Benjamin Fernandez, Kyle Rood, Suraj Shah
10/30/19

HCI Homework 1: AmberVision

AmberVision has a simple goal -- detect cars and display these detections to users. With this goal in mind, we aim to use a clear and concise design method so that users can successfully receive the information we provide. By using modern designs with Javascript, we will have a product that displays information clearly, securely, and instantaneously. Our goal to improve Amber Alerts is only possible because our design will be simple but effective. AmberVision is based on a series of information transfers (from API to database to machine learning algorithm, back to database, and then to the UI), and these need to be as fast as possible for AmberVision to be as effective as we need it to be. Our User Interface reflects the design goal of speed, by helping the person using our software to get the information they need as fast as possible.

To start, the AmberVision system has to be completely effective in order to make an impact in the world of policing. For this application to be fully effective, an officer needs to open the page and be able to get the information they need as fast as possible. This means having all of the buttons they need right on the main screen. Since the goal of AmberVision is to translate Amber Alerts from text to immediate detection of cars in a given vicinity, we want to deliver a product that does exactly this. Therefore, our product is effective because it will show a page with images and cars labeled and information about the cars and their timestamp. This does exactly what we intend which is why our product is extremely effective at delivering what we promise.

Furthermore, AmberVision is focused on optimized queries and efficient data transfer. Our initial design will consist of a home page that will hold all of the information that the user needs. The querying functionality will be the first thing you see. The map and the query information regarding the image will be front and center. This is efficient for users to see exactly what they want and get the information they want without going to a different page. The other aspect of our product will be instantaneous so that users can see a live feed of the cars in the city similar to a traffic camera feed. Using a filter system that will be present on another tab, users can query for any timestamp of a camera to see previously-stored images. Using only two pages for our entire product is optimized for users to immediately see what they want so that they can focus on the information at hand. We are also making sure to use a current web development framework, Vue, which will help us to do faster data visualizations. The way Vue works is it puts all of your information onto one page on load uptime. This may result in longer load times but will provide for much faster interactions with the site in general.

Additionally, the safety of our site is very important, because the information is very sensitive, and depends on specific time and place location. If we allow the user to edit this in any way, it could impact the ability of a future officer to find the information they are looking for. AmberVision is entirely based on “Getting” information, which will involve sending GET

requests to our API. We are never POST-ing information, which allows us to have a much more closed system. Another "safety" based design choice involves our choice to eliminate users. This product should only be used by law enforcement, so we don't need to allow different permissions on our site. The user is not able to change anything about AmberVision by clicking on anything, which makes our system much more secure, and eliminates any chances of breaking data in our database. By eliminating the need for users to interact with our backend software, we reduce any risk of improper data access or anything else.

Furthermore, the product, from a utility standpoint, will have very little buttons and clicks. On the home page, there will be the latest image from the traffic feed on the map so a user will click on a pin drop of a traffic camera which will also give the information of the cars on a side panel. Therefore, there will be two clicks to immediately get the information of a traffic camera and the cars detected in that. The other tab view will have previously stored images of all traffic cameras. To access a specific camera, there will be a search box that you can query for various filters such as a car, color, size, or general. Then, once the *search* button is clicked, all previously stored images of that specific query with its respective bounding boxes will be shown, in a scrolling view so that users don't have to click but can simply scroll for the information they want. Overall, we are minimizing the utility of the application for users to click so that they can quickly get the information they want.

As mentioned earlier, we are keeping a simple interface both for design efficiency and effectiveness. This is also tied to the learnability aspect because when we design the application with minimum buttons and views, it will be easier to get the information a user wants. We will have a help page to explain how to use the website as well so that users can understand how to get started. By limiting the number of tabs and views, users can get all the information they want in at most two clicks. We believe that this will be relatively self-explanatory and the initial setup time for a user to get accustomed to our software will be minimal.

The best way to tell ease of user experience is to assess the memorability of the tool. Our interface will show all of the possible actions on the main page, which makes it incredibly easy to use on the first try. As was talked about above, AmberVision will have a map and an interface with simple selections to query by time, place, and car classification. This is it. The complexity of this project lies in the background work that needs to be done to get the right information, not in the design of the UI. We are very confident that officers will be able to use this tool easily on the first try, especially considering the specific use case for our tool. Officers will user AmberVision only when looking for certain cars, and this tool does exactly that in the least amount of clicks possible.

This project is entirely data driven, and on top of that uses a lot of images. The frontend presentation will be very visual to immediately portray the most crucial feature in AmberVision. The images from the cameras as well as the labels that come from detections are crucial for the user to see on the front page making this the main aspect of data visualization. A novel piece of AmberVision is the use of low resolution data. Most computer vision algorithms use high

resolution imagery, but an important part of AmberVision is the use of real cameras that have high resolution imagery. On the frontend for consumers, these images will be presented in their true resolution to enable users to see what the car detector is seeing.

Overall, AmberVision aims to deliver that is intuitive, simple, yet meaningful to the user. This is done by providing all main actions on the main page, varying between textual and image representation, and providing clear information of what the user is seeing and doing with the platform. The user experience is a very crucial part to help achieve in searching for cars in Amber Alerts and as the developers, we want to make sure the product is usable and powerful in functionality. The context of the project is to help assist in a very serious, time-sensitive situations of Amber Alerts, and AmberVision wants to achieve that goal by providing a seamless user interface