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| **Palmly Neural Network Training:**  Requirements Document (v 1.0) |

Project: Palmly Neural Network Training

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| **1. Introduction** |

This document contains the system requirements for the neural networks that will ultimately be used in the Palmly mobile application. These requirements have been derived from discussions with Andrew Forney, Ph.D.

**1.1 System Overview**

The Palmly Neural Network Training project aims to train 3 different neural networks to recognize the major hand lines used in palm reading. Each neural network will be trained to recognize a different line on the hand, and will be able to categorize the shape of the line shown on an image from the user. The networks will be trained using TensorFlow, a tool built upon Keras that enables machine learning to be on a device instead of sending data back and forth from a server.

**1.2 Scope of the Product**

The product will be used in a mobile application that will enable users to upload photos of their hands, receive readings based on the perceived shape of their major hand lines, and store and share these photos and readings. The trained networks should be able to perceive the shapes of the major hand lines used with suitable accuracy. However, this project does not include building the application that the networks will ultimately be used in. The accuracy of the networks will be both trained and assessed using TensorFlow.

**1.3 Document Overview**

This document will be organized as follows. Section 2 will detail the requirements for each component of the system.

The following language shall be used to specify requirements:

**1.3.1 “Shall”**

This specifies a mandatory requirement that must be fulfilled by the project.

**1.3.2 “Should”**

This specifies a requirement that may or may not be satisfied by completion of the project.

**1.3.3 “Will”**

This declares a design goal describing the way in which other requirements accomplish a purpose. These goals may or may not be met by completion of this project.

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| **2. System Operation and Requirements** |

**2.1 Subsystem Division**

The system will be comprised of two subsystems. The first subsystem will be the database, which will hold all of the training and testing data used during development. The second subsystem will be the three separate neural networks, namely, the Head Line, Heart Line and Life Line networks. Each neural subsystem, will be trained similarly to identify the shape of its specific line on an image of a palm, so their requirements will be grouped together under “Neural Network Subsystems”.

**2.2 Database Subsystem**

2.2.1 The subsystem shall have enough capacity for at least 3600 images with their respective labels.

2.2.2 The subsystem shall provide three different tables for each hand line and its respective images.

2.2.3 The subsystem shall contain a database management system that allows querying of data.

**2.3 Neural Network Subsystems**

2.3.1 The subsystem shall be trained using TensorFlow

2.3.2 The subsystem shall have an accuracy of 60%.

2.3.3 The subsystem shall contain a list of class names corresponding to the appropriate labels for the shape of each line.

2.3.4 The subsystem shall contain a model with at least two layers