Wobot Hackathon 4.0

What is Wobot Hackathon?

Wobot has set itself up as a fast-moving environment in the wake of accomplishing various achievements in recent times. At Wobot, innovation and growth are the driving components. We take pride in the product we offer and the splendidly skilled colleagues who help make those products.

After effectively concluding three batches of our Computer Vision Hackathons over the past two years, we are back with the Hackathon in the hunt for the fourth bunch of skilled and youthful professionals.

What does it offer?

Upon finishing the assignment effectively, a personal interview will follow. The selected candidates will be offered a Six-months internship with Wobot as **Computer Vision interns**. Post the internship; a glamourous **PPO opportunity** also awaits you.

Assignment Details:

Problem Statement

- **Task: Build A Personal Safety Equipment Detection System**

Dataset Details:

- Hardhat/ head detection dataset is available here: Dataset Link
- Dataset annotation format: Pascal VOC (XMLs)
- Dataset Size:
  - → Data with Annotations: 4,750
  - → Data without Annotations (Test): 250

- Dataset classes of interest:
  - → Head
  - → Hardhat
  - → Use of external datasets for hardhat detection other than the provided one is **NOT ALLOWED**.

Model Instructions:

- Use any deep learning model for this, but train it using the given dataset.
- Any Deep Learning framework of choice can be used (Tensorflow, PyTorch, etc.)
- Transfer learning or pre-trained weights is allowed.
- Any innovative solutions going beyond the standard detection is also welcome. However, please provide a proper explanation of the same in a document.

Video for Inference: https://www.youtube.com/watch?v=6PoPwZ0WO9w

Processed/Output Video Specifications:

- Video format: .mp4
- Minimum video resolution: 720p
- Minimum video FPS: 2
- The resulting video must be playable on the chrome browser. (Hint: The Default OpenCV encoded video is not playable on Google Chrome)
- Method to verify if a video is playable on the browser or not: Drag and drop the video on the browser.

Stage 1 Evaluation – Deep Learning:

- Train the deep learning model on the given dataset.
- We expect a hardhat/head detector. However, there is no restriction on getting creative.
- Once you train the model, write an inference script, and process the provided YouTube video with the detections.

- The processed video should contain bounding boxes detecting head or hardhat with varying color as per the class and confidence score in percentage.
- Write a document and explain in detail about what is the approach and speak about why you chose the same. Be precise, concise, and write in points and add images/illustrations if required.
- Submit:
    - → The processed video for evaluation.
    - → The document in the form of a PDF

Stage 2 Evaluation – Find the Colour:

- For every detected hardhat in the Stage 1 problem, the bounding box color should match (or at least closely resemble) the color of the hardhat itself.
- Do the above step on a frame-by-frame basis. So, the detection bounding box color needs to change dynamically based on the hardhat's color for each frame, each detection.
- Add the details to the stage 1 document and explain in detail about what is the approach and speak about why you chose the same. Be precise, concise, and write in points and add images/illustrations if required.
- Submit:
    - → The processed video for evaluation.
    - → The document in the form of a PDF.

Stage 3 Evaluation – mAP:

- After stage 1, use the same model to run inference on the test set of 250 images.
- Write down the predictions in the form of Pascal VOC format. Sample format: Sample XML Format
- Please ensure that the filenames of the XML files should match that of the images. Otherwise, we will be unable to grade your assignment.
- Submit The zip file containing the resulting XML files of the Test Set.

Submission of Files:

- **Stage 1 Evaluation:**
  - → Processed Video: .mp4
  - → Document: .pdf
- **Stage 2 Evaluation:**
  - → Zip file: Containing XML files for all 250 Test Images
- **Stage 3 Evaluation:**
  - → Processed Video: .mp4
  - → Document: .pdf