Smart Wildlife Sentinel (SWS): Preventing Wildlife-Vehicle Collisions and Monitoring Road Ecology With Embedded IoT Systems and Deep Learning

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Every year in the US, millions of roadkill accidents occur making wildlife vehicle collisions (WVCs) a significant danger to both animals and humans. In addition, road networks become abiotic barriers to wildlife migration between regions creating ripple effects on ecosystems. Current solutions intended to mitigate WVCs are passive, ineffective, and inefficient. In this project, a smart wildlife sentinel system (SWS) is demonstrated, utilizing the technologies of Internet of Things (IoT), machine learning, and computer vision. Successful deployment at the Tualatin River National Wildlife Refuge highlights that the SWS is capable of preventing WVCs by actively warning drivers of roadside wildlife presence. Simultaneously, animal images are captured via No-InfraRed cameras. Data processing and collection are conducted through computer vision filtering, convolutional neural network (CNN) based image classification of wildlife species, and other related image metadata. This ecological data can be exported to assist researchers and government road agencies in analyzing wildlife activity hotspots, bolstering conservation efforts with insight.

Awards Won:
Third Award of $1,000
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