MAJOR - PROJECT LOGBOOK

GROUP MEMBERS

1. Vedant Chaudhari
2. Rupesh Darpe
3. Rajaram Desai
4. Salil Gujar

Supervisor/Guide

Dr. Jaychand Upadhyay

Department of Information Technology

Xavier Institute of Engineering, Mahim (W), Mumbai - 400 016

University of Mumbai

(Academic Year 2024-25)

INSTITUTE VISION & MISSION

VISION

To nurture the joy of excellence in a world of high technology.

MISSION

To strive to match global standards in technical education by interaction with industry, continuous staff training and development of quality of life.

INFORMATION TECHNOLOGY DEPARTMENT

Department Vision

To nurture the joy of excellence in the world of Information Technology.

Department Mission

M1: To develop the critical thinking ability of students by promoting interactive learning.

M2: To bridge the gap between industry and institute and give students the kind of exposure to the industrial requirements in current trends of developing technology.

M3: To promote learning and research methods and make them excel in the field of their study by becoming responsible while dealing with social concerns.

M4: To encourage students to pursue higher studies and provide them awareness on various career opportunities that are available.

PROGRAM EDUCATION OBJECTIVES (PEOs)

PEO1: Employed as IT professionals, and shall engage themselves in learning, understanding, and applying newly developed ideas and technologies as their field of study evolves.

PEO2: Competent to use the learnt knowledge successfully in the diversified sectors of industry, academia, research and work effectively in a multidisciplinary environment.

PEO3: Aware of professional ethics and create a sense of social responsibility in building the nation/society.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Demonstrate the ability to analyse and visualize the business domain and formulate appropriate information technology solutions.

PSO2: Apply various technologies like Intelligent Systems, Data Mining, IOT, Cloud and Analytics, Computer and Network Security etc. for innovative solutions to real time problems.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

STUDENT INFORMATION

Project Title: Deep Fake Video Detection

	Student 1	Student 2	Student 3	Student 4
Student ID	202103005	202103009	202103010	202103015
Name	Vedant Chaudhari	Rupesh Darpe	Rajaram Desai	Salil Gujar
Semester	VIII	VIII	VIII	VIII
Contact No.	98696 49515	9137940143	8767423084	96199 73623
E-mail	chaudharirvv@gmail.com502	202103009.rupeshdsr@student.xavier.ac.in	rajaramdesai04@gmail.com	salilgujar@outlook.com
Address	5th floor, Sunrise galaxy, Gupte road, Vishnu Nagar, Dombivili west 421202	382/A Shankar shett wadi, J.S.S. Road, Chirabazar, Mumbai-400002	Room no 5, V.B. kharat chawl, Hanuman Nagar, Bhandup West, Mumbai 400078	B/G-2 Sunrise Apartment, Amboli, Andheri west-400058

INSTRUCTIONS TO STUDENTS

1. The logbook must be submitted to the Guide or Co-Guide for verification and evaluation of project activities at least once in a week.

2. Log book duly signed by guide must be submitted with project report for evaluation at the end of semester to the department.

DECLARATION

I declare that this project represents my ideas in my own words without plagiarism and wherever others' ideas or words have been included, I have adequately cited and referenced the original sources.

I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my project work.

I promise to maintain minimum 75% attendance, as per the University of Mumbai norms. I understand that any violation of the above will be cause for disciplinary action by the Institute.

Yours Faithfully

1. _____

2. _____

3. _____

4. _____

(Date & Signature of Students)

MAJOR PROJECT-II SEMESTER VIII

Course code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
ITM801	Major Project - II	--	12	--	--	06	--	06

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Pract. / Oral	Total
		Internal Assessment			End Sem. Exam			
		Test 1	Test 2	Avg.				
ITM801	Major Project - II	--	--	--	--	100	50	150

Course Objectives

- To acquaint with the process of identifying the needs and converting it into the problem.
- To familiarize the process of solving the problem in a group.
- To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the problems.
- To inculcate the process of self-learning and research.

Course Outcome: Learner will be able to…

- Identify problems based on societal /research needs.
- Apply Knowledge and skill to solve societal problems in a group.
- Demonstrate project management principles and develop interpersonal skills to work as a member of a group or leader.
- Draw the proper inferences from available results through theoretical/ experimental/simulations and excel in written and oral communication.
- Identify problems and analyze the impact of solutions in societal and environmental context for sustainable development.
- Use standard norms of engineering practices to Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.

Guidelines for Major Project

- Students shall form a group of 3 to 4 students, while forming a group shall not be allowed less than three or more than four students, as it is a group activity.
- Students should do survey and identify needs, which shall be converted into problem statement for Major Project in consultation with faculty supervisor/head of department/internal committee of faculties.
- Students shall submit implementation plan in the form of Gantt/PERT/CPM chart, which will cover weekly activity of major Project-I and major project-II.
- A log book to be prepared by each group, wherein group can record weekly work progress, guide/supervisor can verify and record notes/comments.
- Faculty supervisor may give inputs to students during major Project-I & II activity; however, focus shall be on self-learning.
- Students in a group shall understand problem effectively, propose multiple solution and select best possible solution in consultation with guide/ supervisor.
- Students shall convert the best solution into working model using various components of their domain areas and demonstrate.
- The solution to be validated with proper justification and report to be compiled in standard format of University of Mumbai.
- With the focus on the self-learning, innovation, addressing societal problems and entrepreneurship quality development within the students through the Major Project, it is preferable that a single project of appropriate level and quality to be carried out in two semesters by all the groups of the students, i.e. Major Project-I in semester VII and Major Project-II in semesters VIII.
- However, based on the individual students or group capability, with the mentor's recommendations, if the proposed Major Project adhering to the qualitative aspects mentioned above gets completed in odd semester, then that group can be allowed to Scopus paper publications in Journal/Conference or motivate for Copyright or Indian Patent as an extension of the Major Project-1 with suitable improvements/modifications after testing and analysis in even semester. This policy can be adopted on case by case basis.

Guidelines for Assessment of Major Project:
Term Work

1. The review/ progress monitoring committee shall be constituted by head of departments of each institute. The progress of major project to be evaluated on continuous basis, minimum two reviews in each semester VII and VIII.
2. In continuous assessment focus shall also be on each individual student, assessment based on individual's contribution in group activity, their understanding and response to questions.
3. Distribution of Term work marks for both semesters shall be as below;
    i Marks awarded by guide/supervisor based on log book: 10
    ii Marks awarded by review committee: 10
    iii Quality of Project report: 05

Review/progress monitoring committee may consider following points for assessment based on either one-year major project as mentioned in general guidelines.
One-year project:

In semester VII entire theoretical solution shall be ready, including components/system selection and cost analysis, building of working prototype. Two reviews will be conducted based on presentation given by students group**.**

- First shall be for finalization of problem and proposed solution of the problem.
- Second shall be on readiness of working and testing of prototype to be conducted.

In semester VIII expected work shall be procurement of testing and validation of results based on work completed in an odd semester.

- First review is based on improvements in testing and validation results cum demonstration for publication to be conducted.
- Second review shall be based on paper presentation in conference/journal or copyright or Indian patent in last month of the said semester.

Assessment criteria of Major Project.

Major Project shall be assessed based on following criteria;

- Quality of survey/ need identification.
- Clarity of Problem definition based on need.
- Innovativeness in solutions.
- Feasibility of proposed problem solutions and selection of best solution.
- Cost effectiveness.
- Societal impact.
- Innovativeness.
- Cost effectiveness and Societal impact.

- Full functioning of working model as per stated requirements.
- Effective use of skill sets.
- Effective use of standard engineering norms.
- Contribution of an individual's as member or leader.
- Clarity in written and oral communication.

In one year, project, first semester evaluation may be based on first six criteria's and remaining may be used for second semester evaluation of performance of students in mini project.

Guidelines for Assessment of Major Project Practical/Oral Examination:

- Report should be prepared as per the guidelines issued by the University of Mumbai.
- Major Project shall be accessed through a presentation and demonstration of working model by the student project group to a panel of Internal and External Examiners preferably from industry or research organizations having experience of more than five years approved by head of Institution.
- Students shall be motivated to publish a paper based on the work in Scopus Conferences/Journals or copy right or Indian Patent.

Major Project shall be assessed based on following points;

1. Quality of problem and Clarity
2. Innovativeness in solutions
3. Cost effectiveness and Societal impact
4. Full functioning of working model as per stated requirements
5. Effective use of skill sets
6. Effective use of standard engineering norms
7. Contribution of an individual's as member or leader
8. Clarity in written and oral communication
9. Publications in Sem VII.

COURSE OUTCOMES

CO NO.	COURSE OUTCOME
CO1	Identify problems based on societal /research needs.
CO2	Apply Knowledge and skill to solve societal problems in a group.
CO3	Demonstrate project management principles and develop interpersonal skills to work as a member of a group or leader.
CO4	Draw the proper inferences from available results through theoretical/ experimental/simulations and excel in written and oral communication.
CO5	Identify problems and analyze the impact of solutions in societal and environmental context for sustainable development.
CO6	Use standard norms of engineering practices to Demonstrate capabilities of self learning in a group, which leads to lifelong learning

CO-PO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2														
CO3														
CO4														
CO5														
CO6														

TIME PLAN FOR SEMESTER VIII

Sr. No	Topic	Start (Date)	Finish (Date)	Jan	Feb	Mar	Apr
1.	Implementation - II	January 1	March 23	Yes	Yes	Yes	-
2.	Paper Publishing	March 28	April 7	-	-	Yes	Yes
3.	Black Book	April 4	April 19	-	-	-	Yes

SCHEDULE FOR MAJOR PROJECT

Date	Week	Contents	Remark	Guide Sign
14/01/2025	1	Set up base frontend for user interaction.	Design basic layout: video upload, results section.	
21/01/2025	2	Upload Interface & UI Components	Build file input with drag-and-drop.	
28/01/2025	3	FF++ Dataset Setup & Loader Development	Choose which versions to use (FaceSwap + Deepfake)	
04/02/2025	4	XceptionNet Model Training	Train on prepared data.	
11/02/2025	5	MesoNet Model Training	Compare training speed and accuracy to other models	
18/02/2025	6	ResNet Model Training	Log performance and compare with other models.	
25/02/2025	7	Model Evaluation	Determine best-performing model.	
11/03/2025	8	Inference Script Development	Run face detection and apply best model.	
25/03/2025	9	Final UI & UX Polish	Add helpful tooltips, progress bar	
012/04/2025	10	Paper, Black book, Poster, Logbook	Review and Submit to journal / conference or university.	

PROGRESS/ATTENDANCE REPORT

Title of the Project: Deep Fake Video Detection	
Group No. 01	Name of Student 1: Vedant Chaudhari
	Name of Student 2: Rupesh Darpe
	Name of Student 3: Rajaram Desai
	Name of Student 4: Salil Gujar
Name of the Supervisor/Guide: Dr. Jaychand Upadhyay	

Sr. No	**Date**	**Progress/Suggestion**				
		1	2	3	4	
1	14/01/2025					Set up base frontend for user interaction.
2	21/01/2025					Upload Interface & UI Components
3	28/01/2025					FF++ Dataset Setup & Loader Development
4	04/02/2025					XceptionNet Model Training
5	11/02/2025					MesoNet Model Training

6	18/02/2025					ResNet Model Training
7	25/02/2025					Model Evaluation
8	11/03/2025					Inference Script Development
9	25/03/2025					Final UI & UX Polish
10	12/04/2025					Paper, Black book, Poster, Logbook

Name, Date & Sign of the Supervisor/Guide

WEEKLY REPORT / DISCUSSION

Week 1: Frontend Setup (08/01/2025 – 14/01/2025)

- **Goal:** Set up base frontend for user interaction.
- **Tasks:**
    - Initialize frontend project (e.g., React).
    - Design basic layout: video upload + results section.
    - Create navigation and routing if needed.
    - Style with Tailwind or preferred CSS framework.

Week 2: Upload Interface & UI Components (15/01/2025 – 21/01/2025)

- **Goal:** Enable video upload and preview.
- **Tasks:**
    - Build file input with drag-and-drop.
    - Add video preview player.
    - Include placeholders for detection results.
    - Handle validation (e.g., file type, size limit).

Week 3: FF++ Dataset Setup & Loader Development (22/01/2025 – 28/01/2025)

- **Goal:** Set up the FF++ dataset for model input and build data pipeline.
- **Tasks:**
    - Explore FF++ metadata (labels, manipulation types, compression levels).
    - Choose which versions to use (e.g., c23 compressed, Deepfakes + FaceSwap only).

- Split preprocessed dataset into training, validation, and test sets.
- Implement efficient PyTorch or TensorFlow data loaders with proper labeling.
- Add shuffling, batching, and augmentation (if used during training).
- Validate data loading by visualizing samples and labels.

Week 4: XceptionNet Model Training (29/01/2025 – 04/02/2025)

- **Goal:** Train first deepfake detection model.
- **Tasks:**
  - Implement or fine-tune pretrained XceptionNet.
  - Set up training loop with accuracy/loss tracking.
  - Train on prepared data.
  - Save checkpoints and logs.

Week 5: MesoNet Model Training (05/02/2025 – 11/02/2025)

- **Goal:** Train lightweight detection model.
- **Tasks:**
  - Implement MesoNet architecture.
  - Train on same preprocessed data.
  - Compare training speed and accuracy to XceptionNet.
  - Save model weights and plots.

Week 6: ResNet Model Training (12/02/2025 – 18/02/2025)

- **Goal:** Train third model (ResNet-based).

- **Tasks:**
    - Use ResNet18 or ResNet50 architecture.
    - Run training with tuned hyperparameters.
    - Log performance and compare with other models.
    - Validate across unseen data.

Week 7: Model Evaluation (19/02/2025 – 25/02/2025)

- **Goal**: Evaluate and compare all trained models.
- **Tasks:**
    - Generate accuracy, precision, recall, F1 score.
    - Create ROC curves and confusion matrices.
    - Determine best-performing model.
    - Document comparative analysis.

Week 8: Inference Script Development (26/02/2025 – 04/03/2025)

- **Goal:** Build script to run detection on uploaded video.
- **Tasks:**
    - Extract frames from video input.
    - Run face detection and apply best model.
    - Aggregate predictions across frames.
    - Output final decision and confidence score.

Week 9: Final UI & UX Polish (05/03/2025 – 25/03/2025)

- **Goal:** Complete and polish the user interface.

- **Tasks:**
    - Add helpful tooltips, progress bar, dark mode.
    - Improve responsiveness and layout.
    - Allow result downloads/screenshots.
    - Prepare example videos for demonstration.

Week 10: Paper Documentation, Finalization and Submission (23/03/2025 – 12/04/2025)

- **Goal:** Complete and submit final report/paper.
- **Tasks:**
    - Add references and conclusion.
    - Review, proofread, and format.
    - Prepare appendix with sample results and images.
    - Submit to journal/conference or university.

LIST OF PAPERS/ LITERATURE REVIEWED

Sr. No	Detail of Paper Reviewed	Date of Review	Review Outcome	Guide's Signature and Date
1.	**Title:** Deepfake Attacks: Generation, Detection, Datasets, Challenges, and Research Directions **Author:** Amal Naitali, Mohammed Ridouani, Fatima Salahdine, Naima Kaabouch **Publication Year:** October 2023	August 5, 2024	The paper reviews detection methods like CNNs, attention mechanisms, and temporal analysis, focusing on challenges in generalization across datasets and real-time detection. GANs are used for deepfake generation, and datasets like FaceForensics, DFDC, and Celeb-DF are key to detection research. The outcome emphasizes the need for multi-modal and cross-dataset detection improvements to combat evolving deepfakes.	
2.	**Title:** FaceForensics++ Learning to Detect Manipulated Facial Images **Author:** Andreas Robler, Davide Cozzolino, Luisa Verdoliva, Christian Riess, Justus Thies, Matthias Niebner **Publication Year:** October 2019	August 10, 2024	The paper proposes a benchmark and dataset for detecting facial manipulations, significantly outperforming human observers in detection accuracy using CNNs. It focuses on detecting DeepFakes, Face2Face, FaceSwap, and NeuralTextures manipulations.	
3.	**Title:** Deepfakes Classification of Faces Using Convolutional Neural Networks **Author:** Jatin Sharma, Sahil Sharma, Vijay Kumar, Hany S. Hussein, Hammam Alshazly. **Publication Year:** June 2022	August 15, 2024	The proposed model achieved accuracies of 53.25%, and 88.63% on the three benchmark datasets. The ensemble model significantly improved performance, achieving accuracies of 75.79%,on the same datasets. The results indicate that the proposed models outperform existing models in deepfake detection	
4.	**Title:** A Novel Smart Deepfake Video Detection System **Author:** Marwa Elpeltagy, Aya Ismail, Kamal Eldahshan **Publication Year:** January 2023	August 20, 2024	This paper provides a strong foundation for developing an advanced deepfake detection system by leveraging multimodal analysis, deep learning, and temporal feature extraction techniques. By implementing the XceptionNet and InceptionResNetV2 models, incorporating GRU-based attention mechanisms, and fusing video and audio features, your project can achieve high detection accuracy and outperform traditional methods.	

5.	**Title:** A contemporary survey on deepfake detection: Datasets, algorithms, and challenges. **Author:** Gong, L.Y. and Li, X.J. **Publication Year:** 2024	August 25, 2024	The paper reviews the current state of deepfake detection technologies, highlighting concerns over their misuse and the challenges posed by increasingly sophisticated generation methods. It categorizes existing detection techniques, evaluates their performance, and proposes future research directions to improve efficacy and adaptability.	
6.	**Title:** A survey on deepfake video detection. **Author:** Yu P, Xia Z, Fei J et al **Publication Year:** June 2021	September 5, 2024	They covered the generation of deepfakes, methods for detecting them, and benchmarks for evaluating the performance of detection models. The research indicates that current detection approaches are insufficient for real-world scenarios. The survey highlights the need for detection methods that are efficient, adaptable, and resistant to deepfake manipulation techniques. The study concluded that current detection methods are inappropriate for real-time use and should focus on time efficiency, generalisation, and reliability.	
7.	**Title:** Deepfake Image Detection with Transfer Learning Models **Author:** Demir L. E., Canbay Y **Publication Year:** January 2025	March 2, 2025	The paper proposes an effective deepfake video detection system using models like MesoInceptionNet and XceptionNet, combined with tools like OpenCV and Dlib. It ensures high accuracy and accessibility through a web interface. The system not only tackles technical challenges but also addresses ethical concerns, making it a valuable contribution to media authenticity and digital safety.	

LIST OF PAPERS PUBLISHED

Sr.No	Title of the paper	Name of Periodical/ Conference	Organized/ Published by	Place and Date
1	"Deepfake Detection: A Comprehensive Review of Techniques and Challenges"	International Journal for Multidisciplinary Research	IJFMR	India, 28th March 2025
2				

XAVIER INSTITUTE OF ENGINEERING

External Examiner's Feedback Form – Major Project – II

1. Name of External examiner:
2. Name of Internal examiner:
3. Name of Subject (ITM801): Major Project – II
4. Project Title: Deep Fake Video Detection
5. Date of Examination: ___ / ___ / _____
6. No. of students in a Project Team: 4
7. Name of students in the Project Team: Vedant Chaudhari
   Rupesh Darpe
   Rajaram Desai
   Salil Gujar
8. Status of Current Project:

Table – I (For Fully Implemented Projects)

		Poor	Average	Good	V. Good	Excellent
8.1	Basic Analysis of the project					
8.2	Level of Literature survey					
8.3	Understanding of Actual Implementation					
8.4	Indignity of the Project & its application					
8.5	Understanding of the Future Modification , if any by the students					

Examiner's comments:

_____

_____

_____

Signature of Examiner