Weekly Progress Report - 12

Name of the Student 1	Hetanshi Bhatt
Roll Number of Student 1	22BPC156
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Project Title	Combating Digital Misinformation: Deepfake Detection Using Deep Neural Networks
Name of the Supervisor (Mentor) at PDEU	Dr. Samir Patel
Week Number	Week 12

Progress made in Week:

We conducted a focused literature review to benchmark our XceptionNet approach and identify future research directions.

- **Core Papers Reviewed:** We analyzed the foundational and survey papers that informed our project's methodology.
    - *Advances in DeepFake detection algorithms: Exploring fusion techniques in single and multi-modal approach*
    - *A systematic literature review on deepfake detection techniques*
- **Focus Areas:** The review centered on SOTA (State-of-the-Art) techniques that address the limitations of frame-based models, specifically:
    - Temporal Coherence Models: Investigating CNN-LSTM and Transformer-based architectures that analyze frame-to-frame inconsistencies.
    - Frequency Domain Analysis: Studying methods that detect deepfakes by identifying artifacts in the frequency spectrum, which are often missed in the spatial (pixel) domain.

MLOps: Model Deployment & End-User Website

We successfully actioned the feedback to deploy the model, leveraging the robust MLOps pipeline built in Week 10.

- Backend (Model Serving):
    - Developed a lightweight API server (using Flask) to wrap the final, optimized XceptionNet model

(final_xception_optuna.pth).

- The API exposes an endpoint that accepts a video file for inference.

- Frontend (End-User Website):
  - Prototyped a simple web interface, allowing a user to upload a video file.
  - The frontend sends the video to the backend API, which then processes the video (frame extraction, inference, averaging) and returns the final classification ("Real" or "Fake") to the user.
- Pipeline Integration: The DVC-versioned model on the AWS S3 remote was pulled seamlessly into the deployment environment, proving the pipeline's robustness and reproducibility.

Hetanshi Bhatt	**Kunal Solanki**	**Samir Patel**
		
Name and Signature of Student 1	**Name and Signature of Student 2**	**Name and Signature of Supervisor (Mentor)**