

# Proposal for DSPRO2 (FS24) – Emotion recognition through facial expressions

## Group Members

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## Short Project Description

This project aims to develop a machine learning model capable of detecting and interpreting human emotions in real-time from a live camera feed. The model will analyze facial expressions to identify emotions such as happiness, sadness, anger, surprise, fear, and disgust. The end goal of this project is to create a robust and efficient AI model that can accurately detect human emotions in real-time, which has numerous potential applications in areas such as interactive entertainment, mental health monitoring, and human-computer interaction.

## Data Description

For initial training we are going to use the FER2013 Dataset which consists of 35'887 48x48-pixel grayscale images of faces expressing various emotions. The emotions are categorized into angry, disgust, fear, happy, neutral, sad and surprise. The dataset is split into a training set containing 28'709 images and a testing set containing 7'178 images.<sup>1</sup>

## Cloud Service Integration

We are planning to use Google Cloud where we get \$300 worth of credits for free. Google Colab which runs on Google Cloud server leverage the power of Google hardware, including GPUs and TPUs but because of limited free usage of said hardware we plan to use this service only for the final large trainings. We also plan to store our datasets on the cloud. Google offers 5 GB of free storage.

## Kanban Tool

We are using the Kanban tool provided by GitHub.

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<sup>1</sup> Goodfellow, I., Erhan, D., Carrier, P.-L., Courville, A., Mirza, M., Hamner, B., ... Bengio, Y. (2013). Challenges in Representation Learning: A report on three machine learning contests. Retrieved from <http://arxiv.org/abs/1307.0414>

## Experiment Tracking Tool Approach

We will be using Weights & Biases (wandb) to track our experiments throughout this data science project. This tool will allow us to log key metrics, visualize performance trends, and compare different model runs. This will facilitate efficient experimentation and analysis of our machine learning models. Weights & Biases is free to use for students.

## References

[1] Challenges in Representation Learning: A report on three machine learning contests." I Goodfellow, D Erhan, PL Carrier, A Courville, M Mirza, B Hamner, W Cukierski, Y Tang, DH Lee, Y Zhou, C Ramaiah, F Feng, R Li, X Wang, D Athanasakis, J Shawe-Taylor, M Milakov, J Park, R Ionescu, M Popescu, C Grozea, J Bergstra, J Xie, L Romaszko, B Xu, Z Chuang, and Y. Bengio. arXiv 2013.