(418548 & 418556)

Fourth Year AIML Engineering

Year 2024 - 2025

Group/Project ID:

		0	**5**

Team Members:

1. Jadhav Abhijeet Digambar B400990138
2. Lokare Sakshi Pandurang B400990141
3. Shinde Priya Ravindra B400990149

Project Title: **"Deepfake video detection using Machine Learning"**

Project Guide: Prof. Nangare V.L.

Area of the Project: Machine Learning

Department of Artificial Intelligence and Machine Learning Engineering

Maharia Charitable Trust's

Sahyadri Valley College of Engineering and Technology,

Rajuri, Tal: Junnar, Dist: Pune, Pin code: 412411, Maharashtra, (India)

UNDERTAKING BY STUDENT

We, the students of B.E. AIML hereby assure that we will follow all the rules and regulations related to project activity for the academic year 2024-2025.The Project entitled- **"Deepfake Detection Using Machine Learning"**

will be fully designed/ developed by us and every part of the project will be original work and will not be copied/ purchased from any source.

Name of the student	**Signature**
1. Jadhav Abhijeet Digambar	_____
2. Lokare Sakshi Pandurang	_____
3. Shinde Priya Ravindra	_____

Project Review (Semester I)

The group members are expected to present their work undertaken during the semester. Journey of development has to be rationally presented with thorough literature survey.

Project Review-I: Problem Statement, Motivation, objectives and Literature Review:

Student is expected to deliver presentation covering Problem Statement, Motivation, objectives and Literature Review.

Sr. No.	Question	Date	Remark / Grade	Sign of Guide
1)	Does the statement give clear identification about what your project will accomplish?	16-07-2024	Yes, problem statement is clearly defined and focused on deepfake detection using ML techniques.	
2)	Is the statement short and concise?	22-07-2024	Yes, statement is precise and highlights core goal.	
3)	Can a person who is not familiar with the project understand scope of the project by reading project problem statement?	29-07-2024	Yes, the scope is easy to understand for a general reader.	
4)	The project's objectives of study (what product, process, resource etc.) are being addressed?	07-08-2025	Objectives are clearly defined and aligned with system goals.	
5)	Is similar type of methodology / model used for existing work?	14-08-2024	Yes, CNN-LSTM-based models are common, but explainable AI adds uniqueness.	
6)	Is the studied literature sufficient to decide scope of the project?	22-08-2024	Yes, literature review is extensive and covers current trends and gaps.	
7)	Are the objectives set will help to achieve goal of the project?	04-09-2024	Yes, objectives are well-structured and support achieving the project goal.	
8)	Does Research gap identified will lead to find motivation of project?	13-09-2024	Yes, research gap is clearly identified and drives the motivation.	

9)	Does your project contribute to us society by any means and will lead to find motivation?	23-09-2024	Yes, helps in preventing misinformation and video fraud, hence socially beneficial.	
10)	Are the objectives clearly and unambiguously listed?	30-09-2024	Yes, listed in a clear and structured manner.	

Remark and Suggestions:

The project is well planned and progressing smoothly. The problem statement and objectives are clear and easy to understand. The literature review and methodology are appropriate for solving the problem. The students have identified the research gap and explained the usefulness of the project to society. Overall, the project work is going in the right direction.

Name and Sign of Reviewers:

1. Prof. Nangare V.L.

Project Review-II: Feasibility and Scope

Student is expected to deliver presentation covering Feasibility and Scope

Sr. No.	Question	Date	Remark / Grade	Sign of Guide
1)	Is the project's view point is understood?	10-10-2024	Yes, the viewpoint is well understood and clearly stated.	
2)	Is the project goal statement is in alignment with the sponsoring organization's business goal and mission?	15-10-2024	Yes, it aligns with goals related to digital security and content verification.	
3)	Who is the project's end user?	20-10-2024	Media companies, content platforms, and general public.	
4)	What is the projected cost of producing a product?	25-10-2024	Mainly involves software resources; minimal financial cost due to open-source tools.	
5)	Is project achievable in specified (Time, Cost Budget)?	30-10-2024	Yes, project is achievable within academic timeframe and resource limits.	
6)	Are the requirements within the scope of the project?	05-11-2024	Yes, requirements are realistic and well-defined.	
7)	Is the scope properly defined?	10-11-2024	Yes, the scope is clearly defined and focused.	
8)	Does the problem statement clearly define scope ofthe project?	15-11-2024	Yes, it gives a clear understanding of what will be done.	
9)	Do the project requirements fit into available software and hardware?	20-11-2024	Yes, compatible with available tools and system configuration.	
10)	Whether the milestones are stated completely and project timeline is given?	25-11-2024	Yes, milestones and timeline are planned stage-wise.	

11)	Whether risks like technical risks, Operational risks, schedule risks, business risks are identified correctly or not?	30-11-2024	Yes, key risks are identified and considered.	
12)	Whether Risk prioritization is done properly or not and any back up plan is there or not?	05-12-2024	Yes, risk handling strategies and backup options are included.	

Remark and Suggestions:

The project scope, timeline, and risks are well understood and documented. All requirements are achievable within the time and budget. Risk planning is also considered. The team has shown good planning and clarity in understanding the project's direction and end goals.

Name and Sign of Reviewers:

1. Prof. Nangare V. L.

Project Review-III: Requirement Analysis

Student is expected to deliver presentation covering Requirement Analysis

Sr. No.	Question	Date	Remark / Grade	Sign of Guide
1)	Is information domain analysis complete, consistent and accurate?	10-12-2024	Yes, all important areas of the project are studied and explained properly.	
2)	Is problem statement categorized in identified area and targeted towards specific area there in?	13-12-2024	Yes, the project is focused on deepfake video detection using machine learning.	
3)	Is external and internal interfacing properly defined?	17-12-2024	Yes, how users and system parts connect is clearly mentioned.	
4)	Is requirement consistent with schedule, resources and budget?	20-12-2024	Yes, project is planned according to time, tools, and resources.	
5)	Are all requirements traceable to system level?	23-12-2024	Yes, each requirement is linked to a system function.	
6)	What is needed to make the product?	26-12-2025	Python, Django, datasets, LSTM/CNN models, & system with GPU.	
7)	Is there a demand for the produce?	28-12-2024	Yes, fake video detection is useful for the public & media.	
8)	Is identification of stakeholders is done properly?	30-12-2024	Yes, like users, media companies, & authorities.	
9)	Whether all requirements are captured and documented in line with scope?	02-01-2025	Yes, everything needed is listed and matches the project scope.	
10)	Whether all type of analysis classes is identified or not?	05-01-2025	Yes, classes like user, admin, and detection modules are added.	
11)	Whether the Acceptance criteria is decided are not?	08-01-2025	Yes, project success is based on correct detection and accuracy.	

Remark and Suggestions:

All the project needs and system details are well planned. The team has listed what is needed, who will use it, and how it will work. The project is on the right track and well organized.

Name and Sign of Reviewers:

Prof. Nangare V. L.

Project Review-IV: Design

Student is expected to deliver presentation covering Design

Sr. No.	Question	Date	Remark / Grade	Sign of Guide
1)	Are requirement reflected in the system architecture?	12-01-2025	Yes, all major requirement is covered in the architecture.	
2)	Does the design support both project (product) and project goals?	14-01-2025	Yes, design aligns well with goals and functionality.	
3)	Does the design address all the issues form the requirement?	16-01-2025	Yes, requirements are considered during design.	
4)	Is effective modularity achieved and modules are functionally independent?	18-01-2025	Yes, modules are well-separated and independent.	
5)	Are structural diagrams (class, Object, etc) are well defined?	20-01-2025	Yes, diagrams are complete and clear.	
6)	Are all class associations clearly defined and understood? (Is it cleat which classes provide which services)?	22-01-2025	Yes, class responsibilities and links are shown.	
7)	Are the classes in the class diagram clear? (What they represent in the architecture design document?)	24-01-2025	Yes, class names and roles are meaningful.	
8)	Is inheritance appropriately used?	26-01-2025	Yes, inheritance is used logically.	
9)	Are the multiplicities in the use case diagram depicted in the class diagram?	28-01-2025	Yes, multiplicities are shown and match.	
10)	Are all objects used in sequence diagram?	30-01-2025	Yes, all relevant objects are used properly.	
11)	Are the symbols used in all diagrams corresponding to UML standards?	01-02-2025	Yes, standard UML notations are used.	
12)	Are behavioral diagrams (use case, sequence, activity, etc.) well defined and understood?	03-02-2025	Yes, diagrams are clear and easy to follow.	
13)	Does each case have clearly defined actors and input/ output?	05-02-2025	Yes, all actors and flows are shown.	

14)	Does the sequence diagram matches with class diagram?	07-02-2025	Yes, both diagrams are consistent.	
15)	Is aggregation/ containment (used) clearly defined and understood?	09-02-2025	Yes, relationships are properly shown.	
16)	Whether State charts are capturing system's dynamic behavior correctly or not?	11-02-2025	Yes, state transitions are well represented.	
17)	Related to procedural thinking whether DFDs and CFDs along with transaction and transformation flow are done correctly or not?	13-02-2025	Yes, data flows and process logic are properly shown.	

Remark and Suggestions:

- All design diagrams are made correctly using proper UML symbols.
- The system is divided into clear and independent modules.
- Class relationships like inheritance and aggregation are shown properly.
- Sequence and class diagrams match each other.
- State charts and data flow diagrams explain the system behavior well.

Name and Sign of Reviewers:

1. Prof. Nangare V.L.

Internal Evaluation Sheet (Semester I)

Sr. No.	Names(s) of the student in the project group	Problem Statement/ Motivation/ Objectives/ Scope / Feasibility Requirement (05)	Literature Survey (05)	Requirement Analysis (05) Modelling & Designing (10)	Planning & Prototyping (05)	Presentation & Question Answer (10)	Partial project Report (10)	Total (50)
1.	Jadhav Abhijeet Digambar							
2.	Lokare Sakshi Pandurang							
3.	Shinde Priya Ravindra							

Name and Signature of Evaluation Committee:

1. Prof. Nangare V.L.

Examiners Feedback and Suggestion:

Signature of Guide

Signature of Head of Department

[Prof. Khemnar K. C.]

Project Review: (Semester II)

The group members are expected to present their work undertaken during the semester. Journey of development has to be rationally presented.

Project Review-I: Modeling (Model Refinement and Algorithm development)

Sr. No.	Question	Date	Remark/ Grade	Sign of Guide
1)	Which software Development Process model is used? (Water fall, Incremental, RAD) How? (at this level?)	15-02-2025	Incremental model is used. Each part like data collection, model training, and UI was done step-by-step.	
2)	Do you clearly identify data objects, their attributes and relationships? (All constraints for SRS are captured or not?)	17-02-2025	Yes, objects like user, video, result are defined with their attributes.	
3)	Have you clearly matched the objects with respective classes and their responsibilities?	19-02-2025	Yes, object responsibilities are mapped to the correct classes.	
4)	Have you analyzed the requirements and represented them into respective models?	21-02-2025	Yes, requirements are shown using class, use case, and sequence diagrams.	
5)	Can you differentiate between different system states and depict them in the form of state transition diagram?	23-02-2025	Yes, system states like upload, processing, detection, and result are shown.	
6)	Does the mathematical model clearly imply design of the project?	25-02-2025	Yes, the model explains how data flows and prediction happen.	
7)	Does the mathematical model clearly state goal of project?	27-02-2025	Yes, the goal of detecting deepfakes is clearly described.	
8)	Does the interface between the modules properly identified?	29-02-2025	Yes, data moves clearly between modules like input, detection, and output.	
9)	Does any functional dependencies are identified and described?	03-03-2025	Yes, modules depend on correct input and data preprocessing.	
10)	Which architectural model does your system supports?	05-03-2025	The system supports layered architecture (data layer, model layer, UI layer).	

11)	Whether Deployment diagram is in line with selected architecture?	07-03-2025	Yes, deployment matches architecture structure.	
12)	Whether all components are designed properly and represented in component diagram?	09-03-2025	Yes, components are well defined and shown correctly.	
13)	Whether NP-completeness of algorithms is checked or not?	11-03-2025	Not applicable, as deep learning models are used instead of algorithms needing NP-completeness.	

Remark and Suggestions:

- Software model, system design, and flow are clear and correct.
- All diagrams and modules are properly matched with the system needs.
- Mathematical and architectural models are used properly.
- Good understanding of system states, modules, and class responsibilities.

Name and Sign of Reviewers:

1. Prof. Nangare V.L.

Project Review-II: Coding / Implementation

Student is expected to deliver presentation covering Coding / Implementation

Sr. No.	Question	Date	Remark/ Grade	Sign of Guide
1)	Does the code completely and correctly implement the design?	15-03-2025	Yes, the code matches the system design and functionality.	
2)	Does the code comply with the coding standard?	17-03-2025	Yes, coding rules and naming conventions are followed.	
3)	Is the code well structured, consistent in style, and consistently formatted?	19-03-2025	Yes, code is neat, readable, and properly organized.	
4)	Are all functions in the design coded?	21-03-2025	Yes, all functions are written and tested.	
5)	Does the code make use of object-oriented concepts?	23-03-2025	Yes, concepts like classes, inheritance, & objects are used.	
6)	Does the code support granularity?	25-03-2025	Yes, code is divided into small functions and modules.	
7)	Does the language used for coding is Correctly chosen as per the project need?	27-03-2025	Yes, Python is used as it is suitable for machine learning tasks.	
8)	If any off the shelf components are used, have you understood the functionalities of using it?	29-03-2025	Yes, libraries like OpenCV, PyTorch, and Grad-CAM are well understood.	
9)	Are all comments consistent with the code?	31-03-2025	Yes, comments are written clearly and match the code logic.	
10)	Whether code optimization is done properly or not? (By using language features)	02-04-2025	Yes, features like efficient loops and functions are used to optimize code.	

Remark and Suggestions:

- Code is written as per the project design and functions properly.
- Proper coding standards and formatting are followed.
- Object-oriented concepts are used well.
- External libraries are used correctly with a good understanding.

Name and Sign of Reviewers:

1. Prof. Nangare V.L.

Project Review-III: Validation and Testing

Student is expected to deliver presentation covering Validation and Testing

Sr. No.	Question	Date	Remark/ Grade	Sign of Guide
1)	Have you done alpha testing?	05-04-2025	Yes, internal testing was done by team members to fix bugs.	
2)	Have you done beta testing?	07-04-2025	Yes, testing was done by outside users for feedback.	
3)	Have you validated the requirements, design and code as per standard?	09-04-2025	Yes, all parts were checked and matched with planned design.	
4)	Have you performed GUI testing of project? How?	11-04-2025	Yes, tested web interface using different inputs and user cases.	
5)	Does your system comply with basic usability norms?	13-04-2025	Yes, the UI is simple and easy to use for any user.	
6)	Have you tested the code using standard datasets available in your area of project?	15-04-2025	Yes, tested using FaceForensics++, DFDC, and Celeb-DF datasets.	
7)	Have you tested the code in real time environment?	17-04-2025	Yes, real-time deepfake videos were tested using the web app.	
8)	After integration of all components whether total performance of system is checked or not?	19-04-2025	Yes, full system was tested and works as expected.	
9)	Whether repository of all components along with versions is documented or not?	21-04-2025	Yes, all files and version history are saved and documented.	

Remark and Suggestions:

- All types of testing like alpha, beta, and GUI are completed.
- System was tested with standard datasets and real-time videos.
- User interface is simple and follows usability standards.
- Project testing is complete and the system performs well.

Name and Sign of Reviewers:

1. Prof. Nangare V.L.

Project Review-III: Report Writing

Student is expected to deliver presentation covering Report Writing

Sr. No.	Question	Date	Remark/ Grade	Sign of Guide
1)	Is the report written as per the prescribed format?	25-04-2025	Yes, the report follows the given college format.	
2)	Is the report timely prepared?	26-04-2025	Yes, the report was completed and submitted on time.	
3)	Is the report properly organized, spelled, grammatically, correct?	27-04-2025	Yes, it is well-organized and carefully written.	
4)	Is the report plagiarism free?	28-04-2025	Yes, the report is original and plagiarism free.	
5)	Is the report precise and written to the point?	29-04-2025	Yes, it is short, clear, and focused on the main topic.	
6)	Is the report contains complete results and comparative graphs?	30-04-2025	Yes, it includes results and related graphs.	
7)	Are all figures and tables properly numbered and labeled?	01-05-2025	Yes, all diagrams and tables are numbered correctly.	
8)	Are all figures and tables properly cited?	02-05-2025	Yes, all visuals are cited in the content.	
9)	Weather references are properly cited?	03-05-2025	Yes, references are included in correct format.	

Remark and Suggestions:

- Report is complete, well-formatted, and submitted on time.
- Language and structure are correct and easy to understand.
- Results, figures, and graphs are included and labeled properly.
- Report is original and all references are cited correctly.

Name and Sign of Reviewers:

1. Prof. Nangare V.L.

Internal Evaluation Sheet (Semester II)

Sr. No.	Names(s) of the student in the project group	Problem Statement/ Motivation/ Objectives/ Scope / Feasibility Requirement (05)	Literature Survey (05)	Requirement Analysis (05) Modelling & Designing (10)	Planning & Prototyping (05)	Presentation & Question Answer (10)	Partial project Report (10)	Total (50)
1.	Jadhav Abhijeet Digambar							
2.	Lokare Sakshi Pandurang							
3.	Shinde Priya Ravindra							

Name and Signature of Evaluation Committee:

1. Prof. Nangare V.L.

Examiners Feedback and Suggestion:

Signature of Guide

Signature of Head of Department

[Prof. Khemnar K. C.]

Contest Participation Details.

A. Paper Publication/ Presentation/IPR

Sr. No.	Name of Organizer	Date	Certificates/ Prizes won if any
1.	**INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN SCIENCE, COMMUNICATION AND TECHNOLOGY**	March 2025	Certificates
2.	**INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT (IJSREM)**	April - 2025	Certificates


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Rubrics

A. Idea Inception

Grade (Grade Point)	Excellent (10-9)	Very Good (6-8)	Fair (3-5)	Poor (1-2)
Parameter				
Problem Definition and Scope of the Project				
Literature Survey				
Software Engineering Approach				
Requirement Analysis				

B. Implementation:

Grade (Grade Point)	Excellent (10-9)	Very Good (6-8)	Fair (3-5)	Poor (1-2)
Parameter				
Implementation- Design, platform, coding,				
Optimization considerations (Memory, time, Resources, Costing)				
Thorough Testing of all modules				
Integration of modules and project as whole				

C. Documents:

Grade (Grade Point)	Excellent (10-9)	Very Good (6-8)	Fair (3-5)	Poor (1-2)
Parameter				
Synopsis				
Project Report				
Quick references				
System manual				
Installation Guide				
Work Book				

D. Demonstration:

Grade (Grade Point)	Excellent (10-9)	Very Good (6-8)	Fair (3-5)	Poor (1-2)
Parameter				
Project Presentation and Demonstration (User Interface, ease of use, usability)				
Understanding individual capacity & involvement in the project				
Team Work (Distribution of work, intra-team communication and togetherness)				
Outcomes / Usability				

E. Contest Participation / Awards, Publications and IPR:

Grade (Grade Point)	Excellent (10-9)	Very Good (6-8)	Fair (3-5)	Poor (1-2)
Parameter				
Participation in various contests				
Appreciation and Awards				
Publications				
Copyright				
Patent				
Commercial value /product conversion of Work				

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2. FaceForensics++ Dataset. Available at: https://github.com/ondyari/FaceForensics
3. DFDC Dataset (Deepfake Detection Challenge). Available at: https://www.kaggle.com/c/deepfake-detection-challenge