



## Artificial Intelligence 1 : Project Proposal

Professor Maherukh Akhtar

CSCI 355 - W01D

### **Students [Old Westbury Campus]:**

Rajendra Bhagroo (rbhagroo@nyit.edu), Department of Computer Sciences, CoECS, NYIT

Christopher Guevarra (cguevarr@nyit.edu), Department of Computer Sciences, CoECS, NYIT

**Project Timeline:** October 25, 2018 - December 10, 2018 (Presentation Date: Old Westbury)

### **Objective:**

We intend to implement artificial intelligence techniques to create a model that can accurately predict handwritten digits. We will use the Modified National Institute of Standards and Technology database (MNIST) as our dataset. Additionally, since the dataset is provided by Yann LeCun, the founder of convolutional neural nets, we will implement our model using a convolutional neural network and attempt to use OpenCV to read handwritten digits from a live video feed. We will use our gained knowledge to develop and experiment with a deep learning pipeline using technologies such as Tensorflow for our backend-engine and Keras as an api to our engine.

### **Requirements:**

Our use of deep neural networks must have the goal of minimizing some error function. This will involve weights between neurons (such as those in informed search methods) with optimizers that handle a backpropagation algorithm to search for optimal weights using partial derivatives (synonymous to hill climbing we learned in class, and genetic algorithms).

### **Existing Systems:**

- Another approach would be to use optical character recognition (OCR)
- Google translate [<https://translate.google.com/>]
- Photomath [<https://photomath.net/en/>]

### **Technologies:**

- Python [3.6]
- Jupyter Notebook [5.5.0]
- Tensorflow [1.11]
- Keras [2.2.4]
- OpenCV [3.4.3]
- Datasets
  - <https://www.kaggle.com/>
    - Competition: <https://www.kaggle.com/c/digit-recognizer>
  - <http://yann.lecun.com/exdb/mnist/>

**Development Analysis:**

We will analyze our development of our project by tweaking parameters and hyper-parameters of our deep learning pipeline to find optimal weights that result in reduction of error and increase in accurate probabilities of the desired output. We will be using supervised learning with a large dataset to train our model. Our model will be evaluated and parameters will be tweaked when used against a validation set of data. Finally, our models overall performance with final parameters will be analyzed using a testing set of data.

**Final Goal**

Our goal is to successfully implement a convolutional neural network that can utilise its receptive field to predict handwritten digits with a high accuracy, with the intent of successfully predicting handwritten digits from a live video feed.