Weekly Progress Report - 13

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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 13

Progress made in Week:

This final week was about wrapping up the project by finalizing the end-user application and creating a comprehensive documentation package that details every phase of the project, from conception to deployment.

1. Final Website (GUI) Finalization

The web application prototype, which serves as the project's primary user interface, was completed and polished.

- **Frontend:** Finalized the UI/UX of the website, ensuring the user flow for video uploading is simple, intuitive, and clearly displays the output.
- **Backend Integration:** Completed the work to robustly connect the front-end interface to the deployed Flask API.
- **End-to-End Test:** Ran multiple tests to confirm that a user can successfully upload a video, the backend processes it correctly (using the DVC-tracked model), and the final "Real" or "Fake" classification is returned and displayed accurately.

2. Comprehensive Project Documentation

A detailed, end-to-end documentation report was written to ensure the project is fully understandable, reproducible, and maintainable. The documentation covers:

- **Motivation & Objective:** The "why" of the project, detailing the threat of deepfakes.
- **Methodology:** A complete walkthrough of the technical pipeline:
    - **Data:** Dataset sourcing (Celeb-DF, FaceForensics++) and the MediaPipe-based face extraction process.
    - **Model:** The XceptionNet architecture, fine-tuning process, and use of Albumentations.

- **Optimization:** The full **Optuna** hyperparameter tuning methodology.

- **MLOps Pipeline:** A dedicated section explaining the robust, reproducible pipeline using **DVC (Data Version Control)** and the migration from Google Drive to the **AWS S3** remote.
- **Final Results:** A summary of the final performance metrics (Accuracy: 0.93, F1-Score: 0.93) and the supporting ROC curve analysis.

Final Deliverables

- Final Project Report (Comprehensive Documentation).
- Working Web Application (Prototype).
- Complete Source Code and DVC-tracked pipeline (Git Repository).
- Final Presentation Slides (Synthesizing all work).

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