

# Fashion MNIST Hackathon

DSI 123 Group 4

Alex, Carl, Krishna, Ryan, Mary



# Table of contents

**01**

## Problem

What problem are we trying to solve?

**02**

## Process

What did we do?

**03**

## Best Model

How well did our best model perform?

**04**

## Difficulties

What difficulties did we face?

**05**

## Conclusions

What did we learn?





# Problem

This project aims to develop a neural net machine learning model that can accurately classify images of fashion products. The data consists of a training set of 60,000 examples and a test set of 10,000 examples. Each example is a 28x28 grayscale image, associated with a label from 10 classes.



# Process

- Normalized image data by scaling down pixel values to a range of 0 to 1
- Used Sparse Categorical Cross-Entropy as a loss function in lieu of one hot encoding.
- We started with a simple model and added complexity as we went.
- Did a lot of guess- and -check and tuning of hyperparameters to get the best validation accuracy score.



# Hyperparameters we tuned

We tried many different combinations of hyperparameters to build the best performing model.

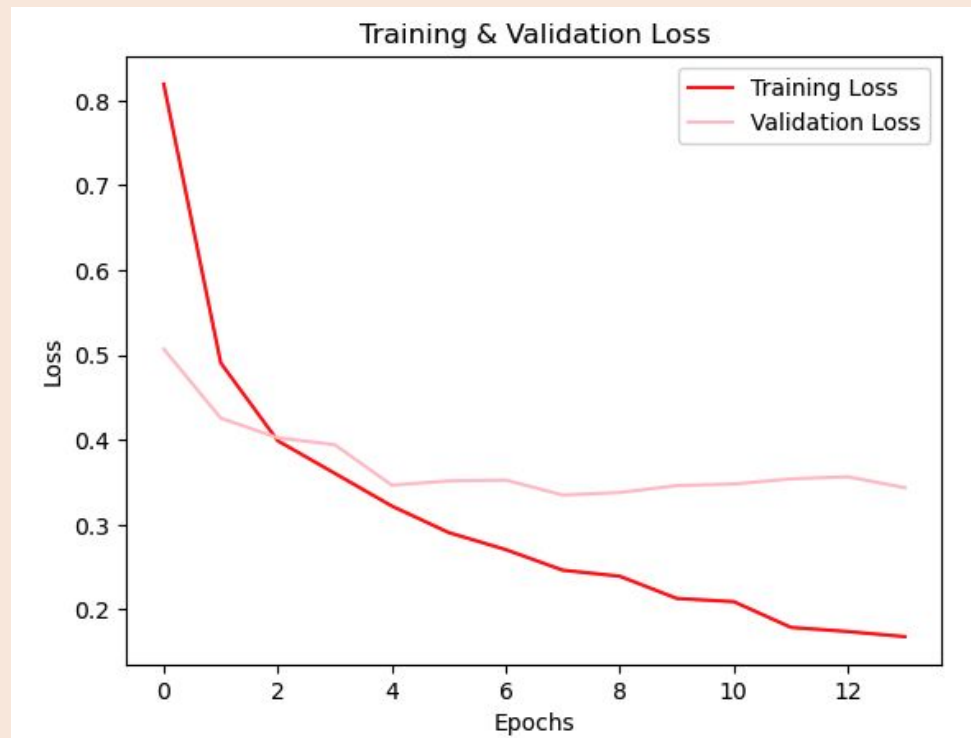
- Learning rate
- Number of hidden layers: Convolutional Layers and Dense Layers
- Number of neurons per layer
- Activation functions: ReLU, Leaky ReLU
- Dropout rate
- Batch size
- Number of epochs
- Early Stopping

# Best Model

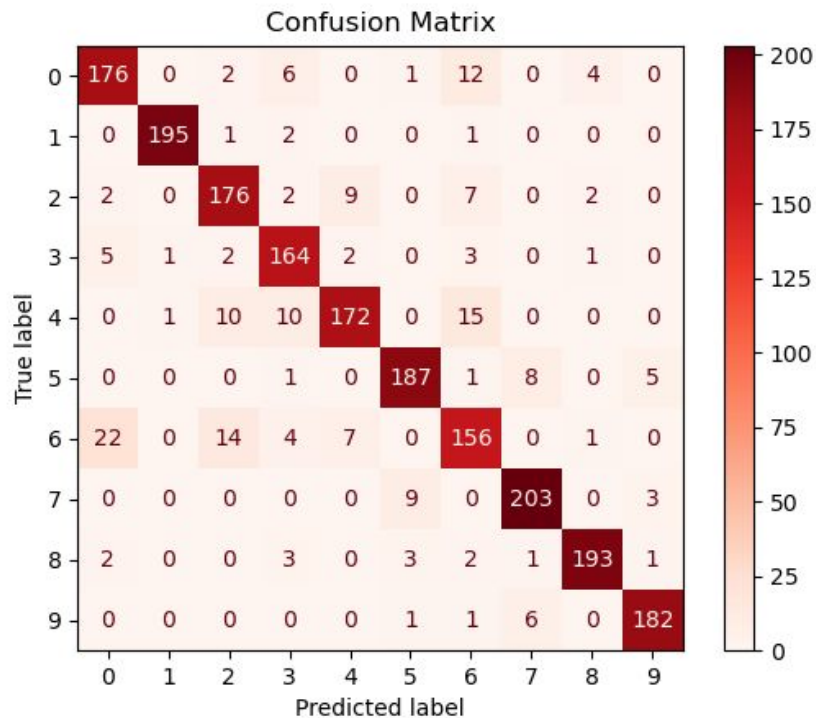
**Validation Accuracy Score : ~ 90%**

## **Tuned params:**

- 1 Convolutional Layer w/ 64 nodes
- LeakyReLU activation( $\alpha = 0.05$ )
- 1 Dense layer w/ 128 nodes
- ReLU activation
- Dropout of 0.6
- Batch size of 32
- Early Stopping w/ patience of 6
- 15 epochs

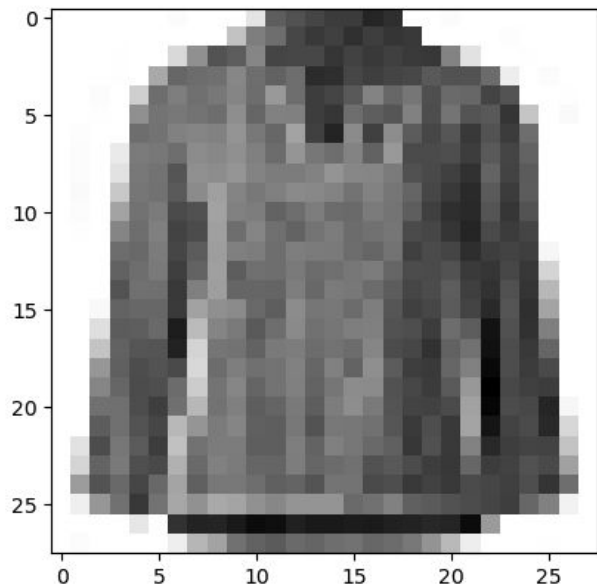


# Confusion Matrix



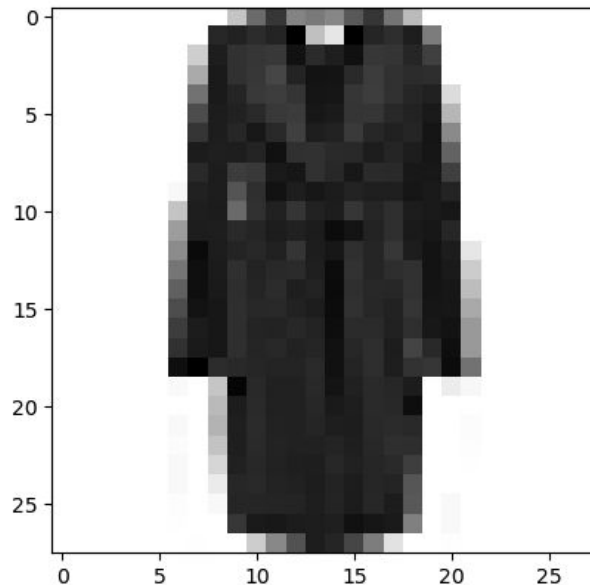
- 0 T-shirt/top
- 1 Trouser
- 2 Pullover
- 3 Dress
- 4 Coat
- 5 Sandal
- 6 Shirt
- 7 Sneaker
- 8 Bag
- 9 Ankle boot

# Visualizations



We thought = 4, but really 6

We thought it was a coat but it was actually a shirt.

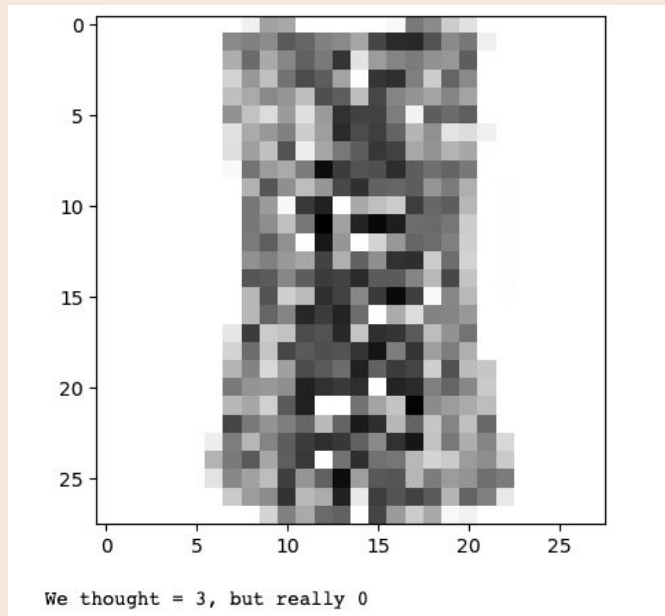


We thought = 3, but really 4

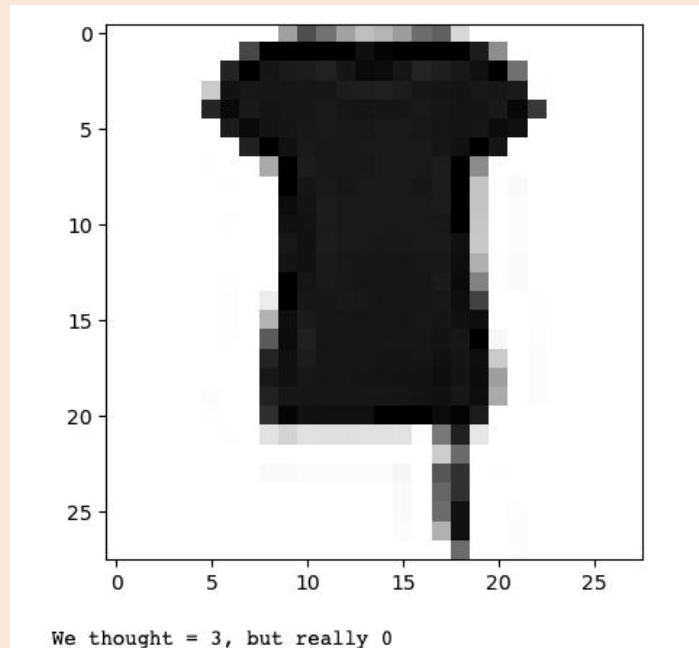
We thought it was a dress but it was actually a coat.



# Visualizations



We thought it was a dress but it was actually a shirt.



We thought it was a dress but it was actually a shirt.



# Difficulties

- Getting better accuracy scores.
- Finding the best combination of hyperparameters.
- Felt like the guess and check could go on forever.

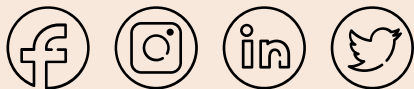


# Conclusions

- Our best model got about 90% accuracy.
- It had the most difficulty correctly classifying tops (shirts, t-shirts, pullovers and coats) and footwear (sandals, sneakers, and ankle boots).
- It did best correctly classifying trousers.
- With higher resolution data, we believe adding complexity to the model would improve accuracy.

# Thanks!

Any questions?



CREDITS: This presentation template was created by **Slidesgo**, including icons by **Flaticon** and infographics & images by **Freepik**

