Amber Alert

The AMBER Alert system is a messaging system that notifies the public of missing children and provides details about the abduction depending on the situation, including the car or the last article of clothing worn by the victim. This model relies on text messages, which is the problem we want to extrapolate and improve upon. We believe that there is a definite purpose and target audience that will benefit from a significant improvement in the AMBER alert system including law enforcement agencies. As the trend continues to use technology to improve upon existing infrastructures and update outdated communication methods, we believe our product is scalable, usable, and beneficial as a tool for social good in the world. The goal we set ourselves to accomplish is to find a car, including details about the color, size, location, and timestamp information given a vicinity of traffic cameras in a city. Our purpose, as mentioned, is to provide a tool for public good that can minimize the loss during emergencies and maximize the rate of finding victim (Kang, 2016). This realm of emergency situation detection has been tackled before, but no approach is currently been published to tackle amber alerts.

Our research and development phase has several steps, each of which will accomplish goals that bring us closer to the tool we will build. We will start with using the DDOT traffic camera data in Washington, DC. Since object detection has been a problem worked on by many notable industries and researchers, we believe using pre existing models will help us identify a car in a traffic camera. However, we will have to face several technical difficulties including low resolution cameras and the likelihood that a pre existing model might not be completely transferable to the DDOT traffic camera network. Therefore, we will need to look into a combination of deep learning models such as YOLO (You Only Look One) and Retinanet (Focal Loss Object Detection). Aside from the specifics of the models, we want to also collect our own data from a specific radius on the George Washington University campus. We want to limit our reliance on the DDOT traffic data so we will also look into other potential dataset collection methods. This includes setting up higher resolution cameras that can also provide more accurate information about the cars in the view. There will be technical difficulties with our data collection methods, especially with the dependency on the weather. We want to be able to collect data in which there are more objects in the cameras. This is based on weather, so there will be less in the view when it rains, snows, or becomes colder. To account for this challenge, we will combine research and development phase of canned models with our own data collection. By combining these two parts, we will have adequate data to focus on the third part, the actual tool.

Regarding our key deliverable and our minimum viable product (MVP), we want to design a frontend website that has a 2D mapping of the filtered cars in the traffic camera radius with their last scene location on this map. This visualization will allow law enforcement to quickly find all cars related to a specific AMBER alert and allow them to focus on the important part, finding the victim. We believe this tool will be exceptionally useful, just for this one specific application, but its overall purpose of social good using deep learning, which is why the funding is necessary to develop this idea into a product. In the end, our project would not be a proof of concept or an idea that has potential, but a full-fledged tool that can be used for various applications, not just for the AMBER Alert system.

Bibliography

Kang, Byungseok. “A Deep-Learning-Based Emergency Alert System.” *ICT Express*, Elsevier, 21 May 2016, www.sciencedirect.com/science/article/pii/S2405959516300169.