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Object Classifier Proposal
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Title?

Object detection is becoming more popular in the technical world. The scope can range from personal security to productivity in the workplace. Some of the industries' object detection spans is computer vision (how computers gain high-level understanding from videos/images), including image retrieval, security, surveillance, and automated vehicle systems. One of the best examples is self-driving cars which are very well-known and controversial in today's society. Self-driving cars need object detection since it is essential in determining what the car will do next. How will the car know when to brake, accelerate, or drive around an object? Why is this a controversial topic? Self-driving cars are not completely autonomous because of the judgement calls one would need to make while driving, and foreign objects that the computer system have not been trained on in the self-driving cars can lead to disastrous situations. For instance, when self-driving cars started in Australia, the system could not properly detect kangaroos on the road.[1] This led to having the car halt and freeze on the road, which could have ended poorly for the passenger(s) in the vehicle. Most object classifier systems use the ground as a reference point, but since kangaroos jump into the air, the system has a hard time tracking how close the kangaroos are and predicting where the landing point will be.[2] The problems in this system are urgent and must be addressed before continuing to move forward in this instance since self-driving cars are heavily pushed for daily consumer use. Without the continued research and improvements of object detection and classification, people's lives could be at risk for not having the most recent object classification software. My team's project will train and improve upon the object classifier infrastructure that has already pioneered the new age of real-time image processing. The people that interact with this technology everyday would benefit from improvements to the object classifier by being accessible for more disciplines in various real-world applications, like self-driving vehicles.

Include transitionsIn this project, YOLO is an algorithm that is used to mean, "you only look once" which is important for fast and real-time multi-object detection. YOLO applies a neural network to the entire image and to divide the image up and creates bounding boxes to be drawn around images, and from there, the computer predicts what the object is from a trained database or something like it for data storage.[3] The YOLO algorithm provides most of the technical challenges that this project will face. Some of the challenges include, but are not limited to, learning how to implement YOLO, how the algorithm works within the project's context, how to setup data in real-time, create bounding boxes setup for images, determine whether or not YOLO's results and predictions were correct/incorrect and setup a way to retrain effectively to improve the object detection. For the beginning portion of our project, some of the technical challenges can be resolved once extraneous research is done and in turn, my team will understand the literature that already exists for object classifiers. To find solutions for other technical challenges, my team has hypothesized that we must focus on how to implement YOLO, how others have used it, how to modify our project to solve the issues of the existing software for object classifiers, and how to lean on linear algebra and other applied mathematics to draw bounding boxes with our software as well as how to process data to classifier in the data storage part of our project.

Include transitionsOur product would be able to be used by the general public rather than limited to private companies that wish to use an object classifier. The classifier would be able to train whatever

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[1]**REFERENCES**

Adam Luehrs, "Seven Problems Self-Driving Cars Need to Overcome", Smith's Lawyers 2018, https://www.smithslawyers.com.au/post/self-driving-car-problems.

[2] Ibid.

[3] Joseph Redmon, Ali Farhadi, "YOLO v3:An Incremental Improvement", University of Washington 2018, https://pjreddie.com/media/files/papers/YOLOv3.pdf.

the user wanted to detect, so the data that the user supplies to the classifier would in turn take the data to then classify and then store the data that it has been fed. This is useful to refer back to models that have already been stored. Sometimes a user needs to access a particular classifier, for instance, a person of interest, and our classifier would in turn save the user trained input to a “penguin” classifier in our database. If another user wanted to train the penguin classifier with more pictures in identifying penguins, that data would need to be stored in the respective penguin sclassifier folder in the database. To conclude, this project would benefit existing fields that use object classifiers and the technology that surrounds object classifiers. Improved object classifiers would fully provide the crucial and necessary classifiers to ensure safety and accuracy to those who use it. The technological advances from the object classifier improvements will develop and impact many other disciplines that depend on its uses such as, facial recognition and detection technology, self-driving cars, object tracking, activity recognition in law enforcement and medical imaging to shape the future of these technologies. What about the technical difficulties you may face? Also, there is no mention of seeking funding.