Capstone Senior Design
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Project Proposal

For the first time in world history, there is definitive scientific evidence that humans are emitting pollutants at an unparalleled rate. There is a need to create awareness for the health of the planet, by showing each person how their actions contribute to climate change, in an attempt to make said person mindful of how they are harming the planet. The proposed mobile application will track a user during their commute throughout the day, interpret what mode of transportation they are using, and summarize the daily impact of their travels. This application will compute masses of carbon dioxide and other greenhouse gases emitted and then perform an analysis and comparison of the user's emission totals for the day and previous week. The application will seek to change how the user travels and will suggest more sustainable transportation choices unique to the user.

The greatest challenge will be to develop an algorithm that can both determine the user's mode of transportation and calculate the amount of greenhouse gases emitted over the course of a user's trip. This algorithm must firstly determine the mode of transportation. The application will use a phone's GPS to find out both where the user is going and how fast they are travelling. These two values can be analyzed to determine what kind of transportation the user is using, whether it be by walking, driving a car, or travelling by public transportation. For example, if the user is moving on the side of a road at the speed of 5mph, the application will conclude that the user is walking. However, if the user is travelling at a faster velocity, on a determined road, the application will recognize that the user is in a type of vehicle. Road speeds and public transportation routes can be determined by making use of the Google Maps API. In instances where the user's car is right behind a bus, or when the trip ending is unclear, the application will interact with the user to clarify misunderstanding. If the application is confused it will have a pop-up interface on the phone's home screen prompting the user to answer a question such as, "Which kind of vehicle are you in?" or "Has your trip ended?" The problem of computing total emission amounts will be approached by having preset data about various transportation types. The algorithm will make use of various accepted formulas that output mass of pollutant, given speed and emission rate of exhaust for a specific vehicle type.

At the end of each day, the application will prepare a summary of emissions, summing the day's mass of carbon dioxide/greenhouse gases emitted. The user will then be shown a comparison of their daily emissions to the previous week's totals. It will also give the user personalized feedback on how they can reduce their transportation carbon footprint the next day. If a route was seemingly congested, the application will suggest an alternative route. This suggestion will advocate for routes with less traffic, and therefore less idling time and less emitted pollutants. The application will also show a user's ranking in their local community (identified by GPS) to see if the user is helping or harming the earth more or less than the people in their community. This community comparison is unique in that it promotes competition, a healthy way to stimulate pollution reduction.

It is novel for a mobile application to interact with a user and prepare emissions data on a personal basis. Environmentally-friendly applications that exist are general, and lack scientific computations that compare a user not only to themselves and their previous emission totals, but to their surrounding community. Moreover, focusing on sustainable transportation is innovative in a mobile application setting, as generally the focus of environmental apps is on material goods.

As the US presidential election approaches, and environmental politics become discussed more frequently, it is foreseeable that people will soon want more feedback on their impact. The topic of climate change, moreover, heavily debated not only in U.S. politics, but on a worldwide scale. The result of creating this application is to not only help those who are mindful of their impact on the environment, but inspire those who do not have an established interest to actually care for the planet. Social change is only realized by getting a large proportion of the population to understand the wrong-doing that is taking place, and this mobile application will do exactly that. In a world where "knowledge is power," this application will cater towards informing the masses and promoting a new environmental age in the transportation sector.