

ATTENDANCE AUTOMATION SYSTEM

Sprint 6 - Presentation

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DELIVERABLE 6

AGENDA

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6. KNN Algorithm
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Project Overview

- The main purpose of this application is to replace conventional manual attendance method with human interference which consumes lot of time and effort to maintain student attendance.
- Our application has been designed to use advanced face detection technique by machine learning algorithm to automate whole process of managing attendance in educational institute
- Our application uses camera to capture one's image compares it with the image stored in database followed by marking attendance.
- Instructor will receive an email with a list of students who were absent for a particular class and school admin can immediately view attendance details after each class.
- Lastly, our application reduces manual errors by consolidating student attendance which can be revisited when required making it easier for instructors to manage student attendance.



Persona

About Professor Riya,

- Raya is a 35 years old Professor at Physics teacher at Pace University. I manually take the attendance for all my classes and don't keep a track of and accidentally one of the student was marked absent, he came back to me saying he was present for the class I couldn't verify it as I don't keep a track of it.

What can we do ?

- Raya can register all the students to the Attendance Automation System and track with separate login details for the faculty and emails after every class.



Persona

- About Student Steve,
- Steve is a 25 years old Student pursuing Masters at Pace University, he attends several classes a day with ample number of students each class and manual attendance would take significant amount of time, he feels there should be an automated attendance system to save class time.
- What can we do ?
- Steve can simply do a one-time registration with school admin and be present in front of camera while professor is capturing image of students to mark his attendance which avoids him to wait for professor to call out each student's name and mark attendance.



Persona

About University Administrator Jonathan,

- Jonathan is a 35-year-old university administrator who keeps track of student's attendance details at Pace University, he find it difficult to call out every professor after each class to submit attendance details to maintain a track of student attendance data.

What can we do ?

- Jonathan can make a one-time effort of registering all the university students to the Attendance Automation System tool which will automatically mark the attendance of all the students present in each professor's class and keeps a track of all the classes and students without any need to contact each professor after every class.



TECHNOLOGIES USED



PYTHON
(BACKEND BUSINESS
LOGIC)



PYQT-5 GUI TOOLKIT
(FRONTEND)



HTML
(FRONTEND)



CSS
(FRONTEND)



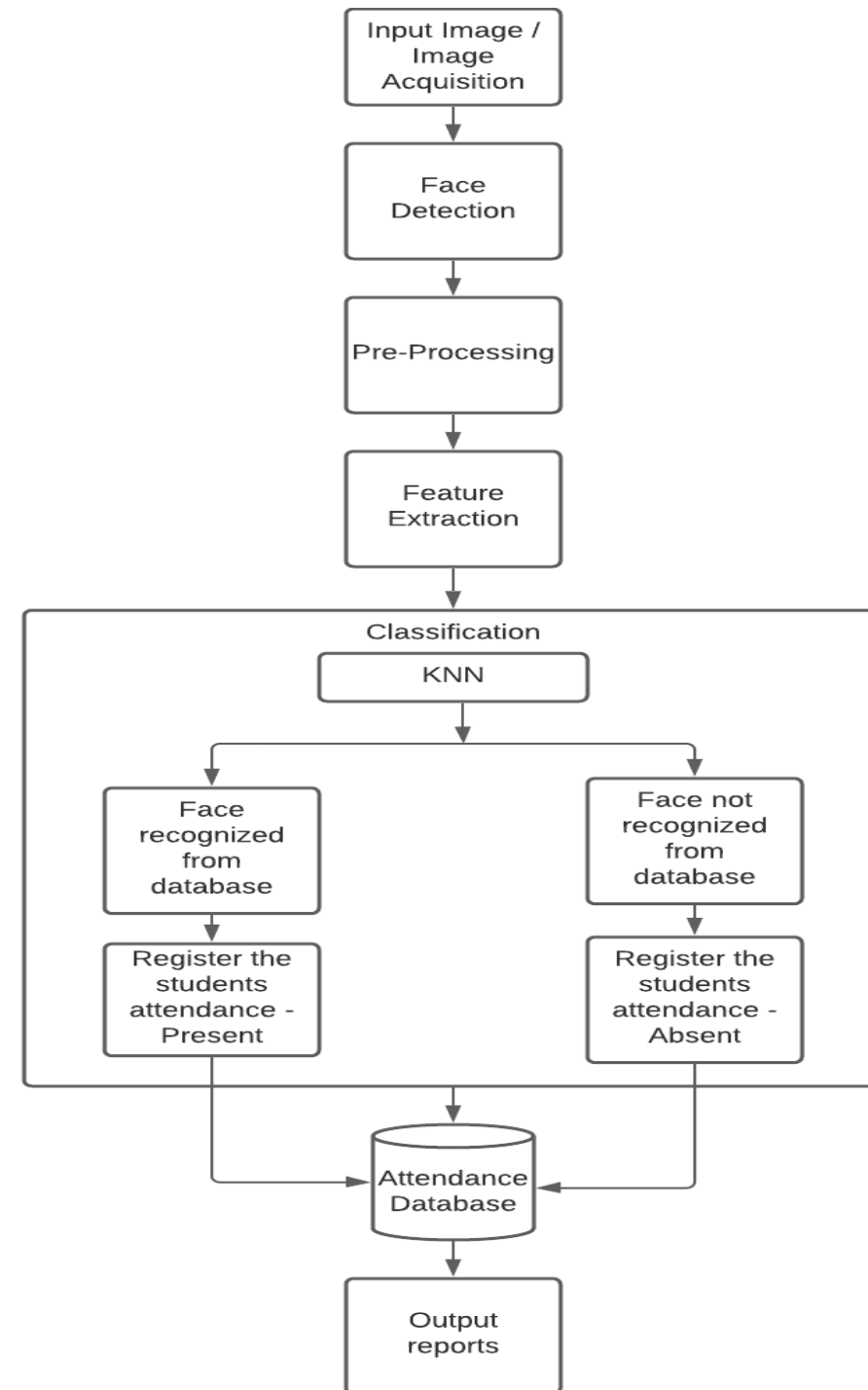
JAVASCRIPT
(FRONTEND)



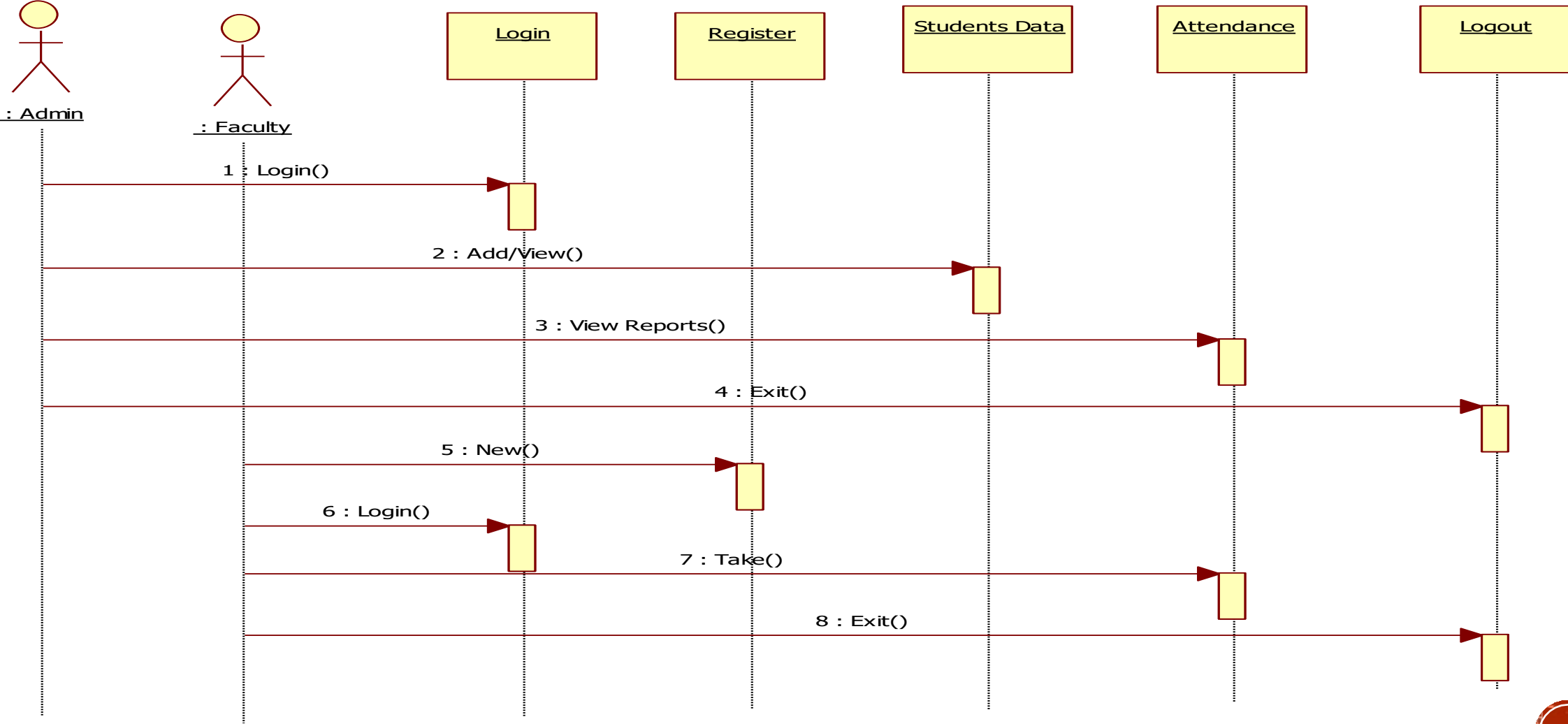
MYSQL
(DATABASE)



Flow Chart



Sequence Diagram



KNN Machine Learning Algorithm for Face Recognition

- KNN is one amongst the best algorithms that may be used for classification
- It consists of two main phases namely the training phase and the testing phase.

Generating Training Data: The subsequent steps are followed to get training data

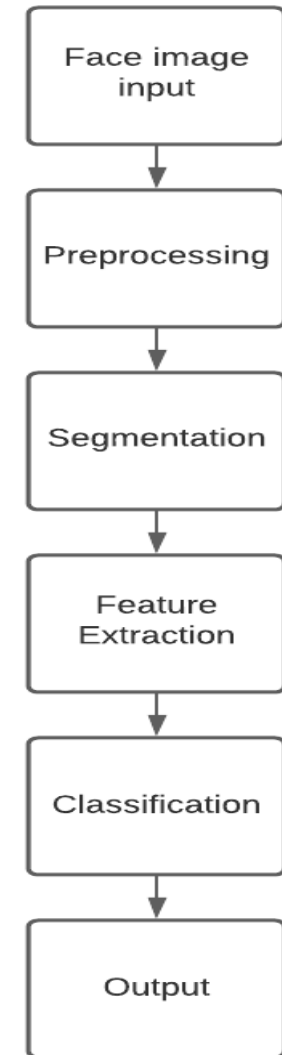
- *Captures images from your webcam video stream*
- *Extracts all Faces from the image frame*
- *Stores the Face information into numpy arrays*
- *Read and show video stream, capture images*
- *Detect Faces and show bounding box*
- *Flatten the biggest face image (gray scale) and save in a numpy array*
- *Repeat the above for multiple people to get training data.*



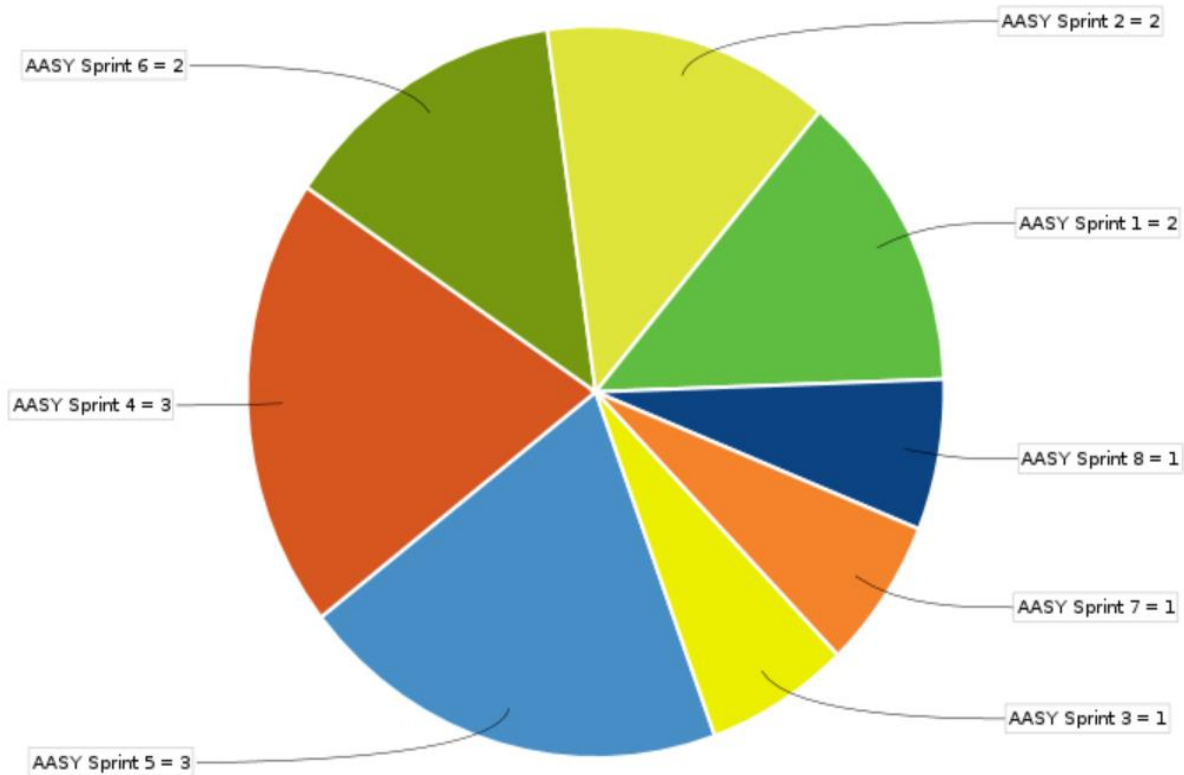
KNN Machine Learning Algorithm for Face Recognition

Building the Face Classifier

- *Recognize Faces using the classification algorithm — KNN.*
- *load the training data (NumPy arrays of all the persons)*
 - *X - values are stored within the NumPy arrays*
 - *Y - values are assigned for every person*
- *Read a video stream using OpenCV*
- *Extract faces out of it*
- *Use knn to search out the prediction of face*
- *Map the anticipated id to call of the user*
- *Display the predictions on the screen - bounding box and name*



Sprint Statistics



Data Table

	Issues	%
AASY Sprint 5	3	20%
AASY Sprint 4	3	20%
AASY Sprint 6	2	13%
AASY Sprint 2	2	13%
AASY Sprint 1	2	13%
AASY Sprint 8	1	6%
AASY Sprint 7	1	6%
AASY Sprint 3	1	6%



What have we done so far ?

Sprint 1



Key	Summary	Issue Type	Priority	Status	Story Points (- → 16)
AASY-1 *	As a admin/ faculty I want to access the options available for login/ register into the application so that We can choose if our school admin or the faculty wants to login with necessary credentials	📖 Story	↑ Highest	DONE	- → 8
AASY-2 *	As a admin I want a secure login account with username and password for admin and faculty individually so that Our personal credentials are safe and secure denying access to unauthorized persons	📖 Story	↑ Highest	DONE	- → 8

Sprint 2







Key	Summary	Issue Type	Priority	Status	Story Points (- → 16)
AASY-3 *	As an admin, once successfully logged in I should be able to view options to add student/ view registered students or check reports	📖 Story	↑ Medium	DONE	- → 8
AASY-4 *	As an admin I want to add/register the students into the database to maintain the student registration details	📖 Story	↑ High	DONE	- → 8









Sprint 3

Key	Summary	Issue Type	Priority	Status	Story Points (- → 13)
AASY-5 *	As a admin, I want to design a Database where we store all the user data (Admin, Faculty and Student private data)	 Story	 Highest	<div>DONE</div>	- → 13

Sprint 4

Key	Summary	Issue Type	Priority	Status	Story Points (- → 16)
AASY-6 *	As a faculty, I would like to login to the application using username and password given during the faculty registration	 Story	 High	<div>DONE</div>	- → 8
AASY-7 *	As a faculty, provide my personal details to register as a faculty and get a secure login to my account	 Story	 Medium	<div>DONE</div>	- → 3
AASY-8 *	As an admin, I should be able to add and view registered students information in database	 Story	 Medium	<div>DONE</div>	- → 5

Sprint 5

Key	Summary	Issue Type	Priority	Status	Story Points (- → 21)
AASY-9 *	As a Faculty, I want to have a secure login using username and password to access my account	 Story	 Highest	<div>DONE</div>	- → 8
AASY-10 *	As a Faculty, I want to register as a faculty providing required personal details	 Story	 Medium	<div>DONE</div>	- → 5
AASY-11 *	As a faculty, I want to access options available to capture attendance/browse an image to upload/view reports	 Story	 High	<div>DONE</div>	- → 8



PRODUCT BACKLOG

Key	Product Backlog Item	User Story	Priority	Status
AASY - 1	Home page login options for admin/ faculty	As an admin/ faculty I want to access the options available for login/ register into the application so that We can choose if our school admin or the faculty wants to login with necessary credentials	Highest	Completed
AASY – 2	Admin login page	As an admin I want a secure login account with username and password for admin and faculty individually so that Our personal credentials are safe and secure denying access to unauthorized persons	Highest	Completed
AASY – 3	Admin options page	As an admin, once successfully logged in I should be able to view options to add student/ view registered students or check reports	Medium	Completed
AASY – 4	Student registration page	As an admin I want to add/register the students into the database to maintain the student's registration details	High	Completed
AASY - 5	Database	As an admin, I want to design a Database where we store all the user data (Admin, Faculty and Student private data)	Highest	Completed
AASY – 6	Faculty login page	As a faculty, I would like to login to the application using username and password given during the faculty registration	Highest	Completed



PRODUCT BACKLOG

Key	Product Backlog Item	User Story	Priority	Status
AASY – 7	Faculty Registration authentication	As a Faculty, I want to register as a faculty to be able to have a secure login to my account	Medium	Completed
AASY – 8	Student registration details from database	As an admin, I should be able to add and view registered student's information in database	Medium	Completed
AASY – 9	Faculty login authentication	As a Faculty, I want to have a secure login using username and password to access my account to take attendance/view reports	Highest	Completed
AASY –10	Faculty registration page	As a faculty, I want to register as a faculty providing required personal details.	Medium	Completed
AASY – 11	Capture attendance / browse image to upload	As a faculty, I want to access options available to capture attendance/browse an image to upload for attendance or view reports	High	Completed
AASY – 12	Detect the students face	As a Faculty/ Admin, I want the application to detect the students face And display the name of the student present for the attendance	High	Completed



PRODUCT BACKLOG

Key	Product Backlog Item	User Story	Priority	Status
AASY – 13	Display registered students in the GUI Console	As an Admin, I should be able to view registered student's information in the GUI console after login	Highest	Completed
AASY – 14	Generate attendance reports	As a Faculty/ Admin, I want to view attendance reports generated after the student attendance is updated	Highest	To do
AASY – 15	Send automatic email to registered faculty	As a Faculty, I want to receive an email immediately with the list of students who are absent	Highest	To do



TEST CASES (Previous Sprints)

Key	Scenario	Test Case	Expected Result	Actual Result
AASY – 1	Main Dashboard	Able to see and hover Admin and Faculty page buttons	-User should be able to click on the Admin or Faculty based on the utility	Pass
AASY – 1	Main Dashboard	Admin/Faculty Should be able to redirect to the homepage of Faculty or Admin accordingly	-User should be able to view homepage according to their role	Pass
AASY – 6	Student registration page	Enter student name, student id, student email, capture image	Student should be added successfully	Pass
AASY – 6	Student registration page	<ul style="list-style-type: none"> - If null details are entered into the form - If student image is not captured - If all details are entered and image is captured 	<ul style="list-style-type: none"> - Display error message to provide all the details - Display error message to capture student image - Display alert student is added successfully 	Pass
AASY – 2	Admin Login page	<ul style="list-style-type: none"> - Sign in using valid username and password - Should be able to see the dashboard page after login. 	<ul style="list-style-type: none"> -Admin should be able to login using his username and password without any errors - Redirected to the dashboard page providing options to add/view students or view reports. 	Pass
AASY – 3	Admin options page	<ul style="list-style-type: none"> - Click on add student to register student - Should be able to view registered students 	<ul style="list-style-type: none"> - Student registration page should be displayed - Display registered students when clicked to view students. 	Pass



TEST CASES (Previous Sprints)

Key	Scenario	Test Case	Expected Result	Actual Result
AASY – 7	Faculty Registration	Enter all the required fields name, email id, password, phone number	- User should be able to successfully register and display successfully registered message	Pass
AASY – 8	Registration authentication	Fields should not be empty and All the fields need to be provided to successfully register	Display fields cannot be empty if any field is not entered successfully	Pass
AASY – 9	Faculty Login	Sign in using the valid username and password provided During registration	User should be able to successfully login with their credentials	Pass
AASY – 10	Add student details to database	Once student name, email id, student id and image is captured admin can add student to database	Student should be successfully registered, and image stored in database	Pass
AASY – 11	Faculty options Page	Immediately after login faculty should be able to see options to capture attendance/ browse image to upload options	- Display capture attendance/ browse image to upload options to faculty after the sign in	Pass
AASY – 11	Faculty options Page	Should be able to click on image upload to browse an image available in the system	Display files available to upload an image available in the user's system	Pass







TEST CASES (Current Sprint)

Key	Scenario	Test Case	Expected Result	Actual Result
AASY – 12	Faculty options Page	Should be able to click on capture attendance icon to open the system camera	- System camera should be invoked and able to capture the image	Pass
AASY – 13	Display registered students on GUI console	Admin should be able to click on view students in the GUI console to view all the registered students	GUI Console should display all the registered student details including name, student ID, email and student image number	Pass
AASY – 12	Detect registered student face	Faculty should be able to capture/upload image and click submit to successfully submit attendance	Display attendance successfully captured message	Pass
AASY – 12	Detect registered student face	KNN Machine learning algorithm should be able to detect the student face from the registered student's data stored in the database	Faculty should be immediately able to see the student's image who are present with their names recognized from the database.	Pass

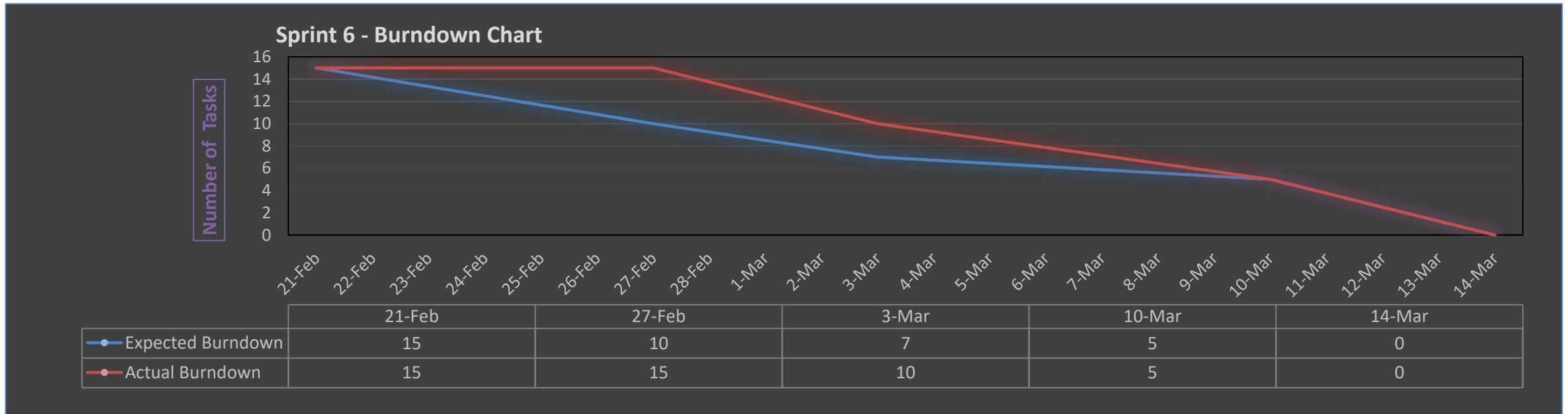


SPRINT 6

Key	Summary	Issue Type	Priority	Status	Story Points (- → 15)
AASY-12 *	As a Faculty/ Admin, I want the application to detect the students face and display the name of the student present for attendance	 Story	 High	<div>DONE</div>	- → 8
AASY-13 *	As an Admin, I should be able to access the view students on GUI console after login	 Story	 Highest	<div>DONE</div>	- → 7



Burndown Chart



- The above graph represents Expected Burndown vs Actual Burndown of user story points for sprint 6.
- Initially there we exceeded the time frame due to estimating lesser points for Machine Learning based Facial Recognition story and by end of the sprint we managed to make up for it.



Sprint Retrospective

What went well		What needs to be improved	Action items
Successfully completed planned user stories and tasks in time	Collaboration between team members was great	Technical tasks should also be distributed equally among the team which will give scope to learn core aspects of the project.	We plan to switch and rotate current sprint responsibilities so that everyone will be exposed to all aspects of the project.
We have migrated our user stories to Jira tool for better tracking of our work			



What's coming up?

- Generate attendance reports based on captured student attendance data.
- Send automatic emails to registered faculty

AASY Sprint 7 1 issue

Start sprint

Plan sprint ▾

⋮

📌 As a Faculty/ Admin, I want to view attendance reports generated after the student attendance is updated

AASY-14 ↑ 13

+ Create issue



AASY Sprint 8 1 issue

1 issue Estimate 13

Plan sprint ▾

⋮

📌 As a Faculty, I want to receive an email immediately with the list of students who are absent

AASY-15 ↑ 13

+ Create issue



1 issue Estimate 13



Future Scope?

- Migrating and managing entire tool on cloud platform.
- Hosting Attendance Automation System tool on an entirely separate setup build for the application.
- Integrating Automation Attendance System tool to a mobile application and enhancing to cater future needs.

Project Links

- Tech Paper Link :

<https://github.com/ashishpulluri/AttendanceAutomationSystem/blob/main/Deliverable-6-TechPaper.docx>

- Git Hub Link :

[HTTPS://GITHUB.COM/ASHISHPULLURI/ATTENDANCEAUTOMATI ONSYSTEM/WIKI/ATTENDANCE-AUTOMATION-SYSTEM#TEAM-2](https://github.com/ashishpulluri/AttendanceAutomationSystem/wiki/Attendance-Automation-System#team-2)



"The golden rule for every businessman is this: Put yourself in your customer's place."

- Orison Swett Marden

Thank You