EE/CprE/SE 491 WEEKLY REPORT 4

Week 7 – Week 8

Group number: 20-18

Project title: Development of Image Analysis Algorithms for Crack Detection Using a Smartphone

Client &/Advisor: Bo Yang/Halil Ceylan

Team Members/Role: Akira Demoss, Maggie Dalton, Modeste Kenne, Nik Thota

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o **Weekly Summary**

This week we began to move forward from collecting and labeling data and into finishing the base functionality for each component of the overall project. Right now, all individual components (Android app/server/web/algorithm) are either functioning or close to functioning individually and we are beginning to piece them together.

o **Past week accomplishments**

- Akira
    - Went over all of the labels in our dataset to evaluate consistency and labeling bias. Organized them and added more labels for transverse cracks and potholes.
    - Wrote a python script that batch resizes and crops images -- This was to match the pixel count of our pothole dataset with our road damage detection dataset.
    - Labeled the pothole dataset and added this to our pre-existing dataset.
    - Wrote code to split the dataset into training, testing, and validation.
    - Installed OpenCV on Laptop for model testing - have some code that uses the webcam to test a tensorflow model that can easily be converted to test video files

- ○ Went through all 5/5 Tutorial Videos for creating a custom object detector using tensorflow.
- ● Maggie
  - ○ Began to integrate machine learning into the Android application for the project
    - ■ Ability to make inferences on a model
    - ■ Logic to capture an image once an inference is made with confidence over a certain adjustable threshold
    - ■ Send the image to the server in an HTTP request once image is captured
- ● Modeste
  - ○ Learned how to create functions to insert/retrieve/remove images on the database.
- ● Nik
  - ○ Worked on web interface.
    - ■ Worked on getting connection to the server.
    - ■ Spoke with Maggie about goals for the web UI.
  - ○ Finished labeling images.

- o **Pending issues**
  - ● Akira
    - ○ Although building Tensorflow from sources went well, when running the code to begin training, an error message came up that one of the necessary libraries was not linked into a dynamic library file called by the code, thus it will be necessary to recompile Tensorflow with this module linked into the shared library.

- o **Individual contributions**

Name	Individual Contributions	Hours this week	Hours Cumulative
Akira Demoss	Made sure labeling was consistent within our dataset, Wrote code to perform batch resize and cropping within a directory, resized and labeled the potholes dataset to match resolution of images in other dataset, wrote code to split dataset into training, testing,	12	53

	and validation.		
Maggie Dalton	Integrated machine learning into Android app	12	47
Modeste Kenne	Learned how to create functions to insert/retrieve/remove images on the database.	8	39
Nik Thota	Finished labelling images and collected	10	38

- o **Plans for the upcoming week**
  - ● Akira
    - ○ Recompile Tensorflow with module linked.
    - ○ Finish training the object detector.
    - ○ Watch and take notes on lectures 6 and 7 from Stanford's online Youtube lecture series CS231n: Convolutional Neural Networks for Visual Recognition by week 10
  - ● Maggie
    - ○ Finish machine learning integration
    - ○ Test app with an example model
    - ○ Add toggles to Android app for sending images on Wi-Fi only vs sending them with any internet connection
    - ○ Begin to work with Nik on the web portal
  - ● Modeste
    - ○ Merge routing scripts so that the server can be started/stopped from a single source.
    - ○ Create functions for adding, retrieving and removing cracks on the database.
    - ○ Create Node.js routes for each of the database functions
  - ● Nik
    - ○ Work on displaying the cracks in the web UI.
    - ○ Figure out how to sort by different metrics.
    - ○ Design side panel to display additional information.

- o **Summary of weekly advisor meeting**

We had a short meeting with Bo this week where we updated him on our progress. We had planned to meet with Bo and Dr. Ceylan following break for an in-depth progress meeting but are currently unsure of how the COVID-19 closures will affect these meetings as of right now. We will likely email documents with written updates, but may need to look into video conferencing or other options to maintain solid communication.