Facial Emotion Recognition (FER) Using the FER13 Dataset

**Objective**: To analyze users' emotions in real-time on social media and personalize content based on their emotional states for enhanced engagement.

**Dataset**: The FER-2013Plus dataset was used, comprising 35,485 grayscale images (48x48 pixels), with emotions categorized into seven classes. Challenges included low resolution, overlapping features, and class imbalances.

**Methods**:

* **Data Augmentation**: Techniques like random rotations, shifts, zooming, horizontal flipping, and rescaling were applied to improve model generalizability.
* **Model Development**:
  + **ResNet50**: High accuracy for complex patterns but struggled with the low-resolution grayscale data and imbalanced classes, leading to test accuracy of 49.57%.
  + **CNN**: Achieved better results with a test accuracy of 76.88%, leveraging a simpler architecture better suited for the dataset.

**Conclusion**: The CNN model outperformed ResNet50 due to its compatibility with the dataset's characteristics, showcasing a more balanced and effective approach to emotion recognition.