Eqwis: Rapid Animal Detection and Driver Warning System To Mitigate Animal Vehicle Collisions Using Artificial Intelligence

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Wildlife-vehicle conflict poses injury/mortality risks to both drivers and wildlife. Eqwis detects animals approaching roads and alerts drivers through intelligent road signs, encouraging drivers to reduce speed and increase attentiveness leading to better outcomes. Eqwis combines a dual stream camera (optical and thermal) for both day and night time vision, with an artificial-intelligence-based computer vision model (YOLO-v5) that can enable real-time detection and classification of moving objects including animals. Detecting and classifying animals in moving imagery presents an opportunity to map an animal's trajectory and to determine if it is a driver-safety concern. The AI system uses three processing and analysis steps: 1) the creation of a bounding box around moving objects of interest, 2) classification of the object as vehicle, human, animal type, and 3) mapping trajectories of moving objects of interest. The AI model was pre-trained with 200K original images from the COCO dataset across 80 categories in addition to 2000 images including horses and other ungulates. A thermal model was also trained for night vision using transfer learning to make the model robust in spite of limited thermal data. The combination of rapid and accurate animal classification with remotely-adjustable hardware and software systems provides a highly-controllable and adjustable roadkill prevention system in real-world settings. This paired with active displays for driver warning create a new modality of roadkill prevention that can be more effective than existing passive solutions.

Awards Won:
First Award of $5,000
Central Intelligence Agency: First Award: $1000 award
International Council on Systems Engineering - INCOSE: Certificate of Honorable Mention, a 1-year free student membership to the INCOSE, and free virtual admission to the 2022 International Symposium of the INCOSE