Deliverable

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We used the Keras Sequential model, which is a linear stack of layers. We chose this type of CNN because we concluded after doing some research that it is fairly simple to use and very beginner friendly.

We started off by converting the data (integers ranging from 0 to 255 for each pixel) into a range of [0,1]. We did this by simply dividing all of the pixel values by 255. We also manipulated the shapes of the NumPy arrays and transformed the pandas data frames into such arrays.

After cleaning up the data and splitting the training dataset into validation data and training data (an 80/20 split in favor of the training data), we reshaped those arrays to match the image shape of our model, which corresponds to (28,28,1); 28 rows and columns for each image and another dimension to make it three dimensional.

Finally, we created our model using the sequential method from Keras and properly fit it to our data. An accuracy of around 83% was displayed for the testing images.

The most challenging parts were properly shaping up our data and messing around with the Keras model. We kept on getting all types of errors while fitting our model because of misshaped data. For example, our model could not complete it's training without errors because our label arrays had the wrong shape (we had forgotten to remove the image ID column). Searching through the documentation of the Sequential model was finally pretty rough for us, as it is rather complicated, and we are beginners in this field.

However, we learned a lot about CNN's, and how to implement a very basic one on an image dataset.

Finally, some of our code is inspired by this kernel, which iss a complete CNN model guide.

https://www.kaggle.com/code/pavansanagapati/a-simple-cnn-model-beginner-guide/notebook

Contributions:

We are brothers who live in the same house, we literally put our laptops next to each other and worked this whole thing out together. Here is a very inaccurate split of how we did it:

John preprocessed the data, found the model we employed, helped fit the model,used the model to make the prediction and did some debugging

Bashar deployed the sequential model, fit it to the data and did some debugging