AI Hub Leaderboard: a web platform for benchmarking computer vision models on Qualcomm AI Hub

Qualcomm® AI Hub (https://aihub.qualcomm.com/) simplifies deploying AI models for vision, audio, and speech applications to edge devices. You can optimize, validate, and deploy your own AI models on hosted Qualcomm platform devices within minutes. The AI Hub supports AI models that are trained using some popular open-source frameworks, including ONNX, PyTorch, TensorFlow, and TensorFlow Lite. It also provides APIs to convert these models for deployment on Qualcomm® AI Engine Direct (i.e., QNN), TensorFlow Lite (recently renamed *LiteRT*; recommended for Android developers), or ONNX Runtime (recommended for Windows developers).

In this project, we would like the students to build a web platform (i.e., AI Hub Leaderboard). It allows the user to benchmark (i.e., evaluate and compare) AI Hub vision models based on open public datasets (e.g., ImageNet and COCO). The web platform should have with the following features:

- A leaderboard benchmarking the state-of-the-art (SOTA) models (hosted at AI Hub) for three major computer vision tasks: classification, detection, and segmentation.
- Upload public datasets to AI hub and run those SOTA models to evaluate the models' performance.
- Obtain model prediction results, i.e., classification scores, segmentation masks from AI Hub, on evaluation datasets (e.g. ImageNet, COCO, Pascal VOC).
- Compute accuracy metrics, such as Average Precision (AP) and Intersection over Union (IoU), using prediction results from AI-hub and ground-truth from evaluation dataset.
- Visualize metrics (accuracy, inference speed) on evaluation datasets.
- Compare and rank the SOTA models based on the outcomes.

For this project, we can utilize existing models from AI Hub and test them on open public datasets like ImageNet and COCO. As a reference, you can check out the website "Papers with Code" (https://paperswithcode.com/).

In the future, we may consider adding more AI tasks to the web platform. Additionally, we can create a submission portal for users to submit their models and participate in the leaderboard.

Reference:

1. AI Hub documentation: https://docs.qualcomm.com/bundle/publicresource/topics/80-62010-1/ai-hub.html?product=1601111739937064

2. Qualcomm AI App Architecture: https://docs.qualcomm.com/bundle/publicresource/topics/80-62010-1/ai-overview.html?product=1601111739937064
3. Qualcomm AI Hub Models (many useful tutorials and information): https://github.com/quic/ai-hub-models/
4. Qualcomm AI Hub Introduction: https://app.aihub.qualcomm.com/docs/
5. Qualcomm developer-platforms-for-universities: https://www.qualcomm.com/research/university-relations/developer-platforms-for-universities