**Capstone Project Submission**

**Instructions:**

i) Please fill in all the required information.

ii) Avoid grammatical errors.

| **Team Member’s Name, Email and Contribution:** |
| --- |
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| **Please paste the GitHub Repo link.** |
| **Github Link**:- https://github.com/Chetanrajput1331/Face-Emotion-Recognition.git |
| **Please write a short summary of your Capstone project and its components. Describe the problem statement, your approaches and your conclusions. (200-400 words)**  **Introduction**  The Indian education landscape has been undergoing rapid changes for the past 10 years owing to the advancement of web-based learning services, specifically, eLearning platforms. Global E-learning is estimated to witness an 8X over the next 5 years to reach USD 2B in 2021. India is expected to grow with a CAGR of 44% crossing the 10M users mark in 2021. Although the market is growing on a rapid scale, there are major challenges associated with digital learning when compared with brick and mortar classrooms. One of many challenges is how to ensure quality learning for students. Digital platforms might overpower physical classrooms in terms of content quality but when it comes to understanding whether students are able to grasp the content in a live class scenario is yet an open-end challenge. In a physical classroom during a lecturing teacher can see the faces and assess the emotion of the class and tune their lecture accordingly, whether he is going fast or slow. He can identify students who need special attention. Digital classrooms are conducted via video telephony software program (exZoom) where it’s not possible for medium scale class (25-50) to see all students and access the mood. Because of this drawback, students are not focusing on content due to lack of surveillance. While digital platforms have limitations in terms of physical surveillance but it comes with the power of data and machines which can work for you. It provides data in the form of video, audio, and texts which can be analyzed using deep learning algorithms. Deep learning backed system not only solves the surveillance issue, but it also removes the human bias from the system, and all information is no longer in the teacher’s brain rather translated in numbers that can be analyzed and tracked.  **What is FER?**    Facial Emotion Recognition (FER) is the technology that analyses facial expressions from both static images and videos in order to reveal information on one's emotional state.  **Problem Statement**  **Key Point:**  One of the many challenges in web based learning is how to ensure quality learning for students. Digital platforms might overpower physical classrooms in terms of content quality but when it comes to understanding whether students are able to grasp the content in a live class scenario is yet an open-end challenge.   * Unable to identify students who need special attention. * Lack of attention. * Lack of surveillance.   **Approach**  This project aims to classify the emotion on a person's face into one of **seven categories**, using deep convolutional neural networks. The model is trained on the **FER-2013** dataset which was published on International Conference on Machine Learning (ICML).First we did Data analysis on FER2013 Data which we downloaded from kaggle |

This dataset consists of 35887 grayscale, 48x48 sized face images with **seven emotions** - angry, disgusted, fearful, happy, neutral, sad and surprised.then We did EDA on we found that the number happy picture are the highest and disgusted picture are the lowest in the dataset. After data preprocessing and model building we found the best model weighs which was for the epoch 39 with loss:0.7801, Accuracy:0.7084, Val\_loss:0.9670, Val\_accuracy:0.6646.Then we perform real time emotion detection with the help of Vs and streamlit. Our model accurately detected all the emotions except disgust. The training data for the emotion class were pretty low as compared to others..

**Conclusion**

Face Emotion Recognition is a crucial application of deep learning algorithms which can be extended to every industry.

Future work in relation to this project can include tracking and analyzing the emotions of

the students. For example If a student is continuously predicted to be sad for a class of an hour, he/she could be flagged and a report of all the students could be generated at the end of the lecture for better analysis and further customized lesson plans.

Another important point to conclude is CNN models could achieve extraordinary results

if appropriate and good amount of training data is provided. For example for this particular case, the training data should include images of students while studying. The model gave 71% accuracy for training data and 66% for validation data. On the other

hand it gave 68% accuracy for the test.