Emotional Sentiment Classification with Neural Networks

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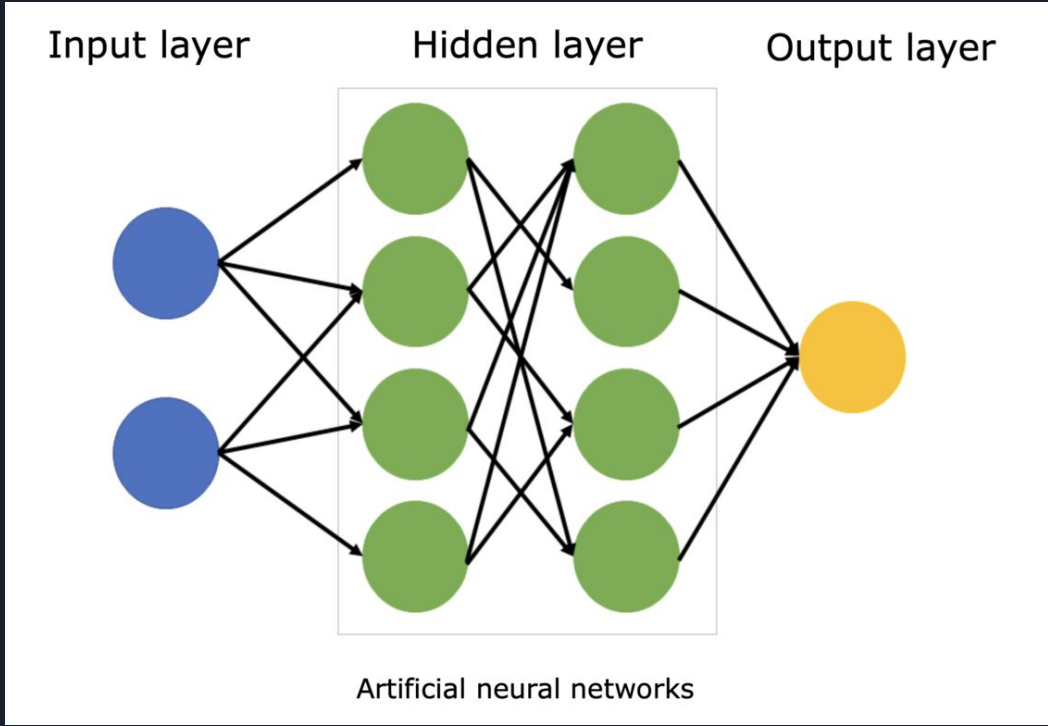
Summary

Build a Neural Network that can:

- Identify emotional sentiments
- Be integrated into other pipelines
- Classify samples quickly and accurately



Img source: https://www.sciencelearn.org.nz/images/5156-neural-network-diagram

Problem?

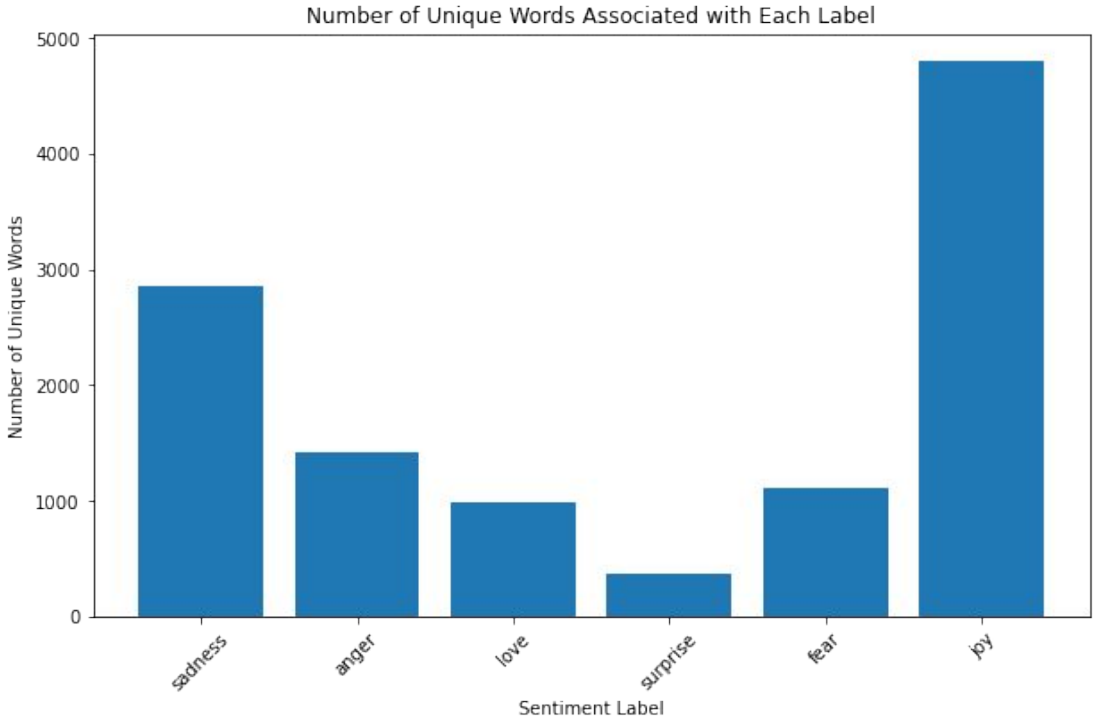
- Reading consumer feedback is time consuming.
- Labeling every piece of feedback is impractical.
- Classifying feedback enables statistical analysis.
- Get real-time feedback on consumer opinion

Data and Methodology

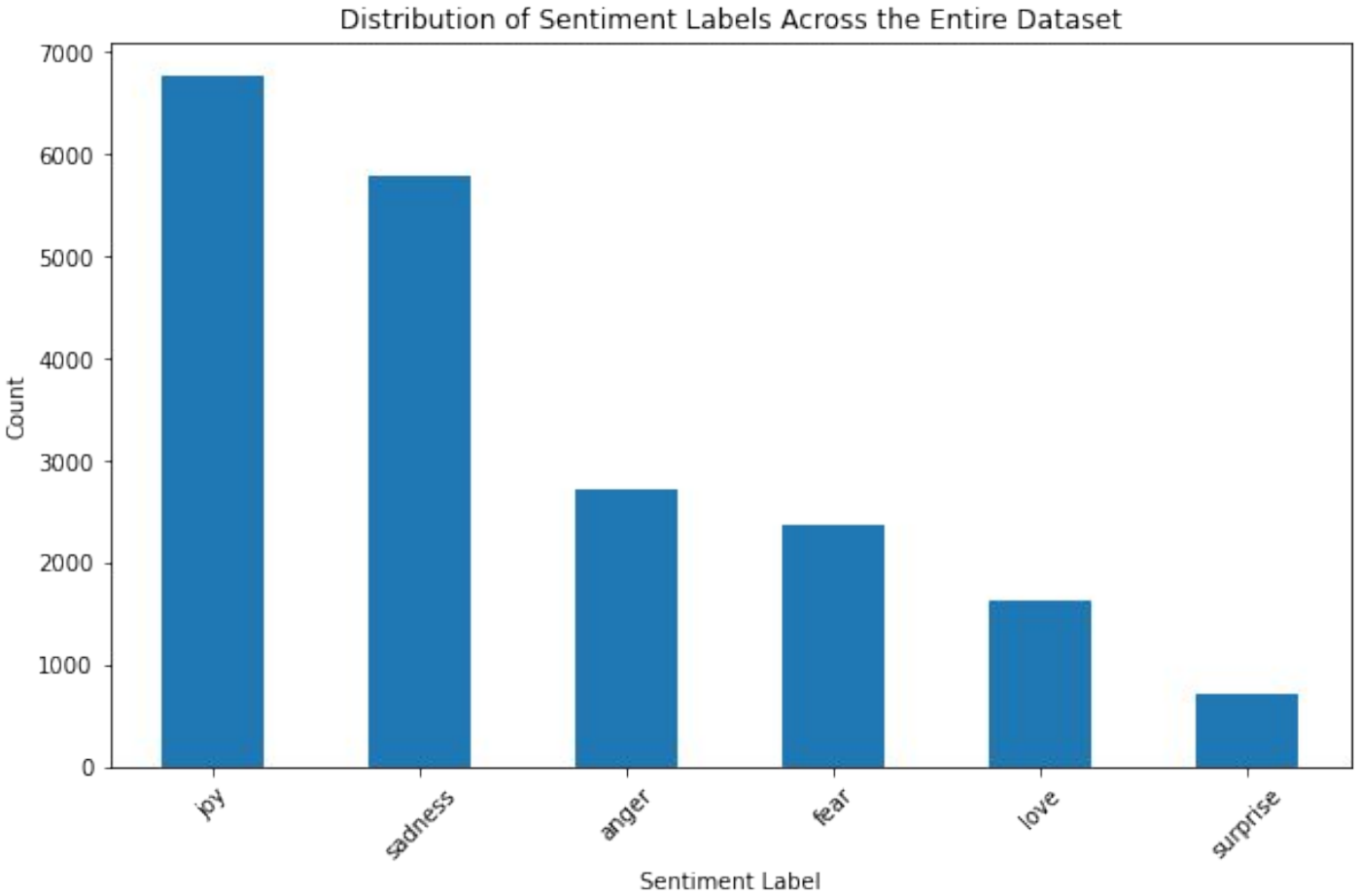
- Data publicly accessible on Kaggle
- Already preprocessed and split into sets, just needs to be encoded
- Experiment with different ML models. Settled on a neural network
- Use standard NN single hidden layer architecture

Data Fun Facts

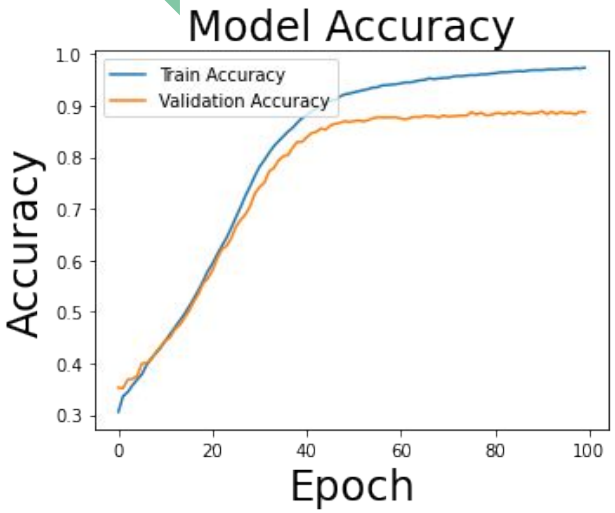
- Surprise is least common, Joy is most common
- Avg length of sample is 100 characters
- Joy has most unique words
- Surprise is proportionately rare

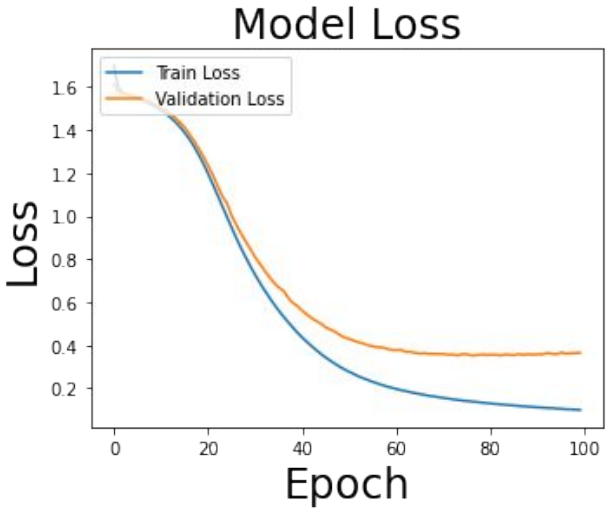


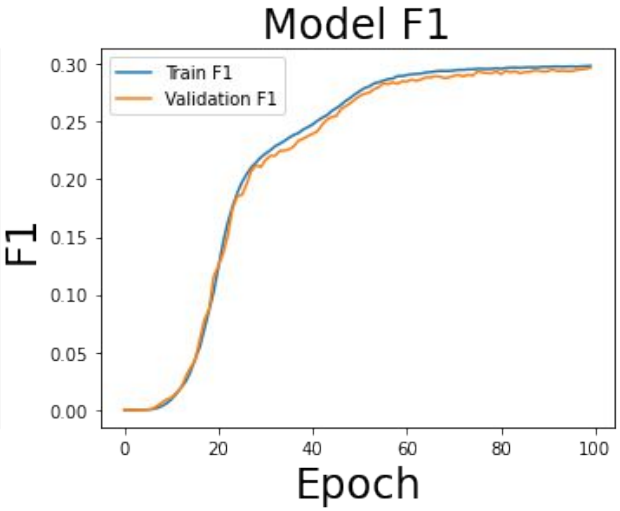
Data Fun Facts (cont.)



Best Model


Model Accuracy
Train Accuracy
Validation Accuracy
Accuracy
Epoch
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
20
40
60
80
100

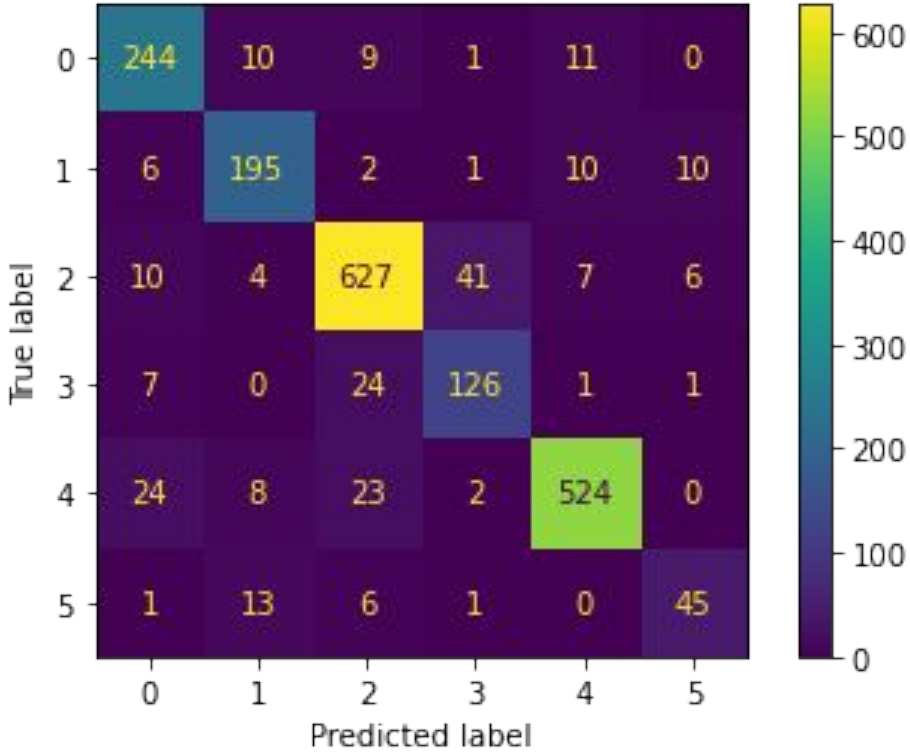

Model Loss
Train Loss
Validation Loss
Loss
Epoch
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
20
40
60
80
100


Model F1
Train F1
Validation F1
F1
Epoch
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
20
40
60
80
100

Best Model (cont.)

Legend

Anger = 0
Fear = 1
Joy = 2
Love = 3
Sadness = 4
Surprise = 5



How Can we Put it to Work?

- Analyze customer feedback on shortform social media like Twitter
- Analyze customer feedback in real time
- Create a dashboard that displays this info
- Must ensure samples are ~100 characters

Conclusion

- 88% accuracy
- 0.3 F1
- Struggles to consistently identify surprise
- (not a huge problem for stated purpose)

Thank you!