

Box 1: Overview, Key Words, and Subtopic Name

The fast-paced world we live in today requires the need to better mobilize and organize events like protests and marches. Our project offers planning for the mobilization of people in events such as protests and large gatherings. The app will result in a decrease in the likeability of violence breaking between two opposite groups of a protest and allow for a safer environment both for those involved in the protest as well as the general public.

The potential outcome of the product is to better mobilize individuals and groups of people. The product will give users the ability to better respond to their surroundings when moving through their city on foot. With the influx of applications and resources for people to use to find better driving directions when it comes to avoiding traffic, accidents, or road closures, this product will utilize similar concepts, but with focus on people on foot.

Areas of technical expertise: Cloud Computing, Mobile Application, Cloud Platforms, Location API

Areas of Application: Mobile phone development, Mobilization, Location-tracking, Routing, The subtopic of this project is Software Engineering

Box 2: Intellectual Merit

This Small Business Innovation Research Phase I project demonstrates the creation of an algorithm that computes the routing people based on large crowds and events. The intellectual merit is the product's algorithm that calculates the number of people per specific area and decides whether a route needs to be adjusted to avoid a highly crowded area or accidents that will impede the continuation of the user's trip. The development of this algorithm includes location tracking of the app users, computing the best route for getting from one place to another, and determining when an area is to be avoided. Technical hurdles for this product include being able to respond promptly when directions need to be adjusted for users. The algorithm must be able to take in and analyze data fast enough to be effective in giving the user the best experience.

Goals of the R&D include providing users with an experience that will give them the most up-to-date information in the quickest response time. In order to reach these goals, the product will focus on two major elements: accuracy and response time. Accuracy will be measured in the algorithm's ability to find all appropriate paths and give the user the best one. Response time will be measured in the program's ability to continuously pull data about location tracking, accident reports, etc that will aid in adjusting the user's path in real time.

Box 3: Broader/Commercial Impact

The broader impacts of the project are benefits to society by providing an innovative way to better mobilize individuals and groups through a medium that focuses on the movement of people at the ground level. On a commercial level, our project provides a tool for better controlling large gatherings of people in a safe way, which is very appealing in today's global climate. On a social level, a more organized system for protests will cause a positive social impact through allowing protest participants to take part of a more organized and thoroughly planned protest. Another aspect of the social level is the impact on the general public that does not take a part of the event but benefits from the safer environment that is resulted from the app.

Elevator Pitch

Have you ever wanted to join a march late but were concerned you won't be able to find it? Have you participated in a march like the Women's March in D.C where there were so many participants that you were not able to actually march? People Movement is here to solve that problem.

People movement is an app for orchestrating the movement of individuals and groups of people on foot. The app focuses on providing directions getting from point A to point B for large groups of people on foot. Furthermore, the app incorporates live updates from the users to improve and adjust the route accordingly. Our app will focus on large groups of people on foot. Some of the potential applications of the app include directing protests and marches across cities, to create a safer environment for the protest participants as well as the city's residents.

Our product focuses on improving the efficiency of four main groups of people: the organizer, the group, the individual, and the community. Any organizer managing large groups will be able to more efficiently manage the moving group. He or she will be able to have up-to-date information to more quickly react to changes in the group's movement. Any group will be able to move more smoothly as a whole. Any individual will be able to join groups late, reconnect if lost, or report any incidents and/or suggestions for the route. And lastly, but most uniquely to our application, is the benefit this will have on the community. Large groups moving on foot tend to disrupt daily activities of the surrounding community and People Movement works to limit those disruptions faced by the community.

People Movement will highlight key features that current market apps do not support. First, the app will ensure a constant-fluent movement of large gatherings and will prevent "deadlocks" situations from occurring. Second, the app will provide tools for group management, allowing a user to create a group as well as join existing groups. This tool can also be used for day-to-day activities such as organizing a social gathering that will travel from one place to another for example a group of friends walking to the movies together. Third, directions will be provided based on the individual's location as well as the group location as a whole.

One does not need to worry anymore about being separated from the group since People Movement will keep track of where all group members are located while on a trip. While there are apps that provide directions for driving while taking into account traffic information, People Movement is the first to provide walking directions with respect to live events and given updates.

Join our movement and move with People Movement!

Commercial Opportunity and Social Impact

Everyone uses apps. Students use Evernote. Craft-lovers use Pinterest. Sports fans use ESPN. Friends use SnapChat. Parents use Urbansitter. Everyone uses apps. The app store marketplace is booming. More apps are being pushed to the marketplace everyday and more people are downloading these apps. And the statistics prove it. According to Statista, from 2016 to 2017, there was a 25.6 billion increase in app downloads. In 2016, the mobile app store revenue was over 36.2 billion US dollars. And the number of apps in the Apple Store and Google Play combined is over 4 billion. Everyone uses apps.

People Movement is a mobile application built for Android and sold in Google Play store. In order to determine its potential for success, our team had to determine its ability to be marketable: Who would our customers be? What category would the app fall under? Which apps can we target as competition? Our customers can be described in a broad sense as people who travel in large groups. However, this is not descriptive enough when identifying those who will actually need or want to download the app. With more fine-tuning, our customers can be described as big-city residents who attend marches and/or protests, are part of an organization that holds events within walking distance, and/or have a desire to avoid large groups if they are traveling by foot. Our customers are smartphone users who need directions for on-foot travel.

Understanding the competition is important for any new business. If the competition already dominates the market with a good product, it may be hard for other products to enter that market and be just as successful. However, People Movement faces a unique challenge when observing the market: there is no market for the product as a whole. Currently, the apps on the market cover issues like Waze's walking directions, Find My Friend's tracking friends feature, or Zello Walkie Talkie's group messaging, but there is no current product that combines all of these into one to support a group's movement. Protesters must use three apps at once just to communicate with, locate, and get to their group. Organization leaders must post to social media groups about departure time or route changes only to hope that everyone in the group gets notified. City residents must use on-the-spot judgement when they approach a crowd blocking their way in order to determine which route to take next. None of these problems are addressed on the market, and People Movement is made to solve them.

Bringing a product to market has risks, and it is important to understand those risks. The biggest risk that our team has identified is the risk that the market does not need a product like this now. App downloaders might not see the need for an application that helps people move around in large groups on foot, but People Movement has potential. When discussing the product idea with some fellow students, our team found that there is more need for a product like People Movement than most people would think. A fellow student was describing her disappointing day when she mentioned: "There was a protest at Union Station today, but I think I got there too late because no one was there. I think the group had moved on in their march around DC". The fellow student did not know of anyone participating in the protest and had no way of contacting its organizer. If she had downloaded People Movement, her disappointing day would have actually been a productive day. Another student was talking about a movie he saw one weekend and mentioned: "If I would have known there would be such a large march on my way, I wouldn't have been late to the movie". This is just the second of many situations where People Movement could have led to a more productive and satisfactory day for a city resident. Although

the risk of pushing a product to market that does not see a lot of downloads exists, People Movement caters its features to fit the needs and wants of the users it targets. People Movement is making a good product that people will use.

The commercialization approach for People Movement will start small and then expand. Our team will first target GW students who are living in DC. We plan to use a medium-sized subset of students to test this product. This group will be members of our Computer Science graduating class and members of our Greek chapter on campus. That subset of students will then be included in our wider subset of students that we will use to market the product. The Greek life chapter has the highest potential for number of potential user reached. Currently, the chapter has 150 members. There is at least one member that has a first connection with a member of a different chapter. Since there are over thirty chapters on the campus, ranging in total membership between 30-175, the average direct-to-consumer advertising possible hits roughly 2500 potential customers. This number is only on the campus of The George Washington University! If our team was able to connect to other active chapters on other campuses, then our number of potential users, just between the ages of 18-22, would increase at an extremely high rate. On top of this, there is the potential of students marketing to students outside of Greek life, to their friends, to the families, etc. Additionally, being in the heart of the nation's capital adds a level of possible users to tap into for marketing. Our team will reach out to protest/march organizers, demonstrate People Movement's success in testing, and encourage them to use the app. These channels will be highly effective in marketing the People Movement product.

The social impact of People Movement goes beyond the call to action that the typical app addresses. We did not create People Movement for our own benefit. We created People Movement to benefit society as a whole. Our app addresses a social need and provides a solution to a problem that affects society on a daily basis. People movement is not directed for specific groups or individuals, but is rather for anyone and everyone. The two ways that People Movement affects society are direct and indirect. The direct impact is related to the app's users while the indirect impact is the way People Movement affects non-users.

The first type of user affected by People Movement is the group event organizer. The task of organizing events will never again be complicated thanks to People Movement. When users download the app, they open a whole new window to better group-organizing experience. Our app allows users to easily create group events such as marches, protests, and other events that demand large crowds in movement. It provides users with the ability to add people to their group event and provide a walking route for all group members. The app algorithms for route calculations takes into account other events around the city and come up with the best route for each specific group. This way, the group organizer can ensure a smooth and continuous movement of the group. Furthermore, the group organizer also gains a better control over the group through the app's feature of tracking all group members. The organizer can track where the group is at all times during the trip and make sure no one is lost or split up from the rest of the group. Lastly, the group organizer will have access to the analytics of the trip. After the event is over, the event organizer can look back at analytics from the event, such as how many members actually showed up. From this, organizers will have a better understanding of how to improve for next event.

The next direct group that benefits from People Movement are the group members. Group members gain the ability to join a group, see in advance who else is a part of that group, and

have transparency to what the route is in order to unite with the rest of their group. This has a huge effect on the user's safety since it assures no user will ever be in a situation where they will not be able to find the rest of their group members. In addition, this also allows for more flexibility on the user's side in the event that a user needs to join the group after it has already begun its route. In the past, attempting to track down a group to join in the middle of the trip was a hard task that involved guessing how far the group made in a specific amount of time. This is no longer an issue since People Movement lets users easily keep track of how far the group is going and join them accordingly. All of these provide sense of security and community for the group as they use the app.

Both of the groups mentioned above also have a mutual benefit from our app that is time efficiency. People value their time and how it is spent. No one likes to be stuck in traffic just as much as no one likes to find out last minute their walking route is blocked. This is why People Movement uses the best algorithms that keep up to date with live events around the city. Our app will use these live events when calculating walking routes. People Movement values its user's time, and we want to treat it accordingly. That is why we provide users with only the most efficient walking route to ensure their time is used effectively. Organizers, groups, and individual users are all direct customers being effective by our app.

In terms of indirect effects, People Movement not only has effects on our app users, but it has just as equally large effects on non-app users. Those non-app users are the city's residents, tourists, and other people staying in the city. People Movement affects the city as a whole by allowing for the flow of people around the city to move more smoothly and to avoid situations of deadlocks. It makes the sidewalks less crowded and easier to navigate. The people living in the city will be affected by this without even realizing People Movement is the reason. They will have a quieter and safer city. In the end, they will have to spend less time running into unorganized crowds and more time enjoying their route.

Looking at a global scope, People Movement has a larger benefit that has to do with a major global issue which is global warming. One of People Movement goals is to encourage people to walk more and drive less. We hope that creating a better walking environment will increase the number of people choosing to use walking as a form of transportation rather than driving. According to UCSUSA, vehicles account for nearly one-fifth of all US emissions with around 24 pounds of carbon dioxide emissions per gallon of gas. This data goes to show how much of a large impact cars have on global warming. Reducing the usage of cars means reducing CO2 emissions and helping fight global warming. We see People Movement serving a larger role than only making cities easier to navigate. We're foreseeing the long-run effects of People Movement on the global society. Even if People Movement will operate in specific cities, it will cause a world-wide improvement to all.