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ENC 3241

Project Proposal

Project Title:

Digital Cartography: A Community-Driven Map Database

Project Objective:

This project aims to focus on modern methods of storing and hosting cartographical data through digital platforms, to consider public interest in real and fictional maps. In facilitating this interest, the project will consist of a web-based interface for users to upload, retrieve, edit, annotate, and give feedback on cartographical data stored in a database open to the public. Public interest in digital cartographical data will be gathered and analyzed and will be valuable in fostering future creative works in formal and fictional mappings through a digital medium.

Project Background and Significance:

For over thirty years, users of the Internet have digitalized maps for others to experience. As the Internet became more and more accessible, websites soon became the most popular platform to access and view maps. Geographical data from satellites through the Global Positioning System brought way to geographic information systems, such as Google Maps, which brought renewed interest into the field. People no longer needed to purchase and or print out maps to know where they were going, as the Internet provided a more convenient solution for navigation. Just as cartography was popular in the eighteenth century for mapping the world, cartographers are back in demand due to an influx of navigational and rideshare applications.

However, while applications like Lyft and Uber are hiring geographers, our culture sees the act of creating maps as niche, given that our planet is well documented. Aspiring cartographers and hobbyists alike are discouraged from publishing maps of Earth unless they discover something new. On the other hand, fictional maps tend to be shadowed by real maps in cultural significance. The creative efforts of authors and worldbuilders can be difficult to access on the Internet, hosted on lesser known and or obscure websites.

The lack of centralized database to upload and provide feedback for real and fictional maps has kept the average person's interest in cartography minimal. Conversely, the creation of a map-based community website would only improve upon the creativity of the cultural zeitgeist. Facilitating interactivity, such a website would require a user-first frontend like Vue or React. The backend framework Django has the capability to handle massive requests for the application to connect to a large MySQL database of users and map data while also remaining convenient to work with. In addition, as Google Maps is proprietary, research into open-source geographic information systems such as OpenLayers 3 will be necessary. As images can vary dramatically, hosting them locally is not feasible, as space limits could be quickly reached, or the site's loading could slow to a crawl. Amazon's S3 subscription service can store larger files over the cloud while also having support for quick API requests for files.

Such a website would create a centralized environment for hobbyists and cartographers to post their geographic creations for the public to see. It would provide a professional addition to resumes and portfolios alike without the risk of unrelated information appearing on the same website.

Research Methods:

The website and database will be worked on over the course of one semester, with user data collection mainly taking place over the semester afterwards. Because of this distinction, the project is separated into two parts, each with their own tasks to fulfill.

Website and Database Construction:

Task 1 – Research Modern Implementations of Digitized Maps: Current map databases and use of digitalized geographical data on the Internet provide valuable data for the creation of this project. Looking into map APIs and waypoint establishment will give inspiration into how we can increase user interactivity within our map database and website.

Task 2 – Website Foundation Construction: The basis of any modern website requires the use of a strong backend to manage POST and GET HTML requests on behalf of a user. As Django will be used as the primary framework, an admin dashboard would already be provided, however user authentication and the look of the website would need to be finalized in this period.

Task 3 – Database Usage: The establishment of models and schemas for user authentication, map data, and comments are important in a web-based application like this project. Usernames, passwords, references to uploaded map creations, and user settings will all need to be considered within our database to provide a quality user experience. In addition, connecting the project to its Amazon S3 storage will be necessary in this step to host uploaded map images.

Task 4 – Finalize User Interactivity: The rest of the project will consist of working with the frontend of the application, and, using React as a framework. Annotating and putting waypoints on maps will require extensive trials to maintain a quality application. In addition, an optional survey for feedback on the website and user interest in geographical data will be added in this task.

Maintenance and Data Collection:

Task 1 – Analysis of User Data: This task will be ongoing throughout the second semester of this project, consisting of the maintenance of the website and observing weekly user analytics using Python. Effort will be taken to advertise the website to students around campus and through social media avenues.

Project Timeline: August 2022 – June 2023

Website and Database Construction:

Task 1 – Two weeks, in August.
Task 2 – One month, from August to September.
Task 3 – One month, from September to October.
Task 4 – Two months, from October to December.

Maintenance and Data Collection:

Task 1 – Six months, from January to December.

Expected Outcome:

The main product that will come from the execution of this project is the digital cartography website and database itself. Users will be able to log in, submit their own digitalized maps, annotate features of those maps, and provide feedback on other users' maps. The website will motivate users to engage in mapmaking on both a professional and hobbyist level. In addition, worldbuilders and tabletops alike would have a more centralized part of the Internet to share fictional geographical data for their audiences. The website, along with the data collected from users, will facilitate interest and creativity on behalf of cartography in the modern world.

The data collected from the optional survey and user analysis will be compiled in an academic journal succeeding the project's timeline. This data will hopefully spark more interest within the field of digital cartography and compel others to create similar projects.

This project shows a conscientious use of Computer Science software development principles, following the software development lifecycle; from planning to pseudocode to feature development. The structure of the MySQL database will not be convoluted, and documentation for contributing to the project will be written as concise, yet thorough as possible. The website will provide a motivational example on behalf of the University of Central Florida's Computer Science department, proving to prospective students how the university's coursework and projects can impact a community's relevance in society.

As I am currently an undergraduate student pursuing a Computer Science degree, the completion of this project will provide me great experience with writing code in a professional manner, allowing me to convey my knowledge of web development and object-oriented programming. My interests in building databases and analyzing data will be expressed within this project, and with its execution, will lead me to graduate study within the field of Data Science. I am motivated to continue pursuing my interests in software development, and through this project, I can demonstrate my ability to others within the industry I am soon to begin formally working in.

Literature Review:

Farkas, G. (2017). Applicability of open-source web mapping libraries for building massive Web GIS clients. J Geogr Syst 19, 273–295 https://doi.org/10.1007/s10109-017-0248-z

Ghimire, D. (2020). Comparative study on Python web frameworks: Flask and Django. Metropolia University of Applied Sciences, May 5, 2020

Melih Basaraner (2016) Revisiting cartography: towards identifying and developing a modern and comprehensive framework, Geocarto International, 31:1, 71-91, DOI: 10.1080/10106049.2015.1041560

Medyńska-Gulij, Beata, David Forrest, and Paweł Cybulski. (2021). "Modern Cartographic Forms of Expression: The Renaissance of Multimedia Cartography" ISPRS International Journal of Geo-Information 10, no. 7: 484. https://doi.org/10.3390/ijgi10070484.

Plantin, J.-C. (2018). Google Maps as Cartographic Infrastructure: From Participatory Mapmaking to Database Maintenance. International Journal of Communication, 12, 489–506. https://ijoc.org/index.php/ijoc/article/view/5988/2250

Veenendaal, Bert, Maria Antonia Brovelli, and Songnian Li. 2017. "Review of Web Mapping: Eras, Trends and Directions" *ISPRS International Journal of Geo-Information* 6, no. 10: 317. https://doi.org/10.3390/ijgi6100317

Preliminary Work and Experience:

As I am currently working for the University of Central Florida's Center for Distributed Learning, my knowledge in the field of web development is extensive. As I am often tasked with creating accessible applications for students and faculty to use in online learning, I have learned how to work with both frontend and backend frameworks for a web-based environment. My interest in databases has grown with the aid of Django, a backend framework that can facilitate user route and data management. My experience with creating new features for an accessible video platform has made me feel confident in my ability to develop a web application for many to use, as the video player has over seven thousand unique users. Working with an API that connects to Amazon S3 for the video platform has also enriched me, requiring me to read and understand extensive documentation in my work. I have also created a social media bot in the past that facilitates a tabletop campaign, working with the social media's API to automate sessions in an online environment.

IRB Statement:

As I will be collecting data on users accessing the website and its features and providing an optional survey to be filled, my proposal requires IRB approval.

Budget:

Dedicated Host Hardware: A Raspberry Pi to host the project will cost about $125, and a 256 GB microSD card for the operating system, web server, and database will cost about $30.

Image Storage: For high-quality image and vector storage, an Amazon S3 Simple Storage subscription would be, on average, $30 per month for storing 1 TB of data. Assuming this project will be hosted for about half of a year, that would be an additional $180. Adding in an additional month for testing would be another $30, for a total of $210.

Total: $365