of the script that she hadn’t and she had been working on parts of the script that I haven’t. We have been on the code together through google docs because we found that to be the easiest way to share what we have done with one another.

Another problem that we did face was trying to get the appropriate widgets on our web app because we couldn’t find them in the options list. But after searching online and trying to create different web apps we were finally able to get the time slider in the web app in the appropriate place. We also had a problem where we began to focus more on the details of the code rather than getting all the functionalities to work. After some contemplation, we decided to do it all in ArcPro just so that we could see what the output should look like. This way, when we do complete the code we can get a sense of what the results should be and look like. Our sponsors are very open to any method we choose and we're glad we chose to do it in ArcPro to see what the results would look like before we continued to challenge ourselves with writing it out by scratch.

BCIT Skills and Learned Skills

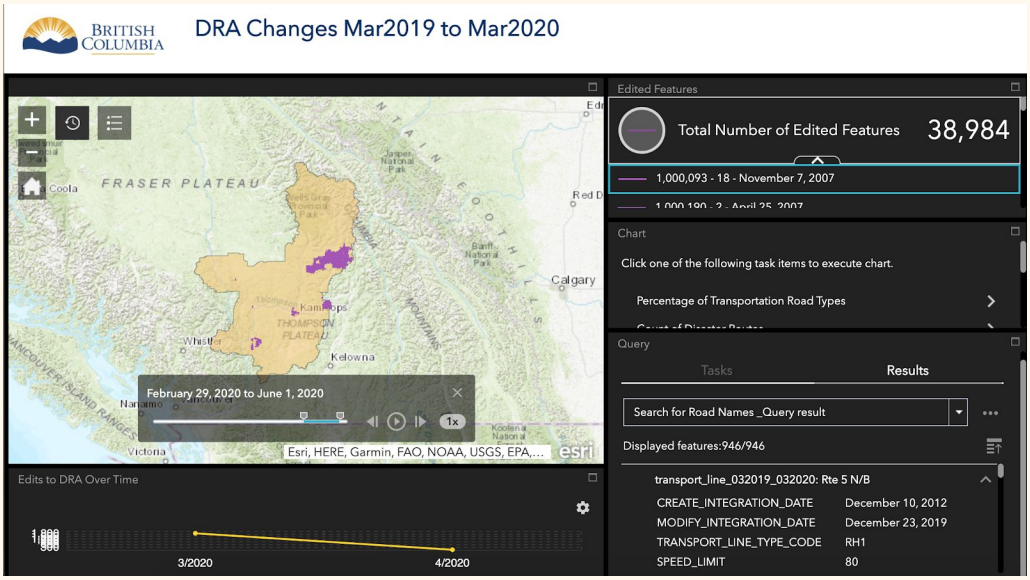
The skills that I have learned at BCIT that allowed me to excel in my practicum have been projects done in class that used ArcMap, ArcGIS Pro and ArcGIS Online. During my practicum these were the main software applications used. There was some coding involved, especially in the beginning, and the courses that dealt with python and scripting in ArcGIS Pro was extremely helpful because in most cases I was able to utilize previous code and alter them to fit our purpose. The new skills that I have learned from doing this practicum is firstly doing work from home, due to the COVID-19 situation I was not able to get the face to face practicum experience but I was able to learn how to manage tasks from home. I also learned how to use Microsoft Teams and share screens as we would use that weekly for our meetings.

Technical Skills Needed due to COVID-19

The technical skills that were required for my practicum was being able to of course use a computer efficiently and effectively. My practicum consisted of weekly meetings through Microsoft Teams where we would have to communicate with a microphone so it was important to have access to one and be able to connect it appropriately for everyone to be able to hear. It was also important to be able to use online resources effectively because although our practicum sponsors were very open and happy to help with any issue that could occur, it would save both parties more time if one could quickly search for solutions online to see what people in the past have done to resolve the issue.

Results of Work

The result of the deliverables is a working web application that showcases the Digital Road Atlas (DRA) across British Columbia but has been focused down to the Kamloops regions to showcase the changes that have been done on each of the roads in each month. Each month had some road sections that have been modified and included the previous road sections as well but our task was to take only the changes made in each month's dataset and export all the changes of every month into a new dataset. The new target dataset that consisted of all the changes was then exported to ArcGIS Online for the web application to be made. The web application consists of a time slider where the user can select which time range they want to see changes in the DRA. At the top right of the web application, dependent on what time range the client or user selected, it will show the amount of changes that were made in that time period. When clicking on the polylines of the DRA, a pop up window will appear that will give the user more information on that particular section that was edited in that time period.



Work Accomplished and Hours Spent

The hours spent working on the practicum from the time period of April 20, 2020 until June 19, 2020 reflect the work completed for GeoBC. Each week a certain number of hours were put in to complete the final product and a total of 360 hours were achieved in doing so.

ASSESSMENT

Overall Experience

My overall experience with GeoBC was great and although I never got the chance to meet the people I was working with or physically be in the typical work environment, the practicum allowed me to strengthen the new skills I've learned from BCIT and gain some other very useful ones as well.

Class Learning and Practicum Experience

The skills that I have learned at BCIT that allowed me to excel in my practicum have been projects done in class that used ArcMap, ArcGIS Pro and ArcGIS Online. During my practicum these were the main software applications used. There was some coding involved, especially in the beginning, and the courses that dealt with python and scripting in ArcGIS Pro was extremely helpful because in most cases I was able to utilize previous code and alter them to fit our purpose. The new skills that I have learned from doing this practicum is firstly doing work from home, due to the COVID-19 situation I was not able to get the face to face practicum experience but I was able to learn how to manage tasks from home. I also learned how to use Microsoft Teams and share screens as we would use that weekly for our meetings.

Practicum Organization

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Workplace Management - The workplace is currently from home due the COVID-19 restrictions and it is following the regular work schedule from 9am to 5pm, Monday to Friday.

Training Received

There wasn't an immense amount of training that was needed or required at GeoBC in order to get started. We did however spend the first week just playing around with the data in order to get familiar with everything.

COVID-19 Impact

My practicum situation has changed a lot in the circumstances surrounding Covid-19. My original practicum with GE Smallworld was cancelled, but fortunately the BCIT staff were able to find great replacement opportunities for us very quickly and I accepted a practicum with GeoBC soon after. Due to COVID-19 I was not able to meet the people that I was working with at GeoBC or be able to physically work in The GeoBC office, which was unfortunate and that would have also been a great learning experience but being able to learn and complete tasks virtually is a skill that I now have and can use later on in my career if need be.

CONCLUSION

To conclude my experience with GeoBC, I have had the opportunity to learn many new skills and enhance the ones I've learned from BCIT. By the end of the practicum, I have created a web application for GeoBC that showcases the Digital Road Atlas (DRA) across Kamloops regions to showcase the changes that have been done on each of the roads in each month. Each month had some road sections that have been modified. The web application consists of a time slider where the user can select which time range they want to see changes in the DRA. At the top right of the web application, dependent on what time range the client or user selected, it will show the amount of changes that were made in that time period.

APPENDICES

APPENDIX A: Contact Details of Practicum Employer

Joy Sinnett

Email: Joy.Sinnett@gov.bc.ca

Phone: 778-974-3625

Jed Harrison

Email: jed.harrison@gov.bc.ca

Destany Crane

Email: Destany.Crane@gov.bc.ca

GIS Department Staff

Email: GeoBCInfo@gov.bc.ca

APPENDIX B: Final Time Accounting Table

Task #	Description	Report #1hours	Report #2 hours	Report #3 hours	Report #4 hours	Final Report Hours	Totoal hours to date	Original Estimate	Current Estimate	Difference Estimated	Percent Complete (%)
1	Orientation	8	2				10	10	10	0	100
2	Weekly Meetings	2	2	2	2	2	10	10	10	0	100
3	Getting Familiar with the Data	5	8	5	2		20	20	20	0	100
4	Writing Queries to Understand Data	1	4	10	5		20	20	20	0	100
5	Signing up to AGO Account and Writing an Introduction	5					5	5	5	0	100
6	Organizing Large Files Given into Appropriate Folders		4	6		10	20	20	20	0	100
7	Experimenting to See if Large Data Can Be Brought into AGO				35	15	50	50	50	0	100
8	Clipping data into Boundary			30	20	20	50	50	50	0	100
9	Writing Pseudo Code and Code		3	5	20	32	60	60	70	0	100.00
10	Experimenting with Web App				5	25	30	30	30	0	100.00
11	Customizing Web App for Project Purpose				5	45	50	50	50	0	100
12	Finalizing App					10	10	10			
13	Management					10	10	10	10	0	100
14	Report Results					15	15	15	15	0	100
	TOTALS	21	23	58	94	184	360	**360**	**360**	**0**	**100.00**

APPENDIX C: References if Applicable

No References used.