Document Title:

Project Proposal

Project Name:

Revising the Back Propagation Algorithm

(Portland State ECE Capstone 14)

Authors:

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Version: 1.0

Project Summary: The current backpropagation algorithm, which is used for training artificial neural networks, stands to be improved or replaced. Specifically, the client is looking for an algorithm to update or entirely replace the current backpropagation algorithm. The updated version will ideally train in fewer steps, amplify less noise, and become trapped in local minima less often.

Requirements: The revised backpropagation algorithm should show increased performance vs. a control network (the control network will be the same as the test network but will use standard backpropagation.) The following metrics will be used to verify that the requirement has been met. Training accuracy, epochs needed for training, and execution time. Training accuracy must be greater than 93% in the network using the novel algorithm.

Constraints: Must not require a high performance computer. More specifically, it should run on any standard laptop computer built after about 2012.

Deliverables: The final deliverable is a Github repository containing an artificial neural network implementing the novel algorithm. The delivered artificial neural network will be able to classify images from the MNIST database. In addition, documentation will be provided in the form of a wiki (embedded in the repository) which will define and describe all equations, algorithms, software assets.

Proposed Solution: The first few months will be spent on a literature review and on investigation on research. The remaining months up until the delivery of the project will focus on implementing three separate solutions and assessing their

Work Schedule (Tentative):

1. Every wednesday - Team meeting
2. Friday February 22 - Sponsor Meeting 3
3. March - Implement Solution 1
4. April - Implement Solution 2
5. Saturday, June 1st - Oral Presentation
6. Saturday, June 1st - Final Project Report
7. Friday, June 7 - Poster Session