

Final Project Proposal

Purpose:

We will be building a system for visually classifying Runes. The goal is to create a program that can take in an image with a Rune tile and find the Rune tile, crop it out of the image and classify which Rune is featured in the image.

Solution:

In order to produce a full solution to this task we will need to build a data set and deploy a Convolutional Neural Network that can recognize the individual Runes. Building the data set will be done by developing a corner detection algorithm that can automatically crop the runes out of images and also another program used to augment and clean the images for a robust data set of feature images.

Algorithms:

Computer vision algorithms will be implemented using OpenCv, Keras and Numpy. OpenCv will be used to implement the corner detection and cropping features of the program through functions such as (GetPerspective(), warpPerspective(), contourArea(), makeBorder()) the Convolutional Neural Network algorithm will be implemented using Tensorflow and a Keras Sequential model.

Goals and Milestones:

Our initial goal is to have a compile time program that can identify Runes in non-preprocessed testing images. Our reach goals involve deploying a runtime solution that will be able to identify Runes in an image or video feed from a mobile application.

Progress and milestones will be documented in the projects README.md

Steps to implement solution:

1. Build image cropping program, test it with self taken photos
2. Build Image preprocessing program
3. Build CNN Program and train it on the generated data from the preprocessing program

02/06- Project Proposal due

02/20- Working Code review, revise plan and document progress

02/27- Code review, Determine whether to pursue reach goals (if 1,2,3 are done)

03/05- Work on bugs, refine final deliverable

03/10- Presentation of Deliverables due

03/15 Final Submission due



This Project will be split into three parts:

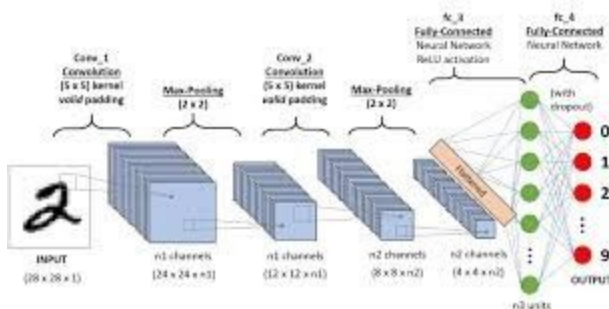
1. Data acquisition and Image Processing

- a. The purpose of this program will be to use openCV to take photos of Runes taken with a smartphone camera and use edge detection to automatically crop the runes and augment the images to generate training data for the CNN.
- b. With this part there will be a necessary aspect of photographing rune tiles and implementing a solution for them to be properly resized and develop a uniform data set.

2. Preprocessing Image Data

After cropping and resizing images they will need to be preprocessed to increase the volume of data. This will be accomplished using [Pandas](#) and [Imageio](#) and openCV

- a. Image data will have to be properly labeled and relabeled automatically during preprocessing



3. Image recognition Convolutional Neural Network implemented with Keras

- a. The purpose of this program will be to train a convolutional neural network using a [keras](#) sequential model and tuning its hyperparameters to reach a threshold classification percentage of 80%.
- b. CNN will have to be developed so as to avoid overfitting to the data set as the amount of data available will be relatively small for a deep learning algorithm