Handwritten Digit Recognition

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ABSTRACT

Human brain is one of the wonders in the world. The human visual system is one such complex system. Problems like handwritten digit recognition is a piece of cake to the human eye. But when it comes to developing a visual system to recognize the same, we would recognize high complexity of the problem. The problem of handwritten digits went hidden for ages, until the new automation processes arrived and better system were developed. For example, the general forms had postal code which were always manually read and updated to the records, but with the automation of the system, the computer need to read the image of the form and recognize the digits on the postal code. We would try to develop one such system for handwritten digit recognition using machine learning algorithms. In this project, we shall choose Deep learning and its convolutional neural network concepts to build an effective system. We would utilize the MNIST dataset of digits to train and test the system. In the project, we be going through the motivation of using these algorithms or the basic science behind them, working of the aforementioned algorithm, tune the system for better accuracy. Towards the end of the project, I aim to develop a Visual system for handwritten digits which is 95% or more accurate.

PROJECT PLAN

A. *Exploration Stage - I*

Initial literature search over the various complexities of handwritten digits, its patterns and necessities of the system. This phase emphasizes more on the deeper understanding of the problem. Targeted by October 31, 2016.

B. *Exploration stage – II*

Initial literature search over the concepts of Deep learning, and exploration of building a convolutional neural network & its concepts. This phase emphasizes on better understanding of the Deep learning concepts. Targeted by November 7, 2016.

C. *Exploration stage – III*

Tool exploration for the implementation of the Deep learning methods and analyzing the dataset. This phase would involve learning python, and Keras for the algorithm implementations. Targeted by November 18, 2016

Involves exploring the MNIST dataset, and understanding its diversity. More of understanding the train set and test set.

D. *Development Stage*

Developing Convolutional neural network in python with Keras. And preliminary unit testing of the implementation. Targeted by November 24, 2016.

Involves converting Deep learning concepts into an executable code. A phase of software development of the classifier.

E. *Review Stage*

Parsing the data set, collection, and comparison & correctness analysis of the results. This phase emphasizes on the result analysis, evaluation of the accuracy and the identification of the errors. Targeted by November 30, 2016.

Involves evaluation of classifier correctness, time analysis, and its effectiveness over recognition of the digits.

F. *Tuning Stage*

We shall calibrate the developed system to deliver better results. This phase involved the development stage and the review stage combined but a bit less tedious. Targeted by December 7, 2016

G. *Final Stage*

Documentation of the project, and its results. This phase emphasizes on the preparing report, presentation and video of the project. Targeted by December 14, 2016.

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