Walk the Hills

College Hill Association and Pullman 2040- Mobile Application

College Hill Association

and

Pullman 2040

Finite Cipher

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Introduction

II.   Project Introduction

The College Hill Association and the city of Pullman recognized the need to enhance pedestrian safety and accessibility within the Pullman community. The growing concern for safe and efficient foot traffic in the area prompted these organizations to seek a solution that would empower residents and visitors to navigate the city on foot with ease. Traditional modes of transportation often proved inadequate or unsuitable pedestrian travel within the city. In response to this, the College Hill Association and the Pullman 2040 team turned to us to develop a practical, user-friendly application that could enhance and protect pedestrian travel in Pullman.

The motivation behind this project stems from a genuine desire to foster a safer, more convenient, and enjoyable environment for all people in Pullman be they residents, students, visitors, tourists, or anyone else. By providing a place to provide feedback on the local community as well as navigate from one place to another with an information source stocked with local insight, we strive to make walking in Pullman safer and better for everyone. Our vision aligns with the broader goal of creating a cohesive and vibrant community where people can explore and engage with their surroundings on foot as well as inform the city of any safety or maintenance ease with a simple and user-friendly interface.

The core objective of this project is to design and implement a robust mobile application that enables all people in Pullman to effortlessly find the safest routes from point A to point B. This application will take into account various factors, such as the time of day and user evaluated safety metrics, to provide real-time recommendations for navigating the city securely. By offering a solution tailored to the specific needs of the Pullman community, we hope to enhance the overall quality of life for its residents and foster a culture of pedestrian-friendly urban planning.

III.   Background and Related Work

It would be irresponsible to not look for an already made solution before diving into a project like this, especially when finding a suitable replacement would mean bringing safety to the public faster. There are many applications that allow a user some, but certainly not all, of the features our project strives to accomplish. Here we will speak briefly on each of those applications and how their technology will assist in making our application perfect for the Pullman community.

When it comes to generating walking instructions for any community in the United States, there is one clear dominant leader: Google Maps. Google Maps is a fantastic application that offers all kinds of customizability in mapping instructions and data on city streets and local points of interest [1]. Google Maps would work wonders as an application for the city of Pullman except that it fails to offer any kind of data to our client or safety information to our users. The city of Pullman is seeking an application that allows users to share the needs of the community and seek safety as a priority. In addition to its inability to provide a safest path filter or user suggestions for walking paths and maintenance needs, google maps also serves the driving community first [2]. While walking instructions are supported, there is far less effort that goes into ensuring these paths are the best for the local pedestrian population.

Google Maps, however, does serve as an exceptionally useful jumping off point. Thanks to Google's enormous size, they offer their services to developers like us as an importable API [1]. Using this we will be able to fast-track the navigational side of our application and focus on the most important aspect; user safety and community reporting (see project overview). There are other popular map apps, such as Waze, that have also been considered, but google maps walking instructions and API integration far out class those options due to other applications having an even greater focus on driving instructions [2].

One of the larger failings of Google Maps, as far as our community needs go, is its inability to provide and record information on public opinion regarding city needs and safety. There are dozens of applications that help assist in public safety concerns, but nearly all of them focus on getting help in unsafe situations, rather than finding safer routes to begin with [4][5]. One such application is WalkSafe, an application focused on user safety.

WalkSafe is, like Google Maps, nearly the application the community wants, but not quite the application the community needs. WalkSafe features imported local crime data and the ability to plot your own course through your local area using information from user reports on criminal activity [3]. Our application will need to do this, but will also feature automatic navigation using google maps API and will also allow for community reporting of other needs. Our team strives to develop an app that the city government can use to determine public work project needs such as street lamp outages, unpaved roads, snow blockages, and much more.

In summary there are many applications that meet the community needs in one area or another, but none that bring all those features together in one Pullman focused application. Our team is committed to making a personalized local application that works with the community for the betterment of all of Pullman.

We will have a lot of learning and resource acquisition ahead of ourselves. In order to accomplish our goals in the given timeline, we will need to master a multi-platform programming language that allows us to build and port our application across hundreds of mobile devices. We will be using Javascript and Facebook's React framework to do this. In addition to the language platform, we will need to make heavy customizations on Google Maps data and information that will require us to purchase a Google Maps API license and master its inner workings.

IV.   Project Overview

Community safety is a growing concern for local government and community agencies all across the nation. The City of Pullman is trying to stay ahead of the curve of growing crime as the city expands. This application will serve as just one of many installments to accomplish that goal. It is a privilege to work with the Pullman 2040 initiative and serve the College Hill Association in creating a new state-of-the-art application centered around community voice and safety. This application will allow a user to not only receive real time instruction to arrive at their local destination, but it will also provide dozens of insider factors such as points of interests and places to avoid based on weather and time of day. Our users will be able to find the fastest, lowest elevation gain, or safest way to walk to their destination all with the click of a button. Not only this, but they will also have an opportunity to inform the city of its needs and help create real change for all Pullman locals.

The primary objective of our application is to gather information about the public routes that the public use and their thoughts on the relative safety and community enhancement needs of those routes. Throughout the city there are needs that go unmet simply due to a lack of reporting. Street lamps go out, stairwells remain unlit, paths go unplowed, and so much more. With our application any user can quickly let the city know and get the word out. These issues are not caused because the city lacks a willingness to help, but because they lack the knowledge of the issue. This application will rectify this while also allowing users to provide information to others about the local safety of various paths.

Safety information reporting and filtering is another of our main objectives. It is paramount that our application go above and beyond Google Maps navigation by providing users the ability to filter a route by its safety rating. This rating will be created thanks to user reports that help create a local community dedicated to helping each other day and night. In addition to creating safer paths for our community, user safety reporting could be used by local law enforcement to determine areas of potential need in the community. Unsafe regions can be recognized as needing additional patrols and the police will be able to see live updates to their patrols' impacts on the city as route safety ratings change over time.

A third pillar of priority is for this application to provide real time changes to its instructions based on time of day and weather. Pullman is no stranger to intense weather conditions or severe swings in community changes due to time of day. Almost no applications take these things into consideration when reporting safety or determining pathways. This application will use the local weather and time of day to filter routes unlikely to be walkable due to reduced safety or increased burden through snowy obstacles and ice. With all the hills and the wild amount of snow, slipping can be a major concern for users that applications like Google Maps simply won't consider. Gathering local weather and time data from a user's device will allow this application to customize the walking instructions for a user no matter when they want to travel.

As a final need for the application, we want to provide our user with the very best experience that a local guide can offer. As Pullman locals we have the ability to far enhance the point of interest information one might find on google. From reporting hidden stairwells and paths, to providing insider scoops on secret menu items, our application could have the ability to give a full walking tour of the city when moving from one point to another. Applications such as Google Maps are unable to accommodate this as their world wide scope makes generating insider knowledge far too encumbering a task.

So, how will all of this be accomplished? This application must be a multi-platform GPS driven application with connections to local databases for safe filtering. To allow for this we will need to build the application in a multi-purpose environment. Using JavaScript and the React environment we will be able to port the application to many devices and allow our users open access regardless of the personal GPS product they wish to use. The navigational aspects must also be cross-platform. Thankfully, this is a task made easier through the use of the Google Maps public API. Using a key, we will be able to make a free community application with little more than a license fee. This will allow for live navigation through the world leader in navigation technologies.

Through the development of this project we will need to consider the local needs of the community we serve as well as their preferences for privacy and safety. Whenever an application chooses to gather data on the public, issues of privacy come up. It will be a constant conversation with the public to ensure that their data is not being sold or used for anything beyond enhancing the community safety and development needs.

In summary, this application must gather local input on community safety and needs, provide accurate filterable and customizable navigational instructions for pedestrian traffic, update its information live given weather and time of data information, provide a community experience, and protect user privacy. This application will serve its community and help make Pullman a safer, better, and more active community by 2040.

V.   Client and Stakeholder Identification and Preference

The main client for this project is the College Hill Association and the Pullman 2040 team, representing the College Hill neighborhood and its community members, with Francis Benjamin and Allison Munch-Rotolo serving as primary points of contact. Their primary objective is to enhance pedestrian safety and accessibility within Pullman. Pullman visitors, including tourists, also stand to benefit from a safe and convenient means of exploring the city. Local businesses have a stake in this project, as it can potentially increase foot traffic and accessibility to their establishments. As the project grows in popularity it also stands to benefit local law enforcement and other groups interested in public opinion on city safety.

Foremost among the needs and preferences of the College Hill Association, Pullman 2040, and the Pullman community at large is safety. They are seeking a solution that prioritizes the safety of pedestrians, helping users avoid potentially unsafe areas or situations while walking through the city. Accessibility is another crucial aspect, with a desire for the application to be user-friendly for people of all ages and backgrounds, including Pullman's visitors. Cross-platform compatibility is preferred to ensure accessibility on a wide range of mobile devices. Real-time information and route recommendations are expected, taking into account factors such as the time of day and season to adapt to changing conditions. Moreover, the project should encourage community engagement by promoting walking as a means of transportation and inspiring residents and visitors to explore Pullman's unique offerings. Lastly, scalability is a key consideration, with the solution designed to accommodate potential future enhancements or expansions to meet the evolving needs of the Pullman community.

Team Member Introduction

Adam Wagener is a senior computer science major at Washington State University. With a former degree in mathematics and a Masters in teaching from the University of Washington, Adam brings a unique perspective on community needs for pedestrian traffic. Adam has considerable soft skills and experience dealing with the public in addition to his programming skills. Adam is a growing member of the Pullman local community through his time at WSU as well as his experience working for SEL.

Mitchell Footer is a junior computer science major at Washington State University with a background in both soft and technical skills. Through jobs such as customer service and being a teaching assistant he has consistently improved on his ability to communicate and work in a team with a wide group of individuals, while also diving into the more technical sides of computer science such as web development and Linux operating systems.

Juan Ibarra-Delgado is a Senior at Washington State University pursuing a degree in software engineering and plans to graduate in Spring 2024. Along with this, he is in the Army ROTC program and plans on Commissioning to the United States Army once he receives his degree. He has interest in working with Military Software Programs after the Army. Juan has experience in these following languages; C,C++, C#, Python, and Java.

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