Benjamin Fernandez

CSCI 4243

Writing 1

Using Computer Vision to assist Amber Alert searches

As the world of data moves from mere gigabytes to exabytes of data points, there is a rising importance of making sense of this data. That is the primary goal of artificial intelligence and within that, Computer Vision focuses on images as a data type to see what can be pulled out and put together from images. This subfield has grown rapidly and can be seen through innovations like self-driving cars, facial recognition software, robotics, and many more. In parallel, the amount of images on the Internet is rapidly rising and adding to the data pool to be tapped into. In recognizing the current state of deep learning models as well as the increased access to images, our team looks to affect the community with this technology. We see an opportunity to assist families, the public, and governing bodies like law enforcement in Amber Alert searches. Taken from the official website itself, “The AMBER Alert™ Program is a voluntary partnership between law-enforcement agencies, broadcasters, transportation agencies, and the wireless industry, to activate an urgent bulletin in the most serious child-abduction cases. The goal of an AMBER Alert is to instantly galvanize the entire community to assist in the search for and the safe recovery of the child.” (DOJ) An AMBER alert usually consists of a description of the child-abduction case including last location seen and suspect vehicle. Using state-of-the-art object detection models, we look to help identify those vehicles using a network of traffic cameras and in doing so, contribute to the goal of AMBER Alerts in search and recovery of the child.

Many approaches have been taken in deep learning to detect cars and other vehicles in images and as we plan to use those existing architectures, we are aware of the technical challenges that will come with refitting these models for the data and images we are analyzing. Most traffic cameras from initial research are not of highest resolution and the images as a result will be harder to analyze. On top of this, most existing models tackle one output of detection while our goal is to combine different outputs for one object. For example, we would aim to detect a red sedan in the image or video feed which could result in multiple detection models being used on one image. Initial research has led us to looking into current models like YOLOv3 (Redmon) for real time object detection but fitting this model on traffic camera feeds is not trivial. Acquiring data will also be a challenge as we are looking for live data in proximity to Washington DC. Our initial research has led us to DDOT’s Washington DC traffic cameras which as stated earlier are not high resolution and have low frames per second. In addition to building/using detection models and acquiring data, our goal is to surface the information in a useful and effective way. This means creating a frontend for our data and analysis to be displayed which will require development in data engineering and user experience. All together, the technical challenges encompass in acquiring valuable data, building/using effective and accurate object detection models, and creating a frontend for users to view the analysis. This full-stack approach will not be an easy feat but we are confident and inspired to help do work towards this specific need. Ultimately, we see the future of AI more as augmented intelligence rather than artificial intelligence as we aim to help people using the technology that exists today. Very well-written! But there is no mention of seeking funding.

Bibliography

1. Department of Justice (DOJ). “AMBER Alert.” *AMBER Alert - America's Missing: Broadcast Emergency Response*, www.amberalert.gov/.
2. Redmon, Joseph, and Ali Farhadi. “YOLOv3: An Incremental Improvement.” *Https://Pjreddie.com/Media/Files/Papers/YOLOv3.Pdf*, 2018, pjreddie.com/media/files/papers/YOLOv3.pdf.