**Week of March 10th:**

**Progress Overview:** Over the past two weeks, we focused on training and evaluating deep learning models for facial expression-based mental disorder detection. Additionally, we conducted a literature review to analyze previous work in this domain and identify key methodologies relevant to our approach.  
 Additionally, we researched the requirements for software architecture and explored integration strategies. As part of this, we attempted to upload a sample dataset to the Google Cloud Platform, assessing how it could be utilized and integrated into various phases of the project for streamlined workflow and scalability.

**Research Paper Overview:**

* Performed comprehensive analysis: Reviewed various relevant research papers to gain insight into existing methodologies and best practices.
* Identified key methodologies: Pinpointed and evaluated critical techniques relevant to the project’s objectives.
* Explored cutting-edge advancements: Investigated state-of-the-art developments in deep learning architectures for facial expression analysis.
* Compiled actionable recommendations: Synthesized research findings into a set of practical suggestions to guide project decisions.
* Conducted comparative studies: Analyzed traditional versus modern methodologies to refine strategy and ensure optimal approach selection.
* Addressed potential challenges: Identified risks and limitations in adopting new technologies, proposing strategies for mitigation.

Next Steps for Research Papers:

* Stay updated with ongoing research to incorporate any relevant advancements during project development.
* Apply the identified techniques from the research paper to the project, tailoring them to specific objectives.
* Incorporating the advancements in deep learning architectures for facial expression analysis.
* Test the prototype against benchmark datasets, refine it based on the results, and address any challenges encountered.

We implemented and tested two models using **Google Colab**, analyzing their performance based on accuracy and loss metrics:

1. **Model 1: EfficientNetB0 trained on the FER2013 dataset (50 epochs)**
   * **Results:** Accuracy: **65.52%**, Loss: **0.9263**
   * **Validation Accuracy:** **60.09%**, Validation Loss: **1.0**
   * **Code:** [GitHub Repository](https://github.com/Capstone-Project-CCNY/AI-Driven-Mental-Disorder-Detection-/tree/main/mental_disorder_detection/notebooks/Srishti_Verison1_EfficientNetB0_FER2013)
2. **Model 2: EfficientNetB4 trained on the AffectNet dataset (50 epochs)**
   * **Results:** Accuracy: **52.55%**, Loss: **1.2725**
   * **Validation Accuracy:** **54.76%**, Validation Loss: **1.2393**
   * **Code:** [GitHub Repository](https://github.com/Capstone-Project-CCNY/AI-Driven-Mental-Disorder-Detection-/tree/main/mental_disorder_detection/notebooks/Srishti_Version2_EfficientNetB4_AffectNet)

#### **Comparison & Key Insights**

* **EfficientNetB0 (FER2013) outperformed EfficientNetB4 (AffectNet)** in terms of accuracy, likely due to differences in dataset complexity.
* **AffectNet provides a more diverse and complex dataset**, capturing subtle emotional variations, which may require extended training and hyperparameter tuning to improve performance.
* Further **optimization and fine-tuning** are required to enhance model performance.

**Next Steps:**

* **Optimize model architecture** and conduct hyperparameter tuning.
* **Explore additional datasets** to complement AffectNet.
* **Leverage IEEE resources** for further research insights.
* **Begin experimentation** with alternative deep learning models.
* **Developing and researching front end architecture.**

#### **Project Resources:**

* [GitHub Code link](https://github.com/Capstone-Project-CCNY/AI-Driven-Mental-Disorder-Detection-)
* [JIRA board](https://dsalimkumar.atlassian.net/jira/software/projects/SCRUM/boards/1/backlog)