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CSCI 4830 Final Project Report

A Better Package Tracker

I started this project in with the goal in mind to provide users of delivery services a more accurate estimation for the arrival of their package. Initial brainstorming considered adding a tracker to each and every package, but this would financially be unrealistic, not to mention the technical challenge behind powering a device in every package. Instead, it would be more realistic to place a device in each delivery truck that keeps a record of packages that are on it out for delivery, and would be able to upload positional data, which in turn could be used to provide a much more accurate estimation for the arrival of a package. In addition, this device would ideally be able to be integrated into currently used systems, minimizing the financial impact on the prospective customer delivery companies. In terms of real world applications and why this service might be desired, many companies rely on daily shipments of goods. Having an accurate arrival time would greatly aid the company in their daily planning. In addition, should a package be delivered to the incorrect location, it would be simple to locate where it was delivered so that the situation may be rectified.

From a proposed system standpoint, a late-stage prototype would include functionality with the currently used scanners, and would have a built-in geolocation device, as well as network connectivity to upload data. On the backend, data would be uploaded to a cloud service to be processed for an accurate estimation for the time of arrival, which would then be available for end users to view. Challenges to developing such a prototype is the financial implications of a geolocation device, a solution to network connectivity, and the unavailability of standard handheld delivery scanning devices. To combat these challenges, early prototypes used a cell phone’s built in geolocation technology, camera for scanning QR codes, and network connection to upload data.

The submitted prototype is not without error, however. A solution to a fully featured accurate time estimation was not found, but end users should be able to see where the delivery vehicle is that carries their package. Additionally, Android can only upload data in the background once every two hours without backend engine work, so a workaround to update positional data was forced. Finally, a few small coding errors remain within the web-apps used, as well as in the user app’s Java code. However, the system is workable and the errors have a workaround to demonstrate how the system would function had it been fully working. The current prototype consists of three Android applications; one for loading packages into the delivery vehicle, one for delivering packages, and one for the end user to check the status on their package. Each of the applications utilizes QR scanning technology to scan a QR code, which contains package identification, then uploading that data to a web-app, which acts on that data. In the case of the user app, data is returned to display the location of the delivery vehicle if the package has not yet been delivered. A simple demo can be found at: <https://www.youtube.com/playlist?list=PL4K3gyt4M5qDtjiIS6iuUKcDF3jfa97JA>

Evaluating the results of this prototype is difficult, but because it is objectively more accurate than currently used tracking technology, it is hard to deny that it has accomplished the original design goal at least partially. There is still work to be done to make it the best it can be, but it is certainly more accurate than current tracking.

In terms of lessons learned while working on this project, I think that I have gained experience in real world design and development despite this being a classroom environment. The design and development process can be pretty rough, especially as a relative newcomer, but overall I would say it was a very positive experience. Deadlines in particular have been revealed to me to be extremely important, as well as particularly stressful should you fall behind early. Prior to this project, I was totally unfamiliar with Android Studio and Javascript, while being fairly inexperienced in Java programming. Throughout the development process, I would say that my expertise in all three of these subjects has greatly increased, particularly in Android Studio and Javascript.

To test the system yourself, simply install the applications that are compressed with this document, and scan a QR code that can be generated by following a link in the readme. Any Android Studio dependencies to view/edit/run the code should automatically be installed/updated by Android Studio should you not have them.