Telangana GOT Tech Talent

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Problem Statement

Title: Road-Health, Pothole Detection

- 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.

Proposed Solution

- To overcome this we came up with a solution which uses Deep Convolution Neural Networks (DCCN).
- Deep Convolutional Neural Networks (DCNN) have proven their abilities for many object detection tasks.
- We propose a model which uses Deep Learning techniques (YOLO).[2]

Methodology and Architecture

Model Selection: YOLOv7

- Improved accuracy and faster processing speed compared to the earlier versions.
- Can handle the variability in pothole appearance and location.

Data Collection: Annotated Potholes Image Dataset

- Size and format : 665 images in jpg format with 720X720 pixels
- Source : https://www.kaggle.com/datasets/chitholian/annotated-potholes-dataset

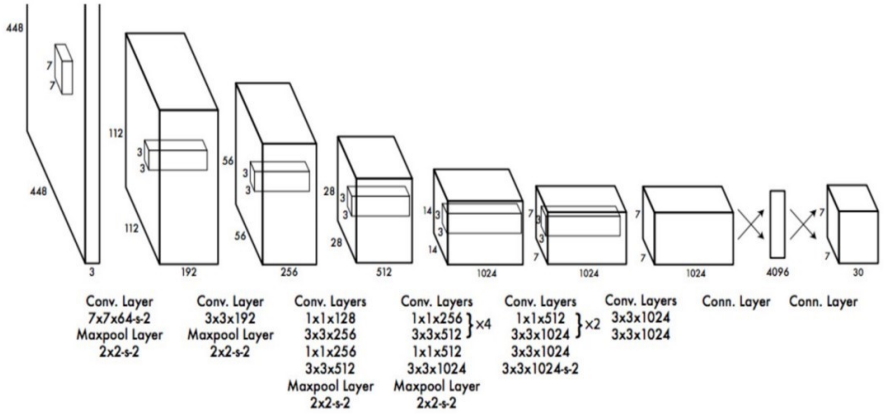

Figure: YOLO architecture

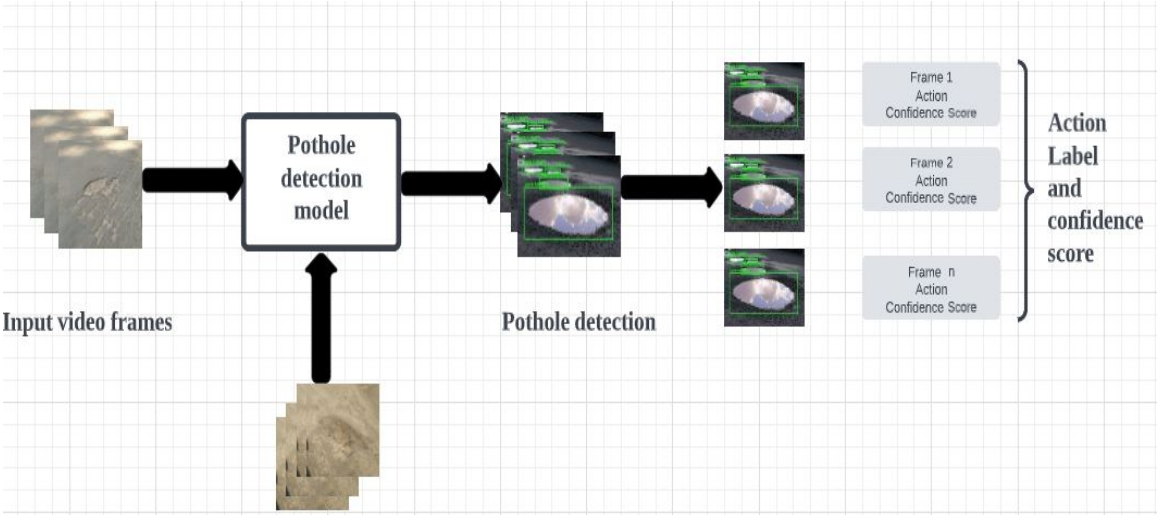

Figure: Work flow of algorithm

Table: Literature Survey

AUTHOR, YEAR	APPROACH	DATASET	DEMERITS
[3]Yang Wang et al., 2022	YOLOv7 with ECA attention mechanism	GC10-DET NEU-DET	Poor accuracy with lighter color images
[4]E Sai Tarun Kumar Reddy Rajaram V 2022	YOLOv7 with Google API and Accelerometer		Could not get the latitude and longitude Real time taken images could not be added to the collection
[5]Madarapu Sathvik et al., 2022	YOLOv7 with Google API and Accelerometer	Microsoft's COCO	Could not get the latitude and longitude Real time taken images could not be added to the collection

Impact

- Reduces accidents caused by potholes
- Predictive Analysis
- Improves quality of road infrastructure
- Integration with autonomous vehicles
- Reduces the cost of road maintenance

References

1. https://taim-gc.in/mobility/ [accesed on 22/12/2022]
2. 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.
3. Wang, Y., Wang, H., and Xin, Z. (2022). Efficient Detection Model of Steel Strip Surface Defects Based on YOLO-V7. IEEE Access, 10, 133936-133944.
4. Reddy, E. S. T. K., and Rajaram, V. (2022, December). Pothole Detection using CNN and YOLO v7 Algorithm. In 2022 6th International Conference on Electronics, Communication and Aerospace Technology (pp. 1255-1260). IEEE.
5. Sathvik, M., Saranya, G., and Karpagaselvi, S. (2022, December). An Intelligent Convolutional Neural Network based Potholes Detection using Yolo-V7. In 2022 International Conference on Automation, Computing and Renewable Systems (ICACRS) (pp. 813-819). IEEE.
6. https://images.app.goo.gl/yKEZcddQTaYexDRt9

THANK YOU