SARSA

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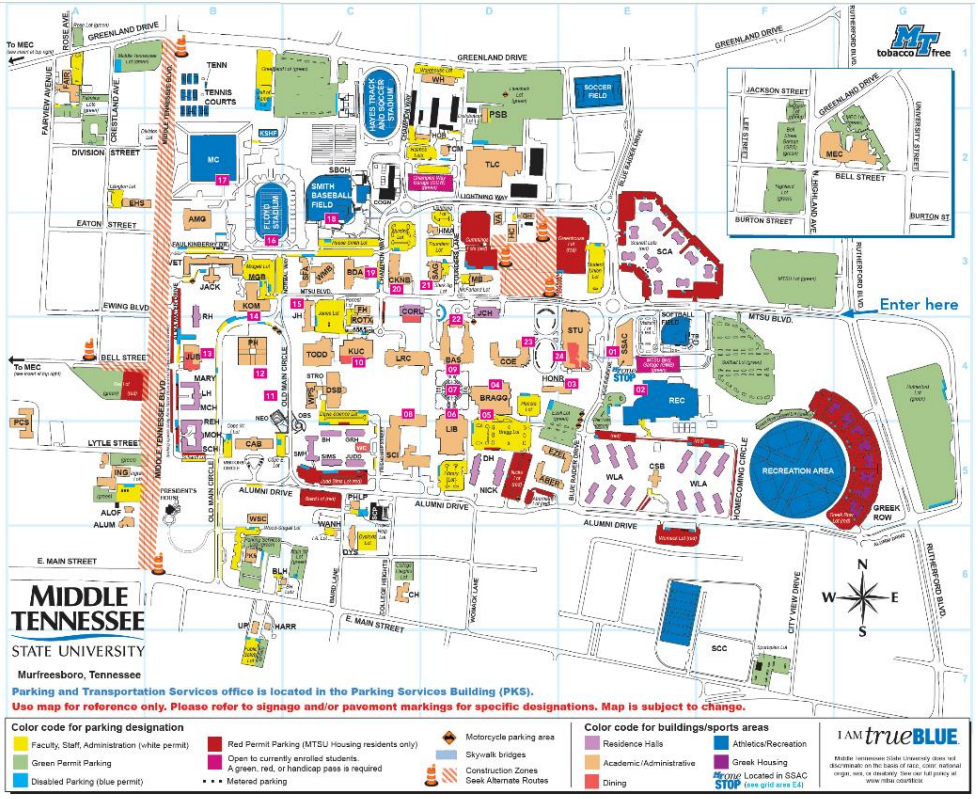
Inspiration

MTSU

~21,000 students

83% commute --2019

Comparison: 73% -- 2014



Key Aim

Given a picture of a parking space, the neural network can identify if it is busy or free.

(Accuracy within 85-95%)

Our Neural Network

- Type: Convolutional Neural Network
- Use: Detection of vehicle within image
- Application: Read-in image and determine if it is a free or busy space

Convolutional Neural Network for Detecting Vehicles in a Parking Lot

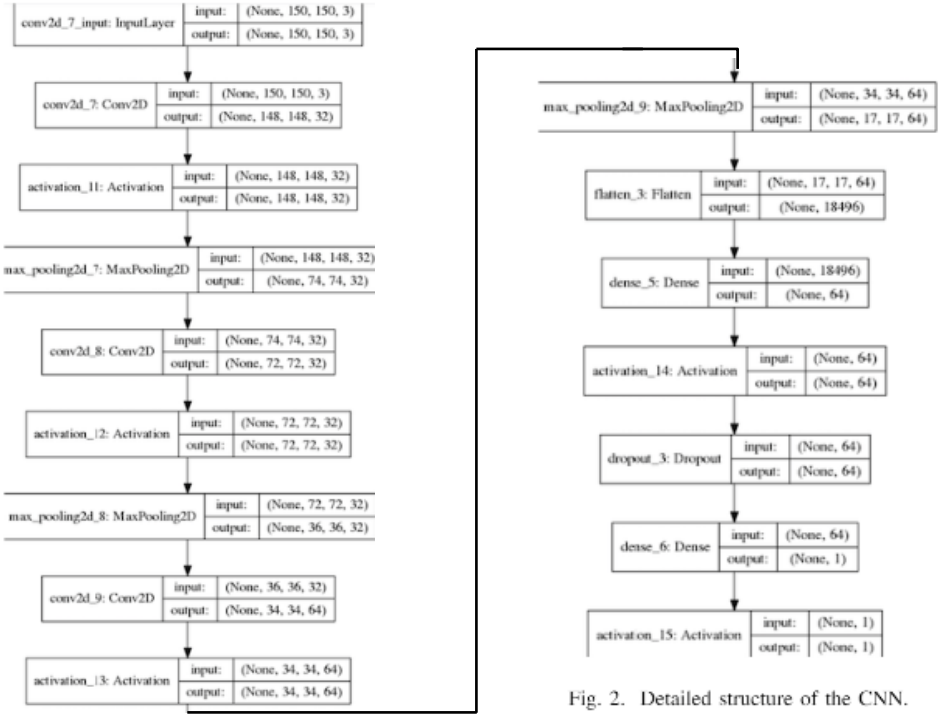


Fig. 2. Detailed structure of the CNN.

Data and Finalization

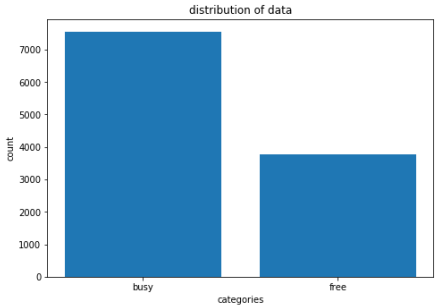
- Data variation/noise level
- First version: only accurate on the given training/test data set.
- Second version: added brightness control to the incoming images and converted images to black and white, increased accuracy for all data.
  - On some parking lots, we experienced 100% accuracy
- Important note: Once cameras are situated at MTSU, parking lot images will not change. This means that a lot of the noise that complicates our neural network will not exist. (Object obstruction(trees…), color of concrete, etc.)
- This opens up the possibility for us to automate splitting up parking spots from a single image using open cv.

Example of Data

Examples of Data

BUSY

Train



FREE

Test

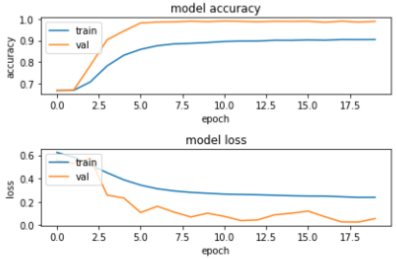


Fig. 3. Model accuracy and loss

Team Contributions

- **Girgis:** Overall floater, worked on paper/presentation/demo/and GitHub control
- **Justin:** Presentation/research other network methods
- **Will:** Paper/convolutional neural network
- **Mubarak:** Paper/convolutional neural network
- **Michael:** Convolutional neural network/Paper/Demo
- **Carolous:** Paper / Presentation

Video of Presentation

- https://youtu.be/lch1SP849rg