

A Mini Project Report on

Signature Analyser and Attendance Management System

T.E. - I.T Engineering

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Academic year : 2022-23

CERTIFICATE

This to certify that the Mini Project report on **Odin: Signature Analyser and Attendance Management System** has been submitted by Devanshu Mahapatra (20104036), Athul Nair (20104048) and Subhashish Mahapatra (20104049) who are a Bonafide students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfilment of the requirement for the degree in **Information Technology**, during the academic year **2022-2023** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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ACKNOWLEDGEMENT

This project would not have come to fruition without the invaluable help of our guide Prof. Jayshree Jha. Expressing gratitude towards our HoD, **Prof. Kiran Deshpande**, and the Department of Information Technology for providing us with the opportunity as well as the support required to pursue this project. We would also like to thank our teacher Ms. Yaminee Patil who gave us her valuable suggestions and ideas when we were in need of them. We would also like to thank our peers for their helpful suggestions.

ABSTRACT

Signature Analyser and Attendance Management System is a Machine Learning Model that is designed to automate the process of attendance management and signature verification for an educational institute or an organization. This system has the capability of verifying signatures on documents, attendance of students or employees, and generating reports. The system is designed to be used in various organizations such as schools, colleges, and corporate organizations. It can be used by teachers, professors, HR managers, and administrators to manage attendance and verify signatures. The system can be used to monitor the attendance patterns of individual students or employees and identify potential issues or trends.

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CHAPTER 1

Introduction

Attendance tracking and management is an essential task for any organization, irrespective of its size. Inefficient attendance management can lead to low productivity, poor performance, and financial loss. Traditionally, organizations use attendance sheets, which are passed around the employees to sign in their attendance. However, this method is prone to errors, fraudulent activities, and consumes a lot of time for data entry, verification, and analysis. Hence, organizations are increasingly adopting digital solutions to streamline their attendance management process. One such solution is the Signature Analyser and Attendance Management System.

The Signature Analyser and Attendance Management System is a comprehensive software application that leverages cutting-edge technology to capture signatures and biometric data in real-time, allowing for accurate and efficient tracking of employee attendance. In this report, we will provide an in-depth overview of the system, including its key features, benefits, potential use cases, and a comparative analysis of other attendance management solutions.

The Signature Analyser and Attendance Management System is a comprehensive software application designed to streamline attendance tracking and management for organizations of all sizes. The system utilizes cutting-edge technology to capture signatures and biometric data in real-time, allowing for accurate and efficient tracking of employee attendance.

With its user-friendly interface, the Signature Analyser and Attendance Management System simplifies the process of managing attendance records, reducing the administrative burden on HR departments and managers. The system provides real-time insights into attendance patterns, allowing organizations to identify and address issues such as tardiness and absenteeism.

This report provides a detailed overview of the Signature Analyser and Attendance Management System, including its key features, benefits, and potential use cases. It also discusses the current market landscape for attendance management systems and provides a comparative analysis of other solutions available in the market. Additionally, the report includes a comprehensive cost-benefit analysis to help organizations assess the ROI of implementing the system.

CHAPTER 1.1

Purpose

The purpose of this report is to provide a comprehensive understanding of the Signature Analyser and Attendance Management System, its features, benefits, and potential use cases. The report aims to assist organizations in evaluating the system as a potential solution for their attendance tracking and management needs.

The report will also provide a comparative analysis of other attendance management systems available in the market, highlighting the unique features and capabilities of the Signature Analyser and Attendance Management System. Additionally, the report will include a cost-benefit analysis to help organizations assess the potential return on investment of implementing the system.

Overall, the report will provide valuable insights into the use of the Signature Analyser and Attendance Management System, its potential impact on organizational productivity and efficiency, and its ability to provide real-time attendance insights that can help organizations make data-driven decisions.

CHAPTER 1.2

PROBLEM STATEMENT

Attendance tracking and management is an essential task for any organization, irrespective of its size. Inefficient attendance management can lead to low productivity, poor performance, and financial loss. Traditionally, organizations use attendance sheets, which are passed around the employees to sign in their attendance. However, this method is prone to errors, fraudulent activities, and consumes a lot of time for data entry, verification, and analysis. Hence, organizations are increasingly adopting digital solutions to streamline their attendance management process. One such solution is the Signature Analyser and Attendance Management System.

The traditional system of taking attendance by passing around an attendance sheet for students to sign is inefficient and prone to errors. With lecturers having limited time to check each signature, it becomes difficult to accurately track attendance. This leads to a need for an automated system that can efficiently manage attendance and verify signatures, ensuring that all students are accounted for. The development of ODIN is therefore necessary to address these issues and improve attendance management in educational institutions or organizations.

CHAPTER 1.3

OBJECTIVE

- To create a system that is efficient and fast for attendance management
- To provide the user with a platform where they can manage attendance and signature verification in a more streamlined and effective way.
- To save time and reduce workload for teachers and administrators by automating attendance management and signature verification.
- To reduce the risk of fraud by using advanced technologies such as image processing and machine learning for signature verification.
- To capture employee signatures and biometric data in real-time, ensuring accurate attendance tracking.
- To develop a user-friendly interface that simplifies the process of managing attendance records, reducing the administrative burden on HR departments and managers.
- To generate automated reports that provide insights into attendance patterns, allowing organizations to identify and address issues such as tardiness and absenteeism.
- To provide customizable dashboards that allow organizations to monitor attendance trends, analyze employee performance, and make data-driven decisions.
- To support multi-factor authentication, including fingerprints and facial recognition, ensuring that attendance records are accurate and tamper-proof.

CHAPTER 1.4

SCOPE

- Attendance Tracking: The system will track employee attendance through real-time capture of signatures and biometric data, ensuring accurate attendance records.
- User-friendly Interface: The system will have a user-friendly interface that simplifies attendance management and reduces administrative burden.
- Automated Reporting: The system will generate automated reports that provide real-time insights into attendance patterns, allowing organizations to identify and address attendance-related issues.
- Customizable Dashboards: The system will provide customizable dashboards that allow organizations to monitor attendance trends, analyze employee performance, and make data-driven decisions.
- Multi-factor Authentication: The system will support multi-factor authentication, including fingerprints and facial recognition, ensuring that attendance records are accurate and tamper-proof.
- Integration: The system will integrate with other HR systems, such as payroll, to streamline processes and reduce manual data entry.
- Flexibility: The system will be flexible to cater to the unique needs of different organizations, such as support for multiple locations and shift patterns.
- Security: The system will ensure data security and privacy by adhering to industry-standard security protocols and encryption.
- Technical Support: The system will offer technical support to organizations to ensure seamless operation and minimal downtime.
- Training: The system will provide training to users to ensure effective utilization and adoption of the system.

CHAPTER 2

LITERATURE SURVEY

Sr.no	Title	Author(s)	Year	Outcomes	Methodology
1	ODIN Signature Analyser and Attendance Management System.	Subhashish Mahapatra, Athul Nair, Devanshu Mahapatra	2023	The proposed system is designed to automate the process of attendance management and signature verification for an educational institute	The attendance management system proposed uses Streamlit for frontend and Python, along with TensorFlow, Keras, OpenCV, NumPy, VGG16, and Scikit for the backend. It makes use of CNN algorithm.
2	Machine learning for signature verification	Harish S. Sargur N. Mathew B.	2021	The paper aims to address the problem of imbalanced datasets by using transfer learning and multiple data augmentations to improve the performance of the system. The deep learning-based methods have shown promising results in this field.	Transfer Learning, Data Augmentation
3	A Review of Signature Recognition Using Machine Learning	Elizabeth Ann Soelistio Rafael Edwin-Hananto Kusumo Zevira Martan Edy Irawansyah	2021	also been proposed for individual signature detection. These methods use bounding and cropping as a pre-processing step to extract individual signatures from the document.	Bounding and cropping as pre-processing steps, CNN Transfer Learning, Data Augmentation

CHAPTER 3

PROPOSED SYSTEM

- User Interface: The system will have a user-friendly web-based interface that allows users to easily upload and manage attendance records and other important documents.
- Signature Verification Module: The system will use advanced image processing and machine learning techniques to verify the authenticity of signatures on documents, ensuring that they are not forged or tampered with.
- Attendance Management Module: The system will provide a comprehensive attendance management module that allows organizations to track the attendance of students or employees, including their clock-in and clock-out times, leave requests, and other related information.
- Reporting and Analytics Module: The system will generate comprehensive reports and analytics that can be used for decision-making and analysis purposes. These reports will be customizable and can be tailored to meet the specific requirements of each organization.
- Security and Privacy Module: The system will ensure the security and privacy of all data stored within it. It will use industry-standard security protocols and encryption to protect sensitive information and prevent unauthorized access.
- Customization and Integration Module: The system will be fully customizable and can be integrated with other systems as required. This will allow organizations to tailor the system to meet their unique needs and requirements.
- Training and Support Module: The system will provide training and support to users to ensure effective utilization and adoption of the system. This will include user manuals, training videos, and other materials that can be accessed online.

CHAPTER 3.1

FEATURES AND FUNCTIONALITY

The Signature Analyzer and Attendance Management System will bring a lot of benefits to the user. It will reduce the time and effort required to manage attendance and verify signatures. It will also reduce the errors and increase the accuracy of the data.

- The use of image processing and machine learning techniques for signature verification will improve the security of important documents and prevent fraud.
- The system will generate comprehensive reports that can be used for decision-making, analysis and other purposes.
- The system will reduce the risk of unauthorized access to sensitive data and provide a range of security features to protect data.
- The system will be customizable to meet the specific requirements of each organization, providing a tailored solution.
- The system will be able to detect between fake and real signatures.

CHAPTER 4

Requirements Analysis

Requirement Analysis for the proposed Signature Analyser and Attendance Management System:

Functional Requirements:

- The system should be able to capture and store attendance data for students or employees.
- The system should allow users to upload and manage attendance records and other important documents.
- The system should use advanced image processing and machine learning techniques to verify the authenticity of signatures on documents.
- The system should generate automated reports that provide real-time insights into attendance patterns.
- The system should integrate with other HR systems, such as payroll.
- The system should be customizable and scalable to meet the specific needs of each organization.

Non-Functional Requirements:

- The system should be user-friendly and easy to use.
- The system should ensure data security and privacy by adhering to industry-standard security protocols and encryption.
- The system should support multi-factor authentication, including fingerprints and facial recognition.
- The system should have a high level of reliability and availability.
- The system should be responsive and have a fast processing time.
- The system should be accessible from multiple devices and platforms.

Performance Requirements:

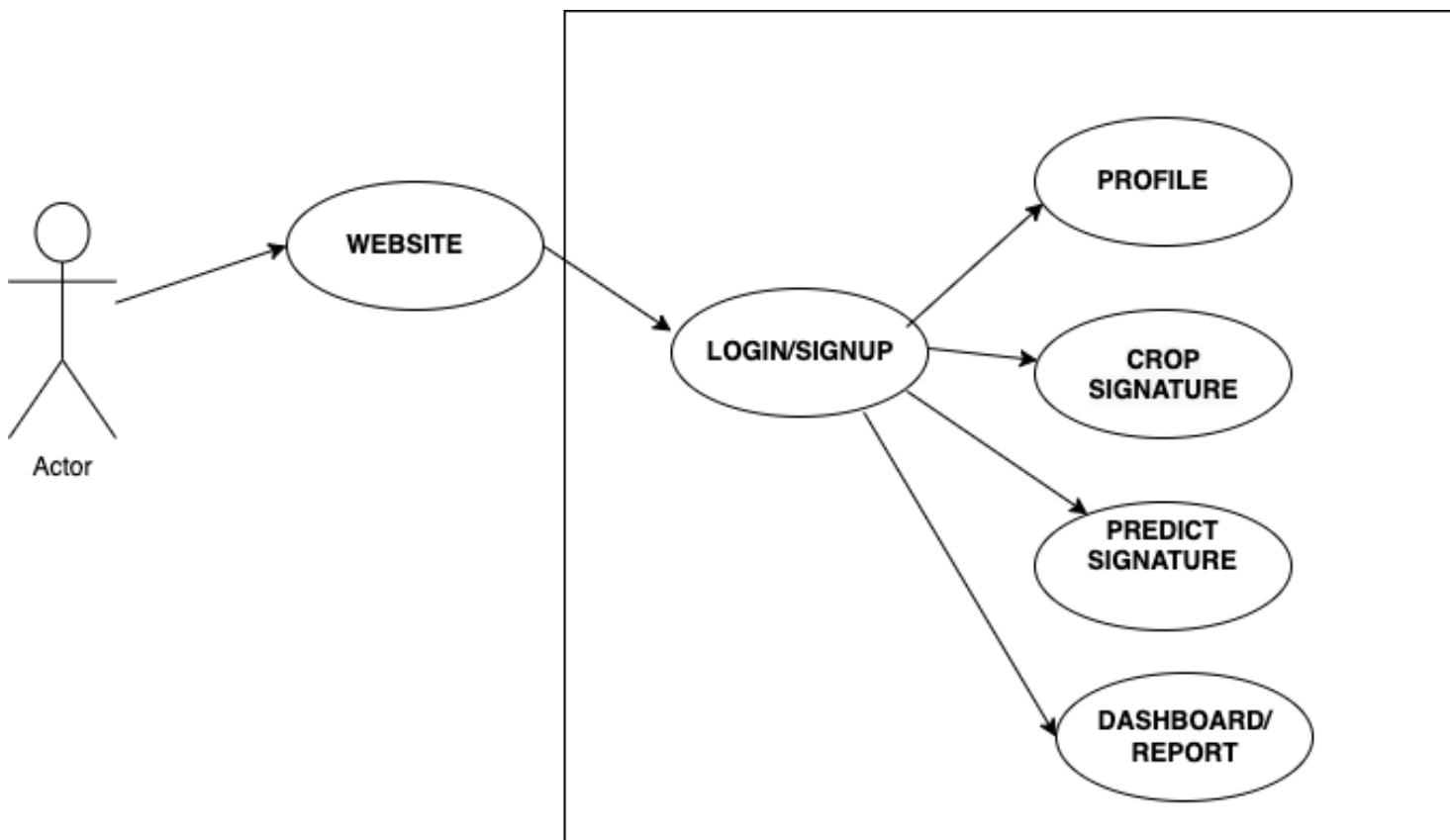
- The system should be able to handle a large number of users and attendance records.
- The system should have a fast response time to ensure real-time attendance tracking.
- The system should have a high level of availability and reliability to ensure uninterrupted access.

- The system should have a user-friendly web-based interface that is easy to navigate.

CHAPTER 5

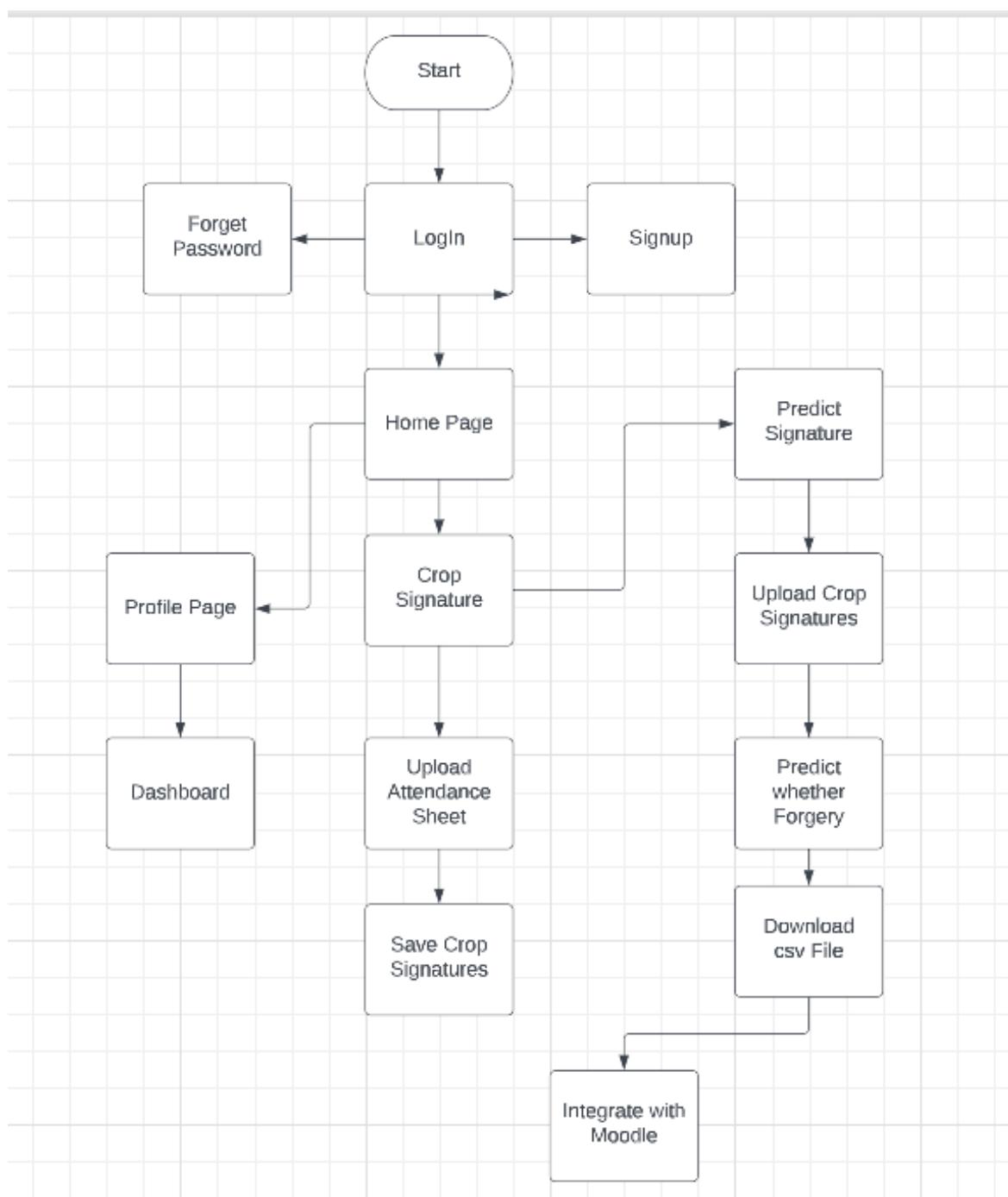
CHAPTER 5.1

Use Case Diagram



CHAPTER 5.2

SYSTEM ARCHITECTURE:



CHAPTER 6

TECHNICAL SPECIFICATION

Frontend: Streamlit

Backend:

1. Python
2. Tensorflow
3. Keras
4. OpenCV
5. NumPy
6. VGG16
7. Scikit

Chapter 7

Project Scheduling

Project Scheduling Template

Sr.no	Group members	Time Duration	Work to be done
1	Devanshu Mahapatra Athul Nair Subhashish Mahapatra	3 rd and 4 th week of January.	Topic finalization and requirements gathering.
2	Devanshu Mahapatra Athul Nair Subhashish Mahapatra	1 st and 2 nd week of February.	Data Preprocessing and Cleaning
3	Devanshu Mahapatra Athul Nair Subhashish Mahapatra	End of February and 1 st week of March.	Developing the Deep Learning Model
4	Devanshu Mahapatra Athul Nair Subhashish Mahapatra	By the end of March.	Final testing and resolving issues if any.

Chapter 8

Implementation:

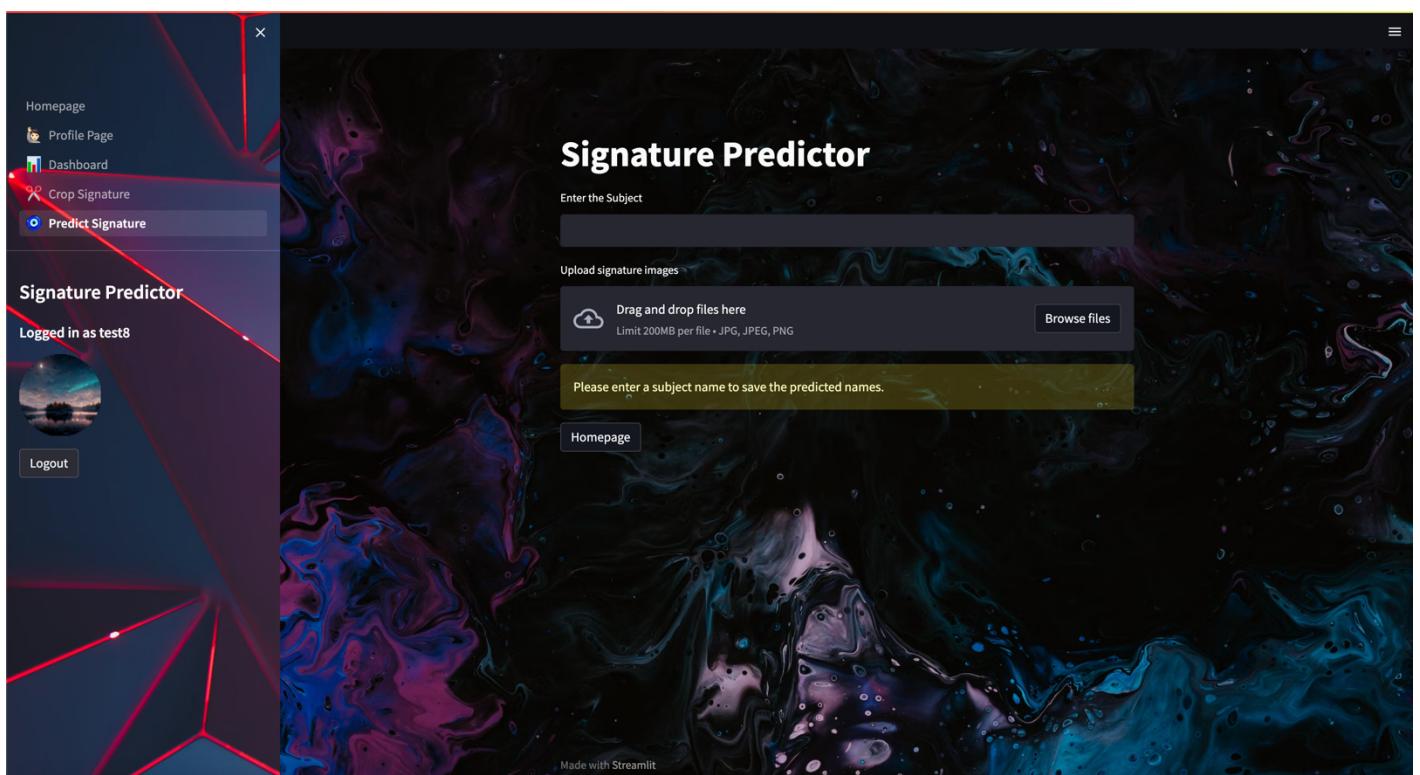
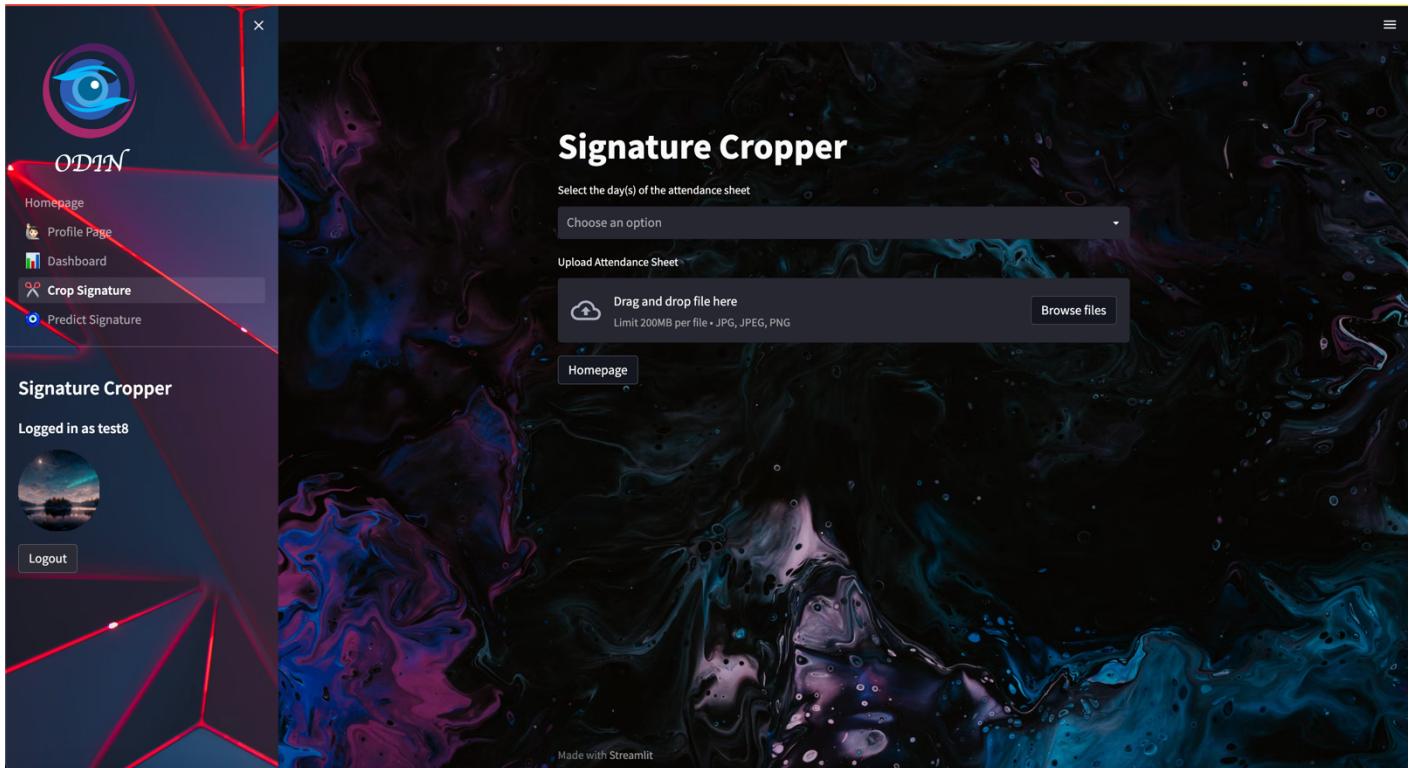
The image displays two screenshots of the ODIN web application, showcasing its implementation. Both screenshots feature a dark theme with a marbled background.

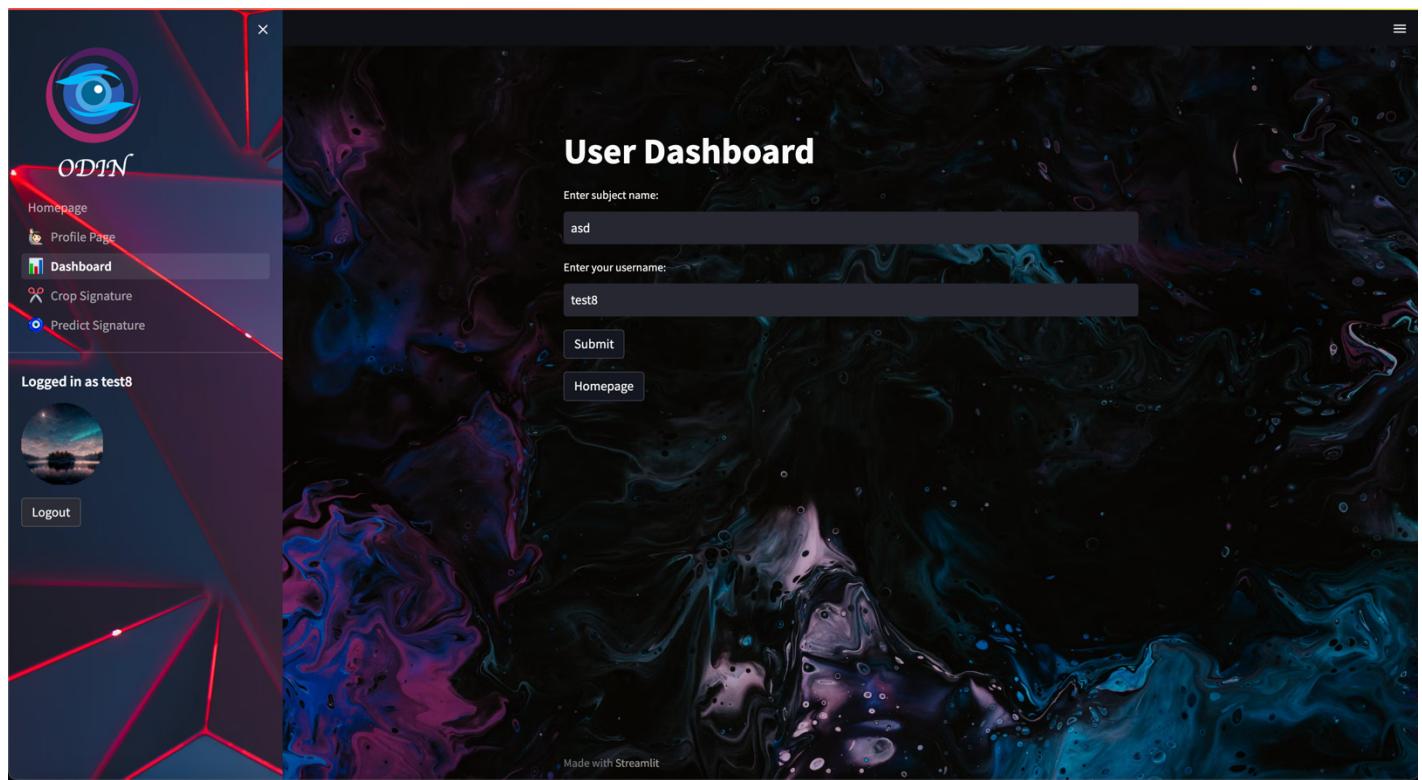
Top Screenshot (Homepage):

- Header:** "Odin" and "Revolutionising Attendance Management With Signature Recognition".
- Left Sidebar:** "ODIN" logo, "Homepage" (selected), "Profile Page", "Dashboard", "Crop Signature", "Predict Signature".
- User Information:** "Logged in as test8" with a profile picture placeholder.
- Logout:** "Logout" button.
- Bottom Left:** "Menu" and "Home" dropdown.

Bottom Screenshot (Profile Page):

- Header:** "Profile Page".
- Profile Photo:** Placeholder image of a landscape.
- Upload Section:** "Upload Profile Photo", "Choose an image file", "Drag and drop file here" (with a 200MB limit), "Browse files".
- About Me:** "None", "Edit About Me", "Save", "Homepage".
- Buttons:** "Refresh", "Screenshot".





Chapter 9

Results and Discussion:

The Signature Analyser and Attendance Management System is a comprehensive software application designed to streamline attendance tracking and management for organizations of all sizes. The proposed system includes various features and functionalities that will allow organizations to effectively manage attendance records and verify the authenticity of signatures on documents.

The system's advanced image processing and machine learning techniques will provide accurate and efficient tracking of employee attendance. This will enable organizations to identify and address issues such as tardiness and absenteeism, resulting in improved productivity and performance.

The system's user-friendly interface will simplify the process of managing attendance records, reducing the administrative burden on HR departments and managers. The automated reporting feature will provide real-time insights into attendance patterns, allowing organizations to make data-driven decisions and take corrective actions where necessary.

Moreover, the system's customizable and scalable design will ensure that it can meet the specific needs of each organization. The system's integration with other HR systems, such as payroll, will also facilitate seamless data transfer and enhance the overall efficiency of HR processes.

The proposed system's non-functional requirements, such as data security and privacy, reliability, and availability, have been carefully considered to ensure optimal performance. The system will adhere to industry-standard security protocols and encryption to ensure data security and privacy. The system's high level of reliability and availability will ensure uninterrupted access and effective utilization of the system.

In conclusion, the Signature Analyser and Attendance Management System will provide organizations with an advanced and effective solution for attendance tracking and management. Its features and functionalities, combined with its user-friendly interface, customizable design, and high level of security and reliability, make it a valuable tool for organizations looking to enhance their HR processes and improve overall productivity and performance.

CHAPTER 10

Conclusion and Future Scope

In conclusion, the proposed Signature Analyser and Attendance Management System offers a comprehensive solution for organizations to streamline their attendance tracking and management processes. With its user-friendly interface, advanced image processing and machine learning techniques, and real-time reporting, the system provides a reliable and efficient solution for managing attendance records and verifying the authenticity of signatures on important documents.

The system's customizable and scalable design ensures that it can meet the specific needs of each organization, while its compatibility with different devices and platforms provides flexibility and accessibility. The system's focus on data security and privacy, as well as its support for multi-factor authentication, ensures that attendance records and other important documents remain confidential and protected.

In terms of future scope, the Signature Analyser and Attendance Management System could potentially integrate with other systems, such as HR and payroll systems, to provide a more comprehensive solution for organizations. The system could also incorporate facial recognition technology to further enhance the security and accuracy of attendance tracking and signature verification.

Additionally, the system could explore the use of artificial intelligence and predictive analytics to provide more advanced insights into attendance patterns and identify potential issues before they arise. This could potentially save organizations time and money by proactively addressing attendance issues and improving overall productivity.

Overall, the Signature Analyser and Attendance Management System offers a robust and innovative solution for organizations to manage attendance records and verify the authenticity of signatures. With its focus on user-friendliness, data security and privacy, and scalability, the system has the potential to become an essential tool for organizations of all sizes and industries.

References:

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