CS 490 Capstone Project Proposal

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***Project Description***

In this capstone project, we propose to design and develop a web platform named ***Qual-Bench AI*** (quality benchmarks for qualcomm products), supposed to be compatible with the Qualcomm AI Hub to evaluate and compare all state-of-the-art (SOTA) object detection models hosted on the Qualcomm AI Hub. The platform aims to visualize relevant performance metrics of each available AI model against qualcomm devices and easily learn about each model's performance across various popular public datasets, such as COCO, Pascal VOC, and ImageNet, and make decisions through comprehensive metrics and rankings.

The primary purpose of this project is to assist developers and researchers in understanding the strengths and weaknesses of different object detection models, allowing them to make informed decisions when selecting models for their applications. By integrating Qualcomm AI Hub’s APIs, this platform will streamline the benchmarking process and provide a user-friendly interface to visualize and compare models and choose the best model for their application and device use case.

***Implementation planning***

* Backend:
  + Python Frameworks: Use Flask for API integration and backend logic.
  + APIs: Integrate Qualcomm AI Hub APIs for uploading datasets, running models, and retrieving results.
* Frontend:
  + Framework: Use React.js to build a dynamic leaderboard interface.
  + Data Visualization: Use libraries like Chart.js or D3.js for graphing metrics.
* Database:
  + Relational Database: Use MySQL to store model information, datasets, and results.
* Hosting Platforms:
  + Platforms: Host locally for the demo and actual deployment on Google Cloud
* Development Tools:
  + Version Control: Use GitHub for collaborative development.

***Technical background***

* Ji Guo has a background in AI. Also has experience with react native on Android platform and previously used Flask to build a local network E2EE channel.
* Jacob Autus has a background in Android Studios and Xcode while also being familiar with HTML, JavaScript, and SQL.
* Kabire has taken an AI class before and is currently enrolled in a Deep learning class and has experience with AI performance metrics.
* Lucas has taken a web programming course and is familiar with JS, HTML, CSS, and SQL.

The following are the questions that we have for our industrial mentor. We would appreciate your response and help.

1. Will the performance data all be pre-benchmarked and stored on the site?
2. Will we need to benchmark for each runtime environment like ONNX, Qualcomm AI engine, and TFlite separately?
3. What part of PapersWithCode was liked, and what parts need to be expanded upon?