

Conifr: Mobile App Tracking CO2 Emissions from Campus-Related Transportation

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Introduction

Transportation is a daily necessity and requirement to most people living around large metropolitan areas. It also plays a significant role in the releasing of greenhouse gases — more specifically CO2. According to the Environmental Protection Agency, in 2014, Carbon Dioxide was the greatest contributor to greenhouse gas emissions at 81%.

Conflicting, yet necessary, it can be difficult for people to identify, especially on their own, how much their lifestyle contributes to climate change. In order to do so, people need to grasp the extent of their own personal contributions to climate change; how much carbon dioxide is released through one's choice of transportation and daily commute habits? Once this is recognized, what are possible solutions at taking action on an individual level?

If people are unsure about how much their vehicles of choice emit, it is even more challenging for large organizations, such as the UC system, to measure accurately a campus' total emissions. Current systems in place require self reporting on vehicles driven and distance and time traveled, but it is near impossible to accurately record and remember all trips in a year or a quarter. Many in this case will estimate and guess -- creating inaccurate data that hinders organizations from making necessary changes to programs such as commuter groups.

The University of California system aims to produce zero-net greenhouse gas emissions by 2025 and 2050. While a smaller player in the grand scheme, transportation to, from, and around campus still plays a role in creating emissions. Campuses must have a method of tracking where the emissions are now, and also have a way of incentivizing those who can to make more sustainable transportation choices.

The Conifr app aims to automatically track a user's transportation type, distance and time traveled, and the CO2 emitted of each trip. The information is processed to place the user on a leaderboard competing against friends and fellow students, in an effort to incentivize behavioral change. The user, over time, should notice the difference sustainable transportation makes on the amount of CO2 emitted, and learn how to make better decisions when possible. The data calculated will also help campus transportation and parking services improve commuter programs, as well as the availability of sustainable transportation for around campus.

Project Goals

This project aimed to create a fully automated mobile app that would:

- Track a user's CO2 emissions from transportation
- Allow them to compete against friends
- Offer Carbon Offset purchasing options

Through these features, an individual could learn how their actions partake in the release of greenhouse gases, and help them learn what activities emit less. Access to that sort of information can allow them to make smarter decisions in choosing more sustainable transportation modes.

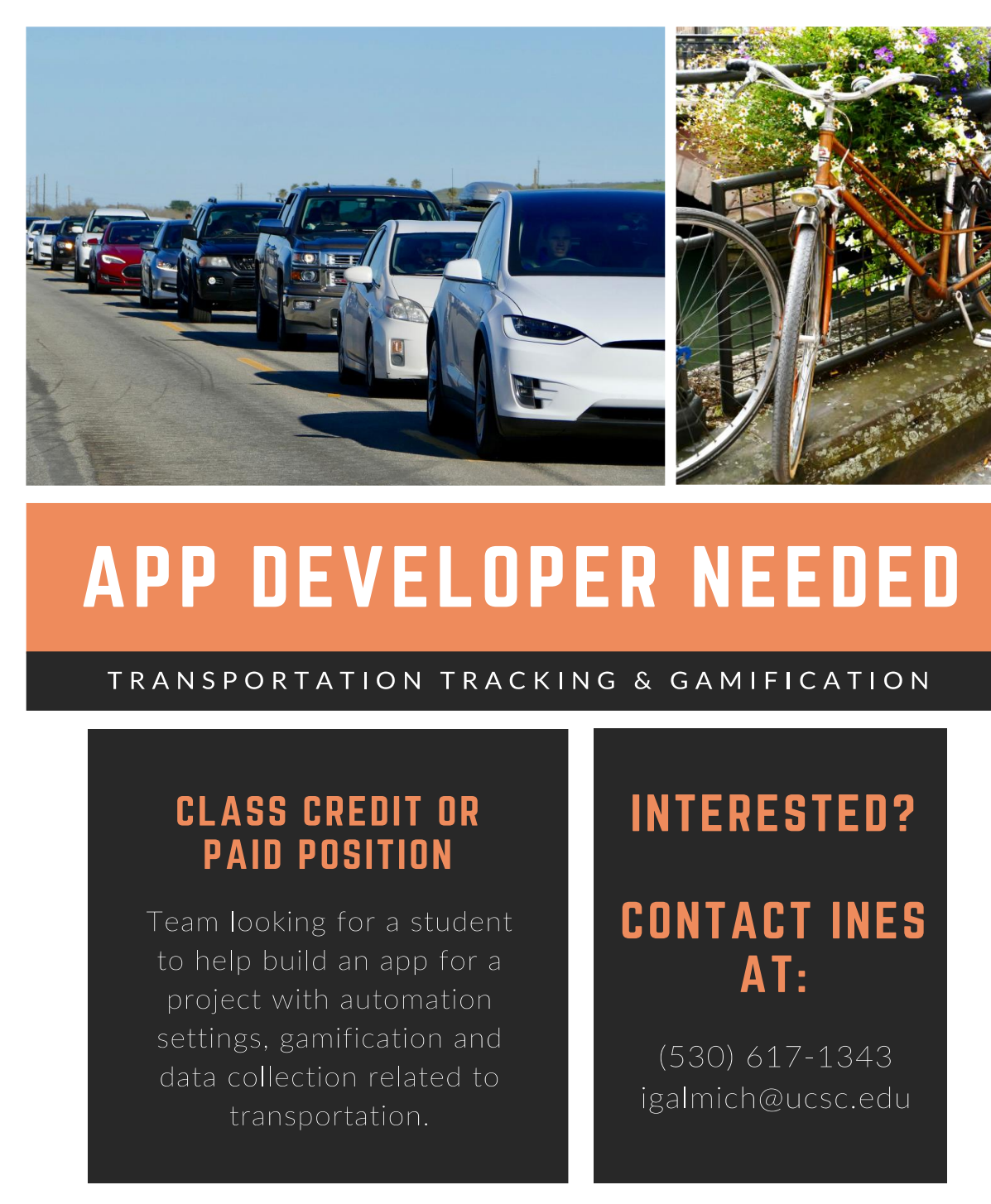
In addition, the UC system would have access to the end results and data to:

- Improve commuter services
- Increase or improve sustainable transportation around campus (walking paths, bikes, scooters, etc.)
- Calculate the price it would cost to offset campus transportation emissions

Materials and Methods

Before being able to create the mobile app, it was important to know what the user base would be interested in and to find out what they knew about transportation emissions and carbon offsets. To do so, I created surveys that were distributed at climate-related events and through social media platforms. In total, about 344 people responded to the surveys.

The most critical part of this project was finding a developer, or team of developers, to create the mobile app. I created and displayed posters around campus and the engineering college, as well as posted ads in campus newsletters and social media in order to attract potential candidates. Once the developer(s) chosen, I presented them with wire frames of the app I had created through JustInMind, and met on a regular basis to discuss progress and challenges. An Apple Developer Account was necessary for the testing and releasing of the app into the App Store.

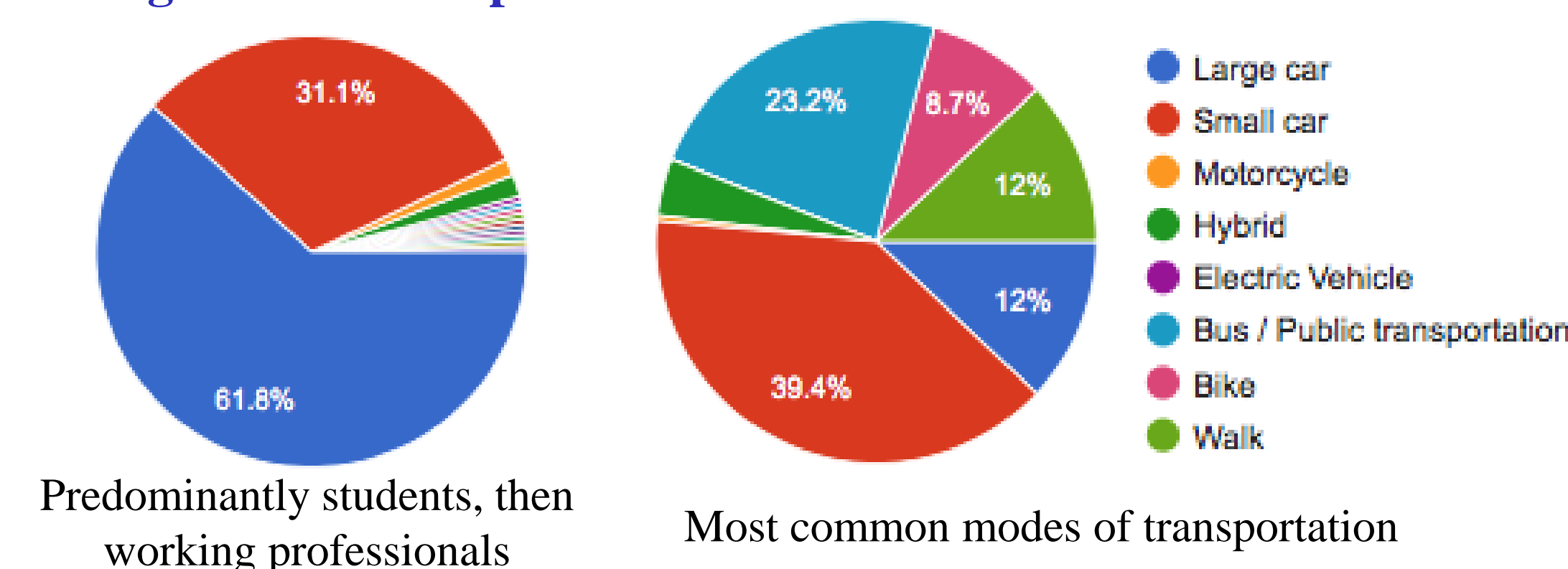


Results and Outcomes

While survey results proved very positive, as well as responses from TAPS, the Sustainability Office, and other advising professors and organizations, the app never reached completion and therefore no data could be collected.

The surveys found that of those who responded, over 90% believed urgent action needed to be taken on climate change, and 79.7% would track their CO2 emissions if it were easy and reliable. Even more, 82.2%, agreed they would counteract those emissions if it were easy and transparent. However, while the majority did know what carbon offsets were, only 40% believed them to be effective; and therefore, only 38.8% said they would pay a small fee to offset their carbon emissions.

Backgrounds of Respondents



Unfortunately the app could not be concluded because of time limits and lack of initiatives for the developer(s). The first developer to join the project was ideal in experience and in personal interests, unfortunately shortly after starting he received an important job offer from a company that would support him with a salary. I then pitched the project to a tech for social good class and was able to recruit a team of 12 undergraduate students to develop both an Android and iOS version. With the end of the class however, and no opportunity for pay, the students did not stay with the project.

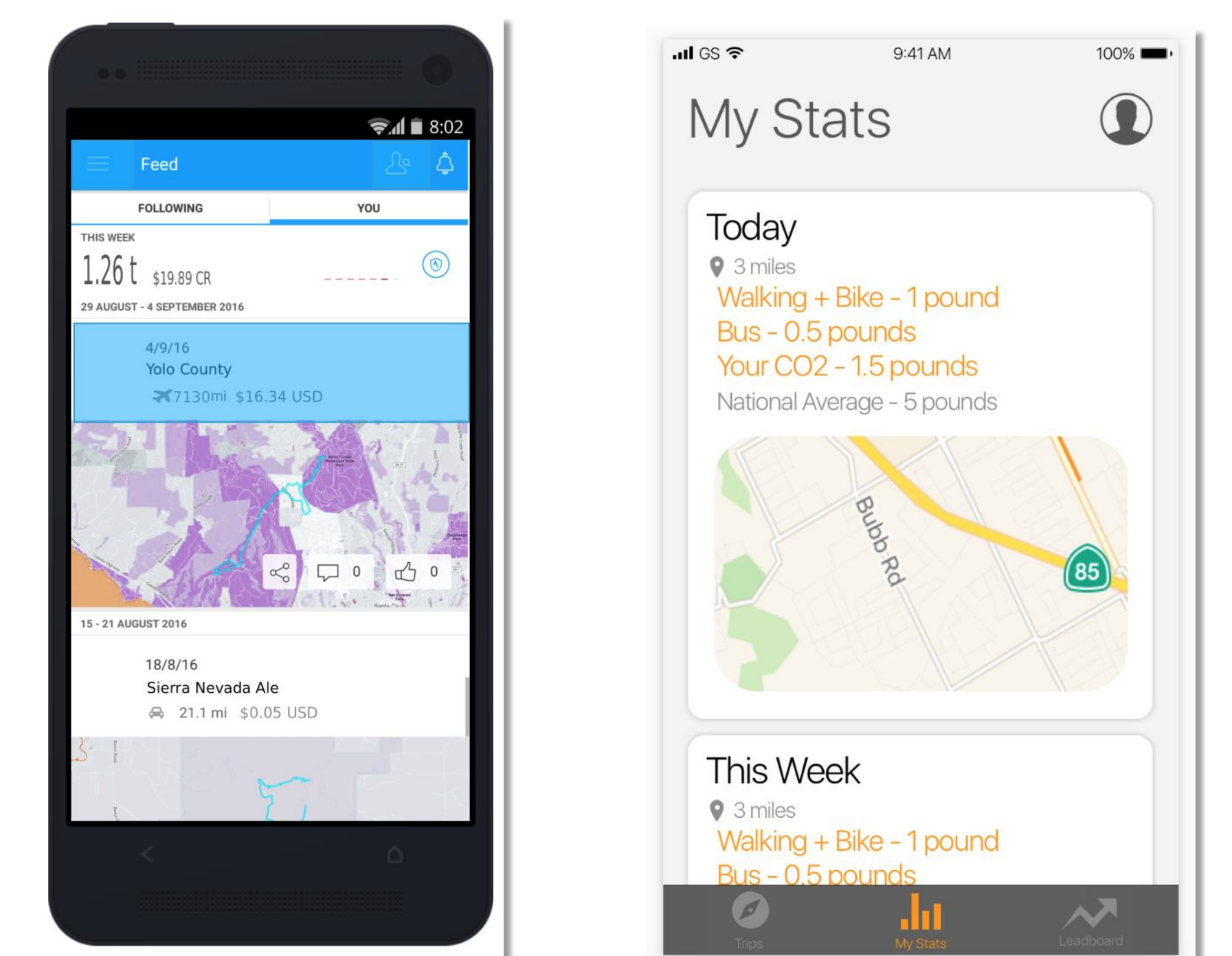
Despite failure at reaching the original goal, this interdisciplinary project was successful at bringing attention to emissions from transportation and inciting critical thinking on personal transportation habits.

Conclusions

The survey statistics, while conducted on a small population, proved that there is indeed a strong interest in the app I proposed, but users would need extensive proof of legitimacy and transparency on where their money is being spent if they paid to offset their emissions.

The University of California knows that to reach its 2025 and 2050 Carbon Neutrality Goals it will need to purchase offsets or create offset project — so this method of collecting emissions data would indeed be useful for the large scale. On an individual level, people need more convincing to spend.

For this project to reach completion, more time and incentives should have been allocated to the team of developers. Incentives do not necessarily mean funding, but even a guarantee of a large enough user base would suffice. This would, however, require that the developers have enough skills and experience to create an app that could attract many other students, staff, and faculty.



First prototype

Second prototype

Future Goals

The most challenging aspect of developing the app was the automatic sensing and tracking of different transportation modes, yet the team lead of the developers was able to overcome this issue. This means that with enough time, effort, and skill, the app can very well be finished. A future goal would be for another student, possibly a future CNI Fellow, to take on and complete the project.

Once completed and successful, the app can be deployed to university campuses through month-long awareness challenges where students, staff, and faculty can compete against one another for the lowest CO2 emissions relative to distance traveled. Such challenges can help gather the most traction around campus, thus gathering the most amount of data. This will also require affiliates to download the app, so once the challenge is over, unless the app is deleted, emissions data will continue to be calculated.

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