

PBT205 – Project-Based Technology AI in NLP/Text/Speech

Assessment 2
By Max Presley

Practice writing English letters

- It is important to practice handwriting letters
- Practicing helps strengthen your character recognition skills
- Makes words easier to read
- This is why I have chosen to include this visual element into the application

Process

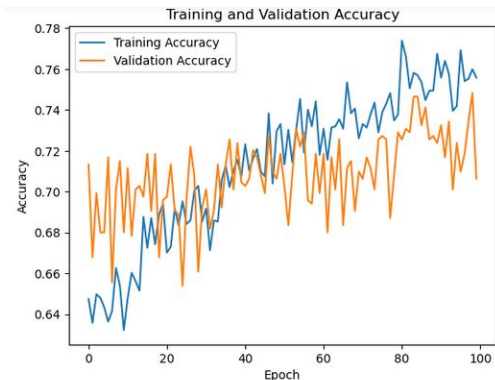
- Acquire a dataset
- Split images 70-15-15 % 70 train, 15 test & 15 validation
- Build the model using TensorFlow
- Train the model
- Analysis its results and accuracy with graphs
- Test the application
- Turn the model to see if it can be improved

Model

- CNN network into 42 classes (a-z A-Z)
- I included numbers but then removed them because silly
- Used ImageDataGenerator to alter the dataset images for more robust learning
- Tried with 10 Epochs for speed

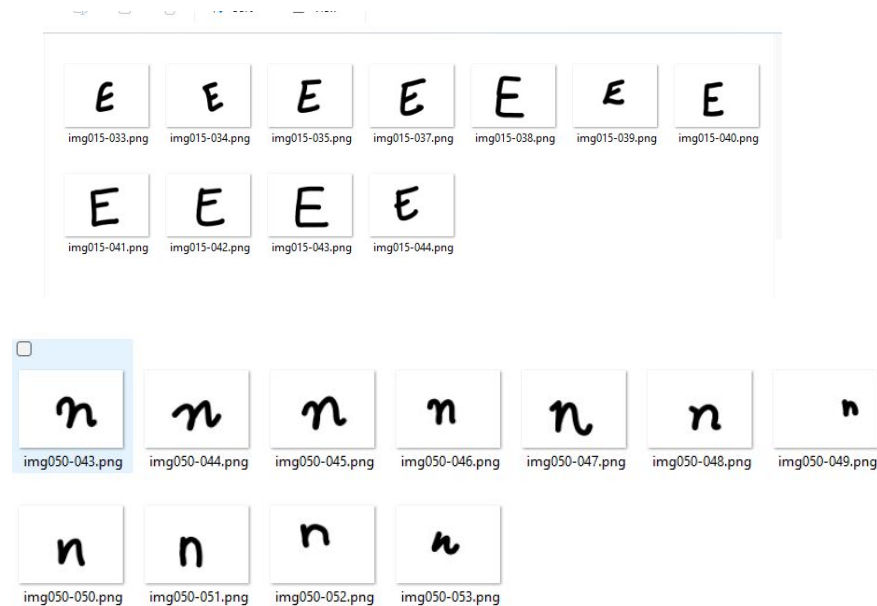
Model Accuracy – 100 Epochs

- Test accuracy: 0.7919580340385437
- Took about 30 minutes
- A steady improvement overtime



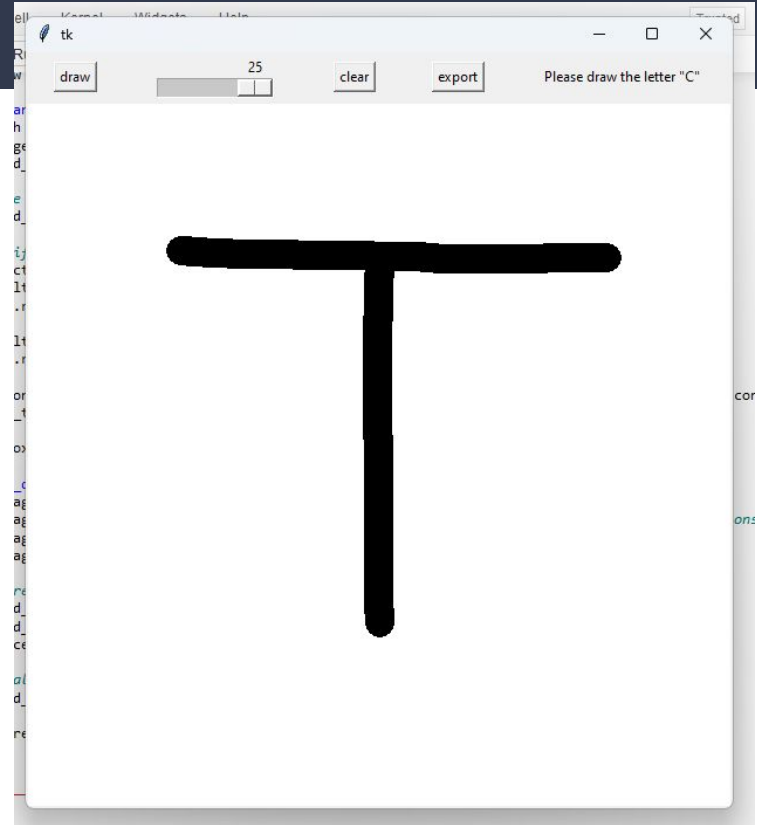
Model Accuracy When Testing

- Despite having a good accuracy this doesn't mean it was accurate in testing
- Constantly got incorrect prediction
- The dataset contains images of a very particular style
- A lot of the images in the dataset were hard to tell what letter they were for so of course it would confuse the model
- I think the dataset lead to a lot of inaccuracies
- Despite that it still is good most of the time



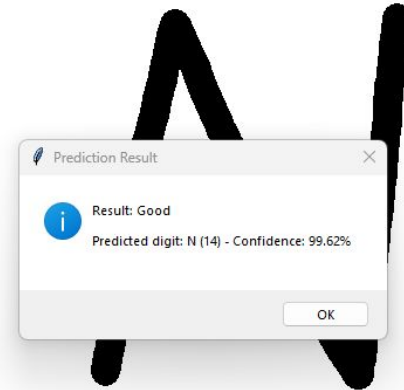
GUI & Prototype

- A paint style input method
- Exports the image and saves it
- Then uses it to predict what it is
- Slider to change brush size
- Found larger brush size was more accurate
- Clear option
- Not pretty UI but gets the job done



GUI & Prototype

- Top right it tells u what to practice drawing
- Draw the letter, then it makes a prediction.
- If the letter matches then it will say good, if not then it will say wrong
- A random letter is chosen each time u export
- Ideally a button would be added to skip letter instead of forcing a skip
- This is needed so you don't get stuck on a hard to predict letter like i l j
- Shows the predicted letter with confidence score



Conclusion

- This solution can help students learn English letters
- The model is accurate at making prediction given you use the provided paint tool
- Dataset was limiting but by using ImageDataGenerator the model became more robust
- GUI makes using the system easy
- Can expand to include more complex things like full words

Q&A - Any questions?