



Neural Networks For Facial Sentiment Analysis

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Background

The goal of this project is to perform facial emotion expression analysis using artificial neural networks and tone analysis. These technologies can be used by business to accurately measure customer service levels rather than relying on customer service email based systems that only receive a 10% response rate.

Methodologies

This project consists of many technologies for implementation, training, testing and deployment.

Convolutional Neural Network

- Written in python and uses Google's TensorFlow machine learning library.
- Trained using an image dataset using the Floyhub cloud PaaS.
- A Python Flask API was implemented for deploying the trained model and hosted on Heroku PaaS

Node.JS Web Application

- The web app was developed with Express.JS

- The app uses the clients webcam for recording the users facial expressions, and takes snapshots in 2 second intervals.
- The snapshots are preprocessed using Cloudinary API and sent to the TensorFlow API for emotion prediction based on facial expressions.

Tone Analysis

- The IBM Watson tone analyzer is utilized to score the sentiment of the person tone of voice.

The scores are then determined using a weighted algorithm and stored in a database for further assessment



Results

The model was successful in design and implementation. Giving approximately 99% accuracy prediction and a 75% validation accuracy. This may be due to the small size of the dataset used, which causes overfitting. However, this shall be address in future work.

Discussion / Future work

Training of the model using an online cloud platform service and hosting of the trained model was also successful in implementation. A web application for facial recording and developed, being integrated with the additional webservises. Future work includes training on a larger dataset also with highest attention spent on image augmentation, for the model to handle with variance.

