TELANGANA GOT TECH TALENT

Proposal Title: Road Health - Pothole detection

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BACKGROUND

Potholes have turned out to be a major cause of road accidents and a number of deaths have been reported recently after people lost control of their vehicles while navigating them. Road potholes are not just an inconvenience, they are also a significant threat to vehicle conditions and traffic safety. According to the Telangana AI Mission (T-AIM) during the four-year period - 2017-2020 - 22,631 accidents were reported due to potholes [1]. The reasons for the surge of potholes are poor road construction, lack of timely effective repair, and maintenance and callousness on the part of authorities in taking preventive and remedial action.

PROPOSED SOLUTION

The traditional practices of inspecting road potholes require human intervention which has proven to be inefficient. For these reasons, researchers have been dedicated to developing techniques for the process of road condition assessment systems. Deep Convolutional Neural Networks (DCNN) have proven their abilities for many object detection tasks. So we propose a model which uses Deep Learning techniques (YOLO v5) [2][4]. The images are sent to the detection model whose results are forwarded to the concerned authority to enforce actions.

Objectives:

- Cost-effective vision-based technique.
- An accurate and efficient model compared to manual inspection.
- Can be integrated with self-driving vehicles.

DATASET

To train the proposed work we are planning to use the RDD2022 [3] dataset, which can be accessed at the Git Hub repository https://github.com/sekilab/RoadDamageDetector. The repository consists of seven folders comprising pothole images for different countries. We plan to take a dataset that is related to Indian roads.

There are two subfolders in the Indian dataset namely test and train folders. The train folder includes images (.jpg) and their annotations in (.xml) format. There is a total of 9,665 images are of 720X720 RGB images.

TOOLS

- Python
- TensorFlow
- OpenCV

REFERENCES

[1] https://taim-gc.in/mobility/# [accesed on 22/12/2022]

[2] Ma, N., F/an, J., Wang, W., Wu, J., Jiang, Y., Xie, L., & Fan, R. (2022). Computer vision for road imaging and pothole detection: A state-of-the-art review of systems and algorithms. *arXiv preprint arXiv:2204.13590*./

[3] Arya, D., Maeda, H., Ghosh, S. K., Toshniwal, D., & Sekimoto, Y. (2022). RDD2022: A multi-national image dataset for automatic Road Damage Detection. arXiv preprint arXiv:2209.08538.

[4] J. Dharneeshkar et al. Deep learning-based detection of potholes in Indian roads using YOLO. In 2020 International Conference on Inventive Computation Technologies (ICICT), pages 381–385. IEEE, 2020.