Project Proposal

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Project #5 GPU

Masked RCNN/Faster RCNN

Currently, I am working with Dr. Fuentes trying to make a network known as Masked R-CNN be able to classify images without texture (i.e., the area where an object is located is mostly a collection of pixel locations with the same intensities). Masked R-CNN is a variant of another network called Faster R-CNN, both networks have as base a CNN (Convolutional Neural Network) that acts as the “engine” which produces proposals (subsamples of the bigger image) to then perform regression over a series of aspects of the region being proposed. For example, we could make regression over the coordinates of where the bounding box that encloses the object is located, also we could make regression over what is the class of the object that is enclosed in such area.

In the case of the Masked R-CNN we can (besides coordinates and class) also apply segmentation at the end of the detection procedure. So, as a project I am very interested to see if we could speed up the experiments, I have to run for the project that I work in with Dr. Fuentes, the code is available in here <https://github.com/ogalindomo/dhs-network>. The code indeed provides the needed settings to say how many GPUs are available and it is possible to switch the number of images that are processed at once (batch size) so that we can speed up the process. In addition, I currently run these experiments in a computer that has the following GPU <https://www.amazon.com/EVGA-GeForce-Founders-Support-11G-P4-6390-KR/dp/B06XH2P8DD> . Every “small” experiment I run of 100 epoch takes around 800 hours to complete, naturally with much greater bandwidth, and with the newest architecture HBM2 I think it is likely that such number could be decreased by an order of magnitude and maybe cost only a tenth of the current time-cost. By doing an experiment it is not the expectation to finish all runs but to instead just have an idea if the network is learning anything. So, using the V100s of Bridge’s could significantly help.

Here is a comparison of the two graphics cards:

A picture containing graphical user interface

Description automatically generated

Graphical user interface, application

Description automatically generated

Table

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