



Proposal
For
Third Year Project
Gyalpozhing College of Information Technology
Bachelor of Science in Information Technology

Smart Attendance System (SAS)

Submitted by
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Read carefully before filling the form.

1. Please do not alter the layout of the application form. Information must be filled in the spaces provided, under set format.
2. Guidance notes in various fields should not be deleted.
3. Required information should be duly filled in the specified fields.

Guidelines and Forms

Submission Procedure

Duly filled proposal forms completed in all respects should be submitted in form of soft copy in the VLE. On receipt of the applications the proposals will be evaluated by the examiner and proposal would then be defended by student groups. The project group may need to revise the proposal in light of the examiner's recommendations.

For further information, please contact:

Module Coordinator

Tshering

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Application for the Project

1. Project Identification

1.1 Reference Number:

2022_PRJ101_01(Year_Module_groupNo)

(for office use only)

1.2 Problem statement

(Please refer [here](#) on how to write a problem statement.)

All organizations need an attendance management system to maintain a record of their staff attendance. Especially in the universities and schools, student's daily attendance in class is essential to maintain discipline and success in academics. By attending the class regularly, the students can keep up with daily lessons and assignments. Roll call or student signing on attendance sheet is the traditional methods that has long been adopted by most of the organizations especially universities and schools. This is both time consuming and not secure. In Most of the universities, the ones who takes the attendance especially the lecturers face challenges such as calling the students name, letting them sign the attendance sheet where the students might do proxy (signing on behalf of others) and also, there is a high possibility of missing out some students while calling student names. As a result, some students could be marked absent while they are actually present in class. Moreover, it becomes tedious to keeps records of every student and referring it. Thus, to overcome all those constraints, the most suitable method to ensure full security and to save history records digitally is through smart attendance system using face recognition.

1.3 Project Title:

(Provide a concise, accurate and informative title which immediately orientates your reader to the focus of your project.)

Smart Attendance System (SAS)

1.4 Key Words: Deep Learning, python, face recognition, openCV, attendance

(Please provide a maximum of 5 key words that describe the project. The key words will be incorporated in our database.)

1.5 Project Guide:

Name:	Mr. Chanon Kulchol
Designation:	Lecturer
Mobile # :	+6596966105, +975 17312603
Email:	chanon.gcit@rub.edu.bt

1.4.1. Project examiner 1:

Name:			
Designation:			
Mobile # :		Tel. # :	
Email:			

1.4.2. Project examiner 2:

Name:			
Designation:			
Mobile # :		Mobile # :	
Email:			

1.6 Project Duration:

Starting Date: 1st March 2022

Completion Date: 13 June 2022 _____

2. Aims, Goals, Objectives and scope of the Project**2.1 Aims of the Project:**

To provide a system that simplifies and automates the process of recording and tracking students' attendance through face recognition.

2.2 Goals of the Project:

To build a face recognition-based attendance system for educational institution to enhance and upgrade the current attendance system to become more efficient and effective as compared to before.

2.3 Objectives of the Project:

- Eliminate the paperwork where attendance marking will no longer involve any manual recordings.
- Reduce the total time needed to do attendance recording.
- Maintaining the accuracy and security of data collected by avoiding the chances of proxy attendance.

2.4 Scope of the Project:

The targeted groups of the attendance monitoring system are the students and teaching staff of the schools and universities.

The facial recognition process can only be done for 1 person at a time.

The system needs internet connection to update the database of the attendance system constantly.

3. Project features

3.1 Background

(Explains why you are doing the project. It provides a brief overview of the background to the project and establishes a particular area, or problem, that needs to be investigated further. It provides a clear statement of the topic of the proposed work.)

The technology aims in imparting a tremendous knowledge oriented technical innovations these days. Deep Learning is one among the interesting domain that enables the machine to train itself by providing some datasets as input and provides an appropriate output during testing by applying different learning algorithms. Though the world has changed towards the era of technology and automation, many of the schools and universities are still using same old ways of classroom management. The most important thing in classroom is attendance which is directly linked to the academic performance of the students. The more efficient the attendance system, the more is class participation and learning (Research Gate, 2018).

Nowadays attendance is considered as an important factor for both the student as well as the teacher of an educational organization. With the advancement of the deep learning technology the machine automatically detects the attendance of students and maintains a record of those collected data.

Almost all of the universities and schools still uses the traditional or manual way of tracking attendance. It is a process where a teacher concerned with the particular subject need to call students names one by one and record their attendance manually. Also, it includes techniques such as calling roll number and signing against a particular roll number. This method relies mainly on the human factor which exposes the method to be vulnerable to forgery, inaccurate, time-consuming and a source of distraction in a large classroom.

So, the problem arises when we think about the traditional process of taking attendance in the classroom. To solve all these issues, we came across the idea of automating this process with modern technologies that is smart attendance system(SAS). Smart attendance system is a technology that is used to record attendance systematically through facial recognition. With this system, the problems of proxies and students being marked present even when they are not physical present in the class can be easily solved.

3.2 Literature Review:

(Detailed review of what all has been done internationally in the proposed area quoting references and bibliography. This section demonstrates the evolution of Technology, the depth of the project team literature search and builds the confidence of the evaluators about capability of the team in achieving the stated objectives.)

Plenty of research has been conducted so far on the various available methods for implementation of an effective attendance monitoring system. These methods vary in terms of the type of input method used, the types of data processing employed and the controllers used to implement the systems.

1. Attendance System Using NFC Technology with Embedded Camera on Mobile Device

According to research journal “Attendance System Using NFC (Near Field Communication) Technology with Embedded Camera on Mobile Device” (Bhise, Khichi, Korde, Lokare, 2015). The attendance system is improved by using NFC technology and mobile application.

According to the research paper, each student is given a NFC tag that has a unique ID during their enrolment into the college. Attendance of each class will then be taken by touching or moving these tags on the lecturer mobile phone. The embedded camera on the phone will then capture the students face to send all the data to the college server to do validation and verification.

The advantages of this method is where the NFC is simple to use, and the speed of connection establishment is very high. It indeed speeds up the attendance taking process a lot. However, this system couldn't automatically spot the violation when the NFC tag is not personally tagged by the original owner. Apart from that, the convenience of the system which uses the mobile phone as the NFC reader was actually an inconvenience to the lecturer.

Imagine if the lecturer had forgotten to bring their mobile phones to work, what would be the backup procedure for the attendance to be recorded? Moreover, most of the lecturer will not likely to prefer their personal smart phones to be used in this way due to privacy matter. Hence, unique information about the student like biometrics or face recognition, which is guanine for a student should be used in replacement of the NFC tag. This will ensure attendance to be taken originally by the actual student.

2. Fingerprint Based Attendance System Using Microcontroller and LabView

The second research journal “Fingerprint Based Attendance System Using Microcontroller and LabView” (Kumar Yadav, Singh, Pujari, Mishra, 2015) proposed a solution of using fingerprint to mark the attendance. This system is using 2 microcontrollers to deal with the fingerprint recognition process. Firstly, the fingerprint pattern will be obtained through a fingerprint sensor, then the information will be transmitted to microcontroller 1. Next microcontroller 1 will pass the information to microcontroller 2 to do the checking with the database that resides in it. After finding a student's match, the details are sent to the PC through serial communication to be displayed.

This design is good as it accelerates development while maintaining design flexibility and simplifies testing. But again, this system is attached to a PC which make it not portable.

4. Face Recognition Based Attendance Marking System

The third research journals “Face Recognition Based Attendance Marking System” (SenthamilSelvi, Chitrakala, Antony Jenitha, 2014) is based on the identification of face recognition to solve the previous attendance system's issues.

This system uses camera to capture the images of the employee to do face detection and recognition. The captured image is compared one by one with the face database to search for the worker's face where attendance will be marked when a result is found in the face database. The main advantage of this system is where attendance is marked on the server which is highly secure where no one can mark the attendance of other. Moreover, in this

proposed system, the face detection algorithm is improved by using the skin classification technique to increase the accuracy of the detection process.

Although more efforts are invested in the accuracy of the face detection algorithm, the system is yet not portable. This system requires a standalone computer which will need a constant power supply that makes it not portable. This type of system is only suitable for marking staff's attendance as they only need to report their presence once a day, unlike students which require to report their attendance at every class on a particular day, it will be inconvenient if the attendance marking system is not portable.

Thus, to solve the issues related to the above mentioned problems from the reviewed literature, we have smart attendance system to systematically record student's attendance from anywhere at any time without any vulnerable to forgery and inaccurate attendance records.

3.3 Requirements

Functional Requirements:

User (Lecturer)

1. Login: User can login using their username and password.
2. Take Attendance: Allow user to open webcam and capture face for attendance.
3. View Attendance: Will display the attendance record.
4. Edit records: Allow user to change the attendance records.
5. Delete records: Allow user to delete attendance records.

Admin

Can add/update/delete all records (Attendance records, face images and their details)

Non-functional Requirements:

Some of the non-functional requirements of our application are:

1. Security

Those with faces recognized in the video camera will be marked present only when the machine matches their faces with the dataset collected.

2. Portability

The system is highly portable as it can easily be deployed in various platforms such as computer laptop, computer desktop, or a mobile device (mobile phone, tablet).

3. Usability: It is effortless for the user to use the Smart Attendance System due to the following reasons:

- a. Learnability: The user will be able to use our application very easily since the system instructions will be properly written in a simple language that can be understood by anyone.
- b. Errors: There is no option of any mistakes from user's side as they cannot make any changes to the system.
- c. Memorability: Since our application is not complex as the user does not require to learn anything to use our application, the users will not face trouble when using our application after long time also.

3.4 Technology

The technology and version to be used for developing this application is

- A. Google Collab: Platform to develop machine learning models.
- B. OpenCV (open computer vision): Open source library for computer vision, machine learning and image processing.
- C. Visual Studio: Code editor to help build applications.
- D. Heroku: Platform to deploy, manage and scale applications entirely in cloud.

Hardware Technology

Developers:

- 1. Laptop/Desktop (Microsoft Windows 7/8/10 (64 bits)/linux/mac)
- 2. 8 GB RAM minimum, 16 GB RAM recommended
- 3. 1280 * 800 minimum screen resolution

User: Laptop/Desktop/Smart phone

3.5 System Architecture

3.5.1 System Design

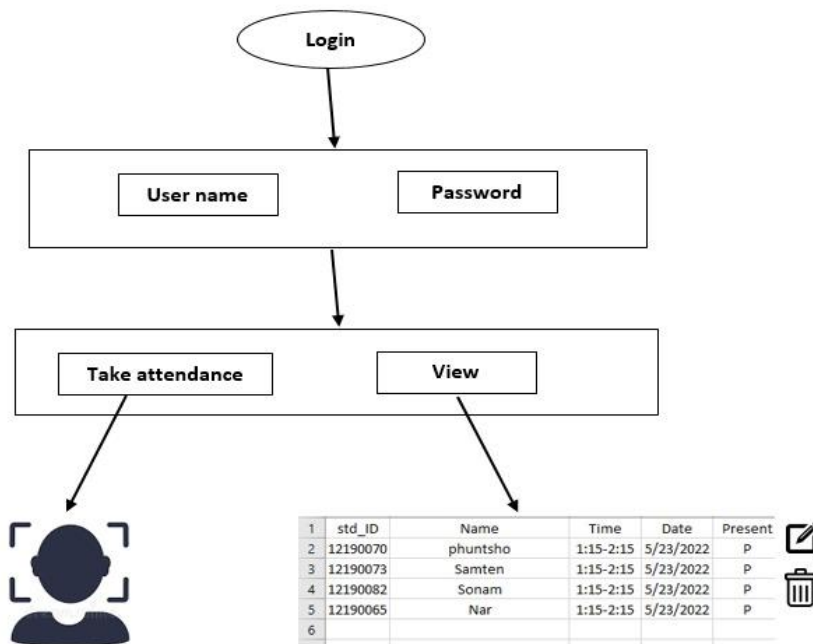
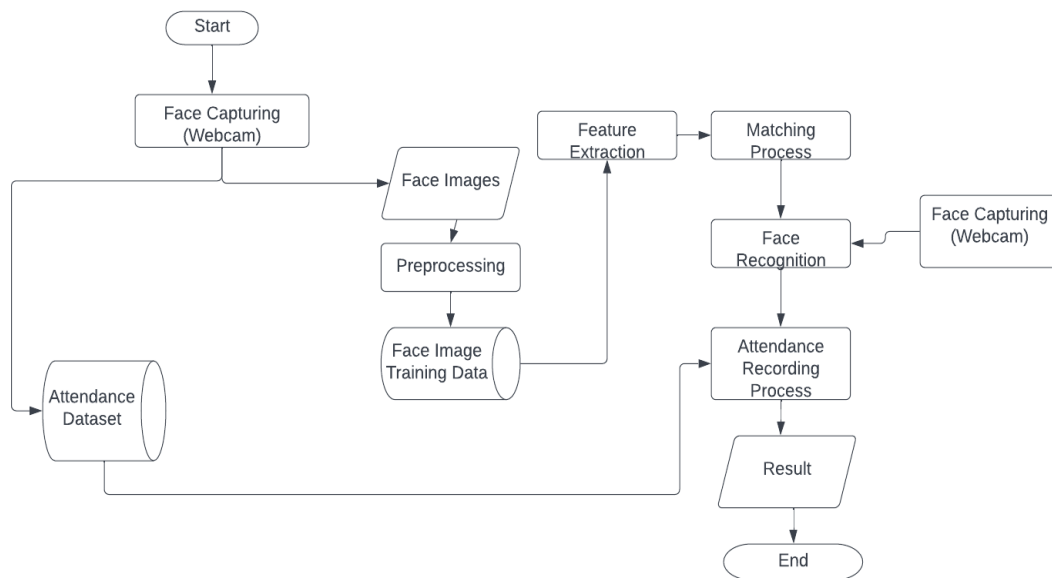
This system is a three-tier architecture which consists of three logical and physical computing layers: Presentation tier, Application tier and Data tier.

The presentation tier is a user interface and communication layer of the application. Here, the user first login with their username and password and can take attendance of the students through webcam, the students will be marked as present. The user can also view the students' attendance records and can edit and delete attendance record.

The application tier is also called as logic tier or middle tier. The system will process and check whether the face captured matches the one stored in the database. Once matched, database gets updated.

The data tier or database tier stores and manages the student's details and attendance records.

3.5.2 Workflow



3.6 Deployment

The proposed system will be developed, integrated with web application and hosted on Heroku platform.

4. Team Members Role

4.1 Member 1 Name and Role

Samten Wangmo (Team Leader)

4.2 Member 2 Name and Role

Sonam Dendup (Lead Programmer)

4.3 Member 3 Name and Role

Nar Bdr Kharka (Database Designer)

4.4 Member 4 Name and Role

Phuntsho Dorji (UI Designer)

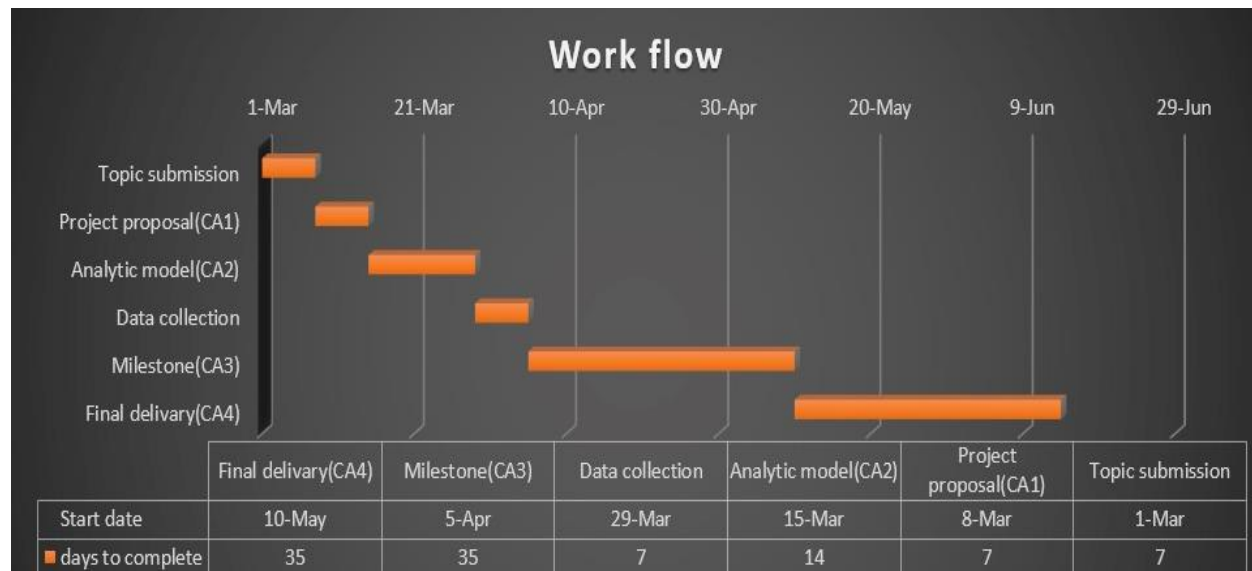
5. Examiner Comments

5. Project Schedule / Milestone Chart /Work plan

[describes what you will do. It is a plan of the tasks which will enable you to achieve the stated aims of your project. To devise a plan, you need to break the project down into a series of steps or stages, and you then outline the tasks within each stage. The project plan should also include a timetable in which you plan the timing for the main tasks. This timetable can help to keep you on track throughout the project. The plan may also include a list of the resources required to do the project.]

(Project schedule using MS-Project (or similar tools) with all tasks, deliverables, milestones, clearly indicated are preferred. Task should be measured in terms of hours)

Sl:no	Title	Start date	End date
1	Topic submission	1/3/2022	7/3/2022
2	Project proposal(CA1)	8/3/2022	14/3/2022
3	Analytic model(CA2)	15/3/2022	28/3/2022
4	Data collection	29/3/2022	4/4/2022
5	Milestone(CA3)	5/4/2022	9/5/2022
6	Final delivery(CA4)	10/5/2022	13/6/2022



6. Bibliography

- Alhanaee, K., Alhammadi, M., Almenhali, N., & Shatnawi, M. (2021, October 1). *Face recognition smart attendance system using Deep Transfer Learning*. Procedia Computer Science. Retrieved March 12, 2022, from <https://www.sciencedirect.com/science/article/pii/S1877050921019232>
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- VigneshLakshmanan8 Follow. (n.d.). *Smart attendance system using facial recognition*. SlideShare. Retrieved March 12, 2022, from <https://www.slideshare.net/VigneshLakshmanan8/smart-attendance-system-using-facial-recognition>
- Automatic attendance monitoring system using facial ...* (n.d.). Retrieved March 12, 2022, from https://www.researchgate.net/publication/349566171_Automatic_attendance_monitoring_system_using_facial_recognition_through_feature-based_methods_PCA_LDA
- Sai, E. C., Hussain, S. A., Khaja, S., & Shyam, A. (2021, May 24). *Student Attendance Monitoring System using face recognition*. SSRN. Retrieved March 12, 2022, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3851056

**GYALPOZHING COLLEGE OF INFORMATION
TECHNOLOGY**
PRJ202 Checklist

The checklist need to be completed by the project team and submit as attachment with proposal.

SI No	Particulars	Status(Please Tick)
1	Proposal document submitted via module VLE link	✓
2	Copy of the proposal document maintained in the GitLab	✓
3	Proposal has problem statement	✓
4	Project intends to solve real world problem	✓
5	Proposal has Aim of the project	✓
6	Proposal has Goals of the Project	✓
7	Proposal has objective of the project	✓
8	Background provides a clear statement of the topic of the proposed work	✓
9	Literature search shows capability of the team in achieving the aim, goal and objectives	✓
10	Requirement relates to project scope	✓
11	Proposal presents analytics technology to extract features, pre-process, clean, analyse, interpret and visualize through a live dashboard	✓
12	Proposal presents architecture of their project	✓
13	Proposal presents system design	✓
14	Proposal presents workflow of processes	✓
15	Proposal presents features of the systems clearly	✓
16	Proposal presents how project will be deployed	✓

17	Members role are clear	✓
18	Proposal attached with work schedule	✓
19	Project diary is attached with proposal	✓
20	Checklist is attached with the proposal	✓

Project Diary

Sl.no	Meeting number and Date	Discussion	Feedback (Project Guide)
1	1 (28 th February 2022)	<ul style="list-style-type: none"> ✓ Member introduction ✓ Deciding of the project leader. ✓ Roles of member 	Explore about dashboard and application of machine learning.
2	2 (1 st March)	<ul style="list-style-type: none"> ✓ Discussion on the topics selected for the project ✓ Finalizing the topic ✓ Gathering ideas from the members and guide 	Find out about the information related to finalized project topic and explore about Tensor flow.
3	3 (9 th March 2022)	<ul style="list-style-type: none"> ✓ Review on the feedbacks provided in meeting 2. ✓ Discussion on the information to be included in project proposal. ✓ Submission of 1st draft proposal to guide. 	<ul style="list-style-type: none"> ✓ Check some of the correction made in the draft proposal submitted. ✓ Show gantt chart instead of bar chart. ✓ Clearly mention the roles of user. ✓ Check the functional requirements. ✓ Explain the system design. ✓ Once check the work flow diagram.