

**CS1002 - PROGRAMMING IN PYTHON**  
**CONTINOUS INTERNAL ASSESSMENT – 2**  
**MINI PROJECT – ONE PAGE WRITEUP**

**BARCODE SCANNING BASED ATTENDANCE SYSTEM**

*By*

**Jayashre K – 22011103020**

**B. Tech CSE (specialization in Cyber Security)**

**INTRODUCTION:**

The Barcode Scanning based Attendance System is a python-based project that enables college students and professors to efficiently manage the attendance records of students. This system incorporates the use of ***tkinter*** and ***pyzbar*** python libraries to create a user-friendly attendance system for the batch of Cyber Security students and their faculties. By utilizing a camera to scan the barcode on the student's identity card and faculties' identity cards, the system can retrieve their details from an Excel sheet that stores their information. The system then automatically updates the attendance record in Excel, thereby saving time and reducing errors.

**METHODOLOGY:**

1. Importing Modules:

To facilitate the functioning of the project, several modules such as pywin32, opencv, time, pyzbar, tkinter, datetime, and openpyxl are imported. These modules are used for different functionalities in the script and contribute to the seamless execution of the project.

2. Opening Excel files and sheets:

The “***protected\_view\_excel***” function opens Excel files, if the user wants to view attendance records, courses and faculty records or the student records, in protected view, hides sheets that are not currently in use, and protects the sheets with a password. The “***write\_date\_to\_sub***” function writes a selected date, by the user, to a specific cell in an Excel sheet.

3. Barcode Scanning:

This system utilizes OpenCV to continuously read and capture frames from the web camera and detect barcodes in those frames through “***scan\_barcodes***” function. If a new barcode is detected, it is added to the list of barcodes. The ***pyzbar*** library is then used to decode the barcodes detected by the system.

4. Authenticating users and marking attendance:

- The “***adding\_attendance***” function scans barcode, reads data from an Excel sheet, and verifies the user's attendance by checking if their roll number matches the data from the sheet. The “***add\_p***” function adds the attendance of the verified user to the excel sheet, chosen by the user, of the Excel Workbook.

- From the perspective of faculty members, the system offers the functionality of marking students as "absent" or "present". This feature involves the verification of the registration numbers entered by the faculty against the last two digits of the registration number column. Once the verification process is completed, the system automatically records the attendance status of each student under the designated date selected by the faculty member.

### 5. Changing the attendance status:

The system also has a feature that enables users to change their attendance system. The “***absenttopresent***” function changes the attendance status of a specific user on a particular date for a particular course from “Absent” to “Present” in the excel sheet. Similarly, “***presenttoabsent***” function changes the attendance status from “Present” to “Absent”.

*Overall, the methodologies used in the code involve interacting with Excel sheets, scanning barcodes, manipulating data in the pandas Data frame, and using computer vision libraries like OpenCV and pyzbar.*

### **CLASSIFIERS:**

The code of this project uses a supervised learning approach to recognize barcodes. The Support Vector Machine (SVM) algorithm are the classifiers to classify the barcode images.

SVMs are particularly useful for accurately classifying different types of barcodes and are used in this project to classify students as present or absent based on the barcode information. The OpenCV library is used to pre-process the images before classification. However, using SVMs requires additional pre-processing steps such as image processing to extract the barcode information.

### **DATASETS:**

The code required a dataset of barcode images to train the classifiers. The project utilized an Excel workbook as a database. Here are the main datasets were used:

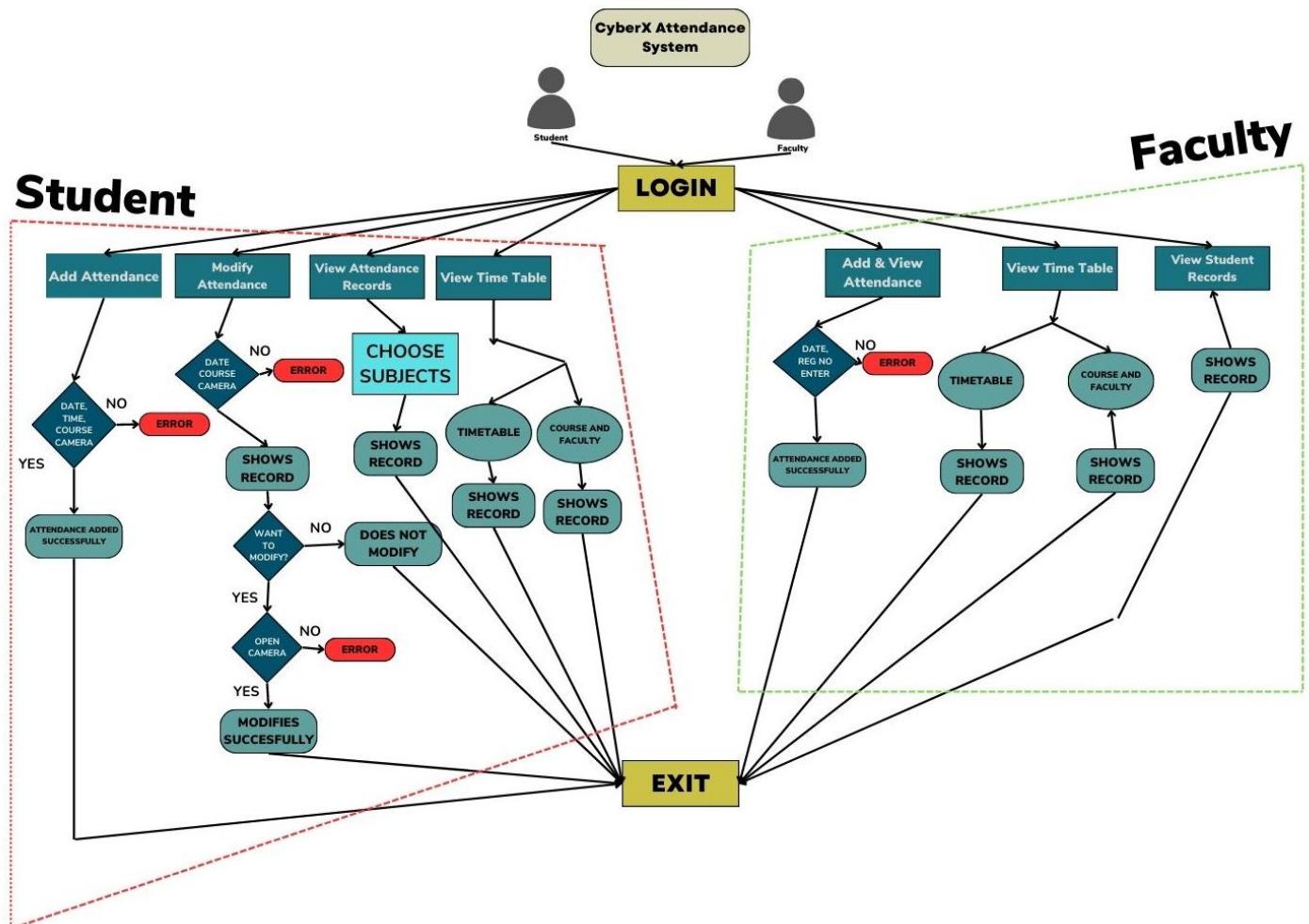
- i. ***Student data*** – that includes information about the students, such as their names. Roll number and other relevant information. This data is used to create unique student barcodes that can be scanned to track attendance.
- ii. ***Course data*** – This dataset includes information about the courses being taught such as the course code, course name and other relevant information.
- iii. ***Attendance Data*** – This dataset includes information about the attendance of the students such as the date of the attendance, and whether the student was present or absent. This data is usually collected through the barcode scanning system and is them stored in an Excel database.

### **IMAGE PROCESSING TECHNIQUES:**

Image processing techniques are employed to extract and decode the information stored in the barcode. Image processing is also an important step when using SVMs, as it helps to transform the raw image data into a format that can be analysed and used by the SVM algorithm. The two main steps in barcode scanning are image acquisition and decoding.

- i. **Image Acquisition** – The process of capturing an image of the barcode using a camera. Once the image is captured, it is then processed using various image processing techniques such as
- thresholding* that is used to convert grayscale images to binary images.
  - smoothing* that is used to remove noise from the images.
  - edge detection* that is used to identify the edges of the bars and spaces that make up a barcode.
  - contour analysis* that is used to identify and extract the barcode from an image by detecting its contours, or the curves that make up its boundaries.
  - morphological operations* such as *dilation* and *erosion* are used to improve the shape of the barcode, to enhance the barcode's contrast, sharpness, and readability.
- ii. **Decoding** – The process of extracting the information encoded in the barcode. This process happens after the image has been processed. This is typically done using specialized software or libraries that can recognize and decode different types of barcodes, such as Pyzbar and Zbar

## **FLOWCHART:**

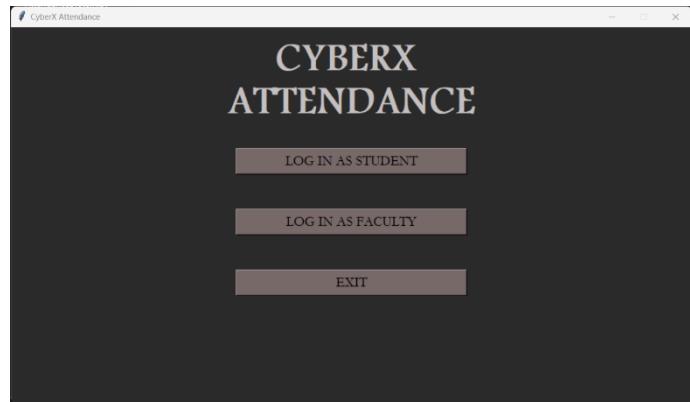


## **SAMPLE OUTPUT:**

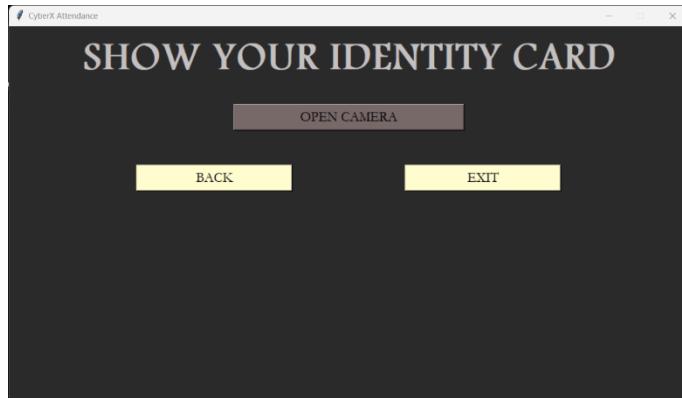
### **MAIN FRAMES:**



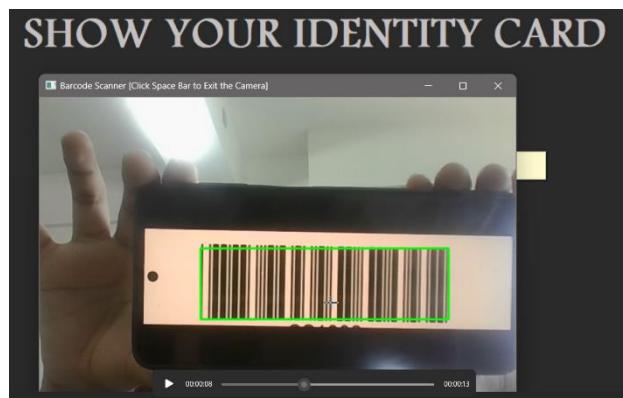
**LOADING SCREEN**



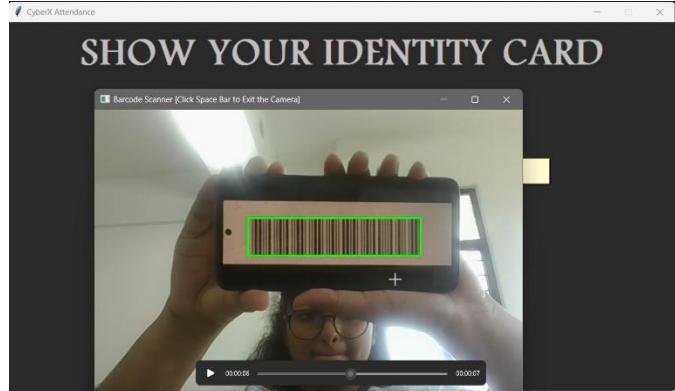
**MAIN FRAME**



**CAMERA FRAME**



**CAMERA FRAME - FACULTY**

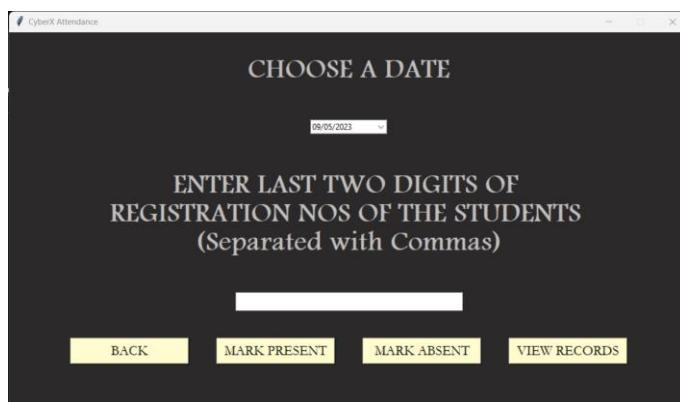


**CAMERA FRAME - STUDENT**

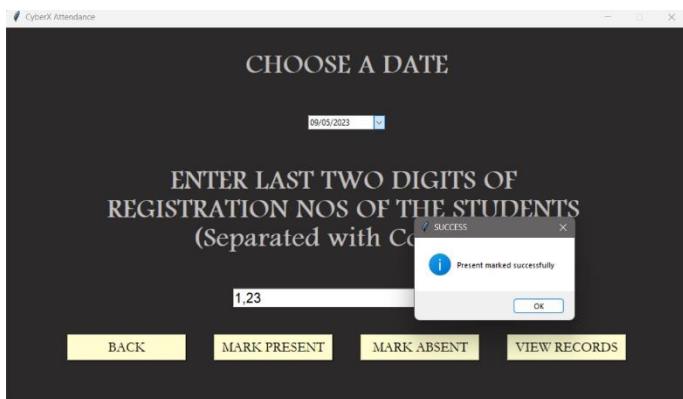
## FACULTY FRAME:



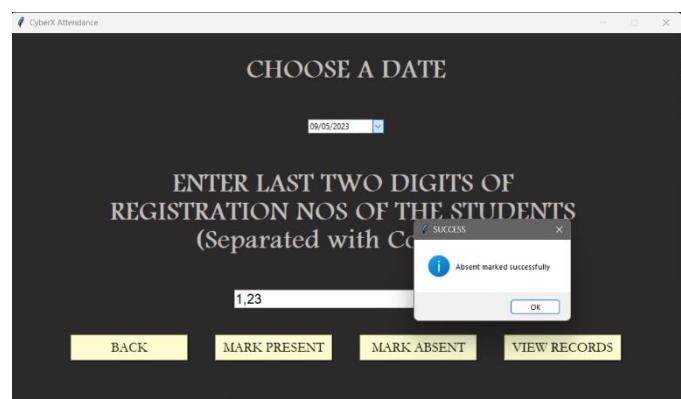
## ADD AND VIEW ATTENDANCE:



## MARKING PRESENT:



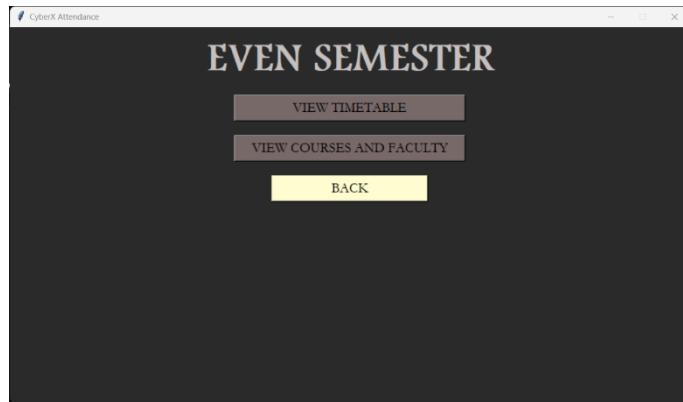
## MARKING ABSENT:



## VIEWING RECORDS:

A	B	C	D
REGISTRATION NO	ROLL NO	NAME OF THE STUDENT	DATE
2201103001	22110445	A SLANGATHAN	09-05-2023
2201103002	22110443	ABHISHEK RAKANA P	
2201103003	22110180	ADITYA A	
2201103004	22110133	ADITYA B	
2201103005	22110015	AKHILA RAYALA	
2201103006	22110247	B ABHINAV	
2201103007	22110157	BRIJESH V D	
2201103008	22110372	DANUSH S V	
2201103009	22110404	DHEPIKA P	
2201103010	22110407	DHRUVI T	
2201103011	22110426	DESHNA BHARAT RAMANI	
2201103012	22110232	DHNAKAR S P	
2201103013	22110173	DHYANESWARAN T	
2201103014	22110047	ELESWARAPU KRUTHIKA	
2201103015	22110160	H SAADIVI SREE	
2201103016	22110460	HARIPRIYA S	
2201103017	22110048	HARISH SANTHOSH KUMARAN DILAP ANT	

## VIEW TIMETABLE AND COURSES-FACULTY:



### VIEW TIMETABLE:

EVEN SEMESTER																																																																																															
Sri Sankar University Chennal, Kattankudi - 601118 School of Engineering - Department of Computer Science and Engineering General Academic Year - 2022-23 With Effect from 02.02.2023																																																																																															
Class: II Faculty: SE (Cyber security) Room No: 406																																																																																															
Shift: Class I / Constitue Chairman: Dr. T. Nagalingam Class Advisor: Dr. S. Sudhakaran																																																																																															
<table border="1"> <thead> <tr> <th>Day</th> <th>8:00-9:00</th> <th>9:00-10:00</th> <th>10:00-11:00</th> <th>11:00-12:00</th> <th>12:00-1:00</th> <th>1:00-2:00</th> <th>2:00-3:00</th> <th>3:00-4:00</th> <th>4:00-5:00</th> <th>5:00-6:00</th> <th>6:00-7:00</th> </tr> </thead> <tbody> <tr> <td>MON</td> <td>CSE1002 CSE1003 CSE1004 CSE1005 CSE1006</td> </tr> <tr> <td>TUE</td> <td></td> </tr> <tr> <td>WED</td> <td></td> </tr> <tr> <td>THU</td> <td></td> </tr> <tr> <td>FRI</td> <td></td> </tr> <tr> <td>SAT</td> <td></td> </tr> </tbody> </table> <p>Subject: Theory/Practical / Other Activities</p>												Day	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00	5:00-6:00	6:00-7:00	MON	CSE1002 CSE1003 CSE1004 CSE1005 CSE1006	TUE												WED												THU												FRI												SAT																					
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SAT																																																																																															

### VIEW COURSES AND FACULTY:

EVEN SEMESTER				
S.NO	COLLEGE	NAME OF THE FACULTY	PHONE NUMBER	EMAIL ID
1	The Class Advisor		7504149794	sudhakaran@srckennel.edu.in
2	UNI00 English for Engineers		7504056392	charlym@srckennel.edu.in

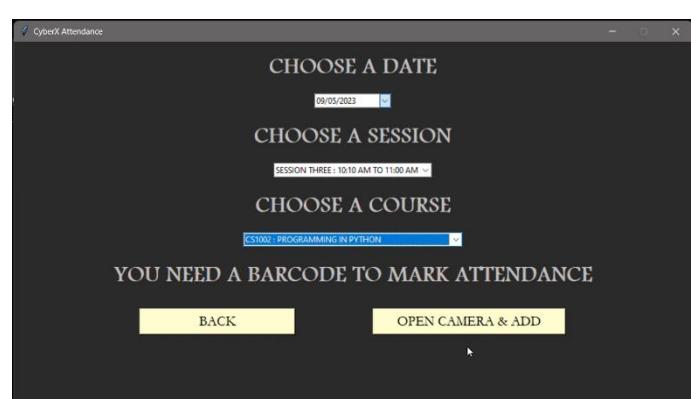
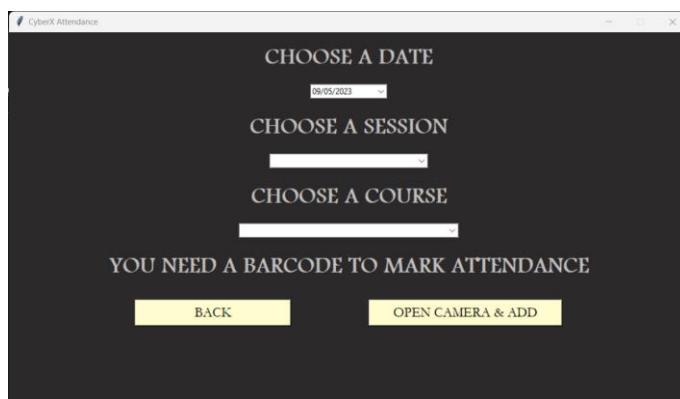
### VIEW STUDENT RECORDS:

S.NO	ROLL NO.	NAME OF THE STUDENT	REGISTRATION NO	EMAIL ID	PHONE NO	HOD
1	22110047	A SHANMUGAM	2201110001	shanmugam.s@srckennel.edu.in	9876543210	
2	22110064	ABHISHTHARAVANA P	2201110002	abhishtharavana.p@srckennel.edu.in	9876543210	
3	22110080	ADITHYA A	2201110003	adithya.a@srckennel.edu.in	9247654321	
4	22110081	ADITHYA B	2201110004	adithya.b@srckennel.edu.in	9247654321	
5	22110017	AKHLIA RAYALA	2201110005	akhlia.rayala@srckennel.edu.in	9220000000	
6	22110247	B ABINAV	2201110006	babinav@srckennel.edu.in	9274662029	
7	22110251	B ABINAV V L	2201110007	babinav.vl@srckennel.edu.in	9274662029	
8	22110372	DANISH S V	2201110008	daniish.sv@srckennel.edu.in	9249991779	
9	22110404	DEEPIKA P	2201110009	deeepika.p@srckennel.edu.in	9223220429	
10	22110429	DEEPMALA P	2201110010	deepmala.p@srckennel.edu.in	9223220429	
11	22110426	DEEPTHA BHARAT RAMANI	2201110011	deephtha.bharat.ramani@srckennel.edu.in	9223000000	
12	22110522	DHRINAKAR S P	2201110012	dhrinakar.s.p@srckennel.edu.in	9877440096	
13	22110577	EELA MUTHU S	2201110013	eela.muthu.s@srckennel.edu.in	9223220429	
14	22110647	ELUVVARAPU KRUTHIKA	2201110014	eluvvarapu.kruthika@srckennel.edu.in	9223000000	
15	22110560	JI SAADHU SREE	2201110015	ji.saadhu.sree@srckennel.edu.in	9223000000	
16	22110561	JYOTHI SREE	2201110016	jyothi.sree@srckennel.edu.in	9223000000	
17	22110649	KARUNA SREE	2201110017	karuna.sree@srckennel.edu.in	9223000000	
18	22110647	HARISH MENTHIL KUMAR DHARANI	2201110018	harish.menthil.kumar.dharani@srckennel.edu.in	9223000000	
19	22110567	HARSHITA R S	2201110019	harshita.r.s@srckennel.edu.in	9249991248	
20	22110549	J PROKTHI	2201110020	j.prokthi@srckennel.edu.in	9223000000	
21	22110569	KARUNA SREE	2201110021	karuna.sree@srckennel.edu.in	9223000000	
22	22110560	KAVITHA M	2201110022	kavitha.m@srckennel.edu.in	9223000000	

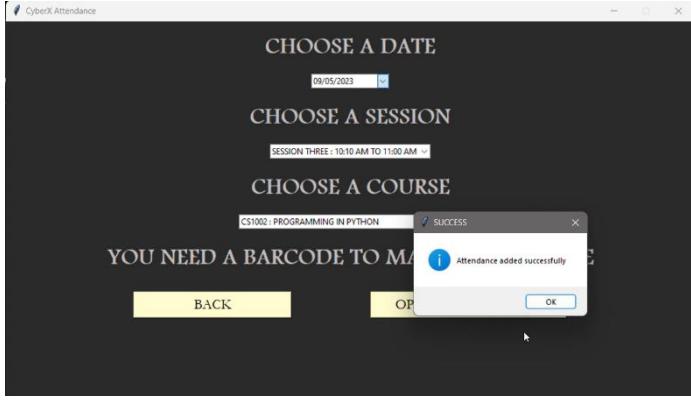
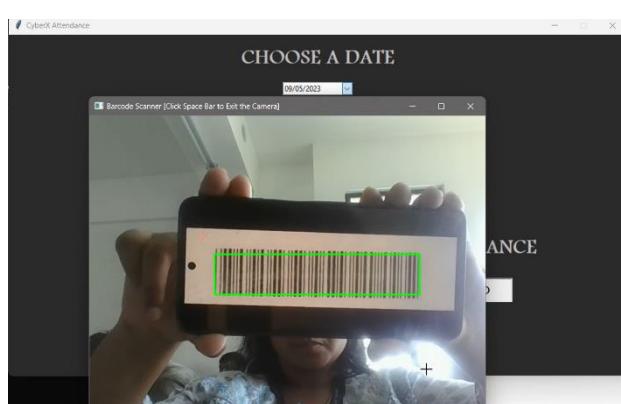
## STUDENT FRAME:



## ADD ATTENDANCE:

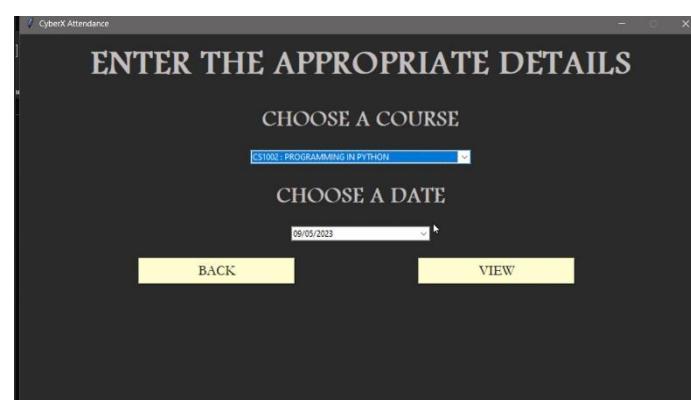


## ADD FRAME

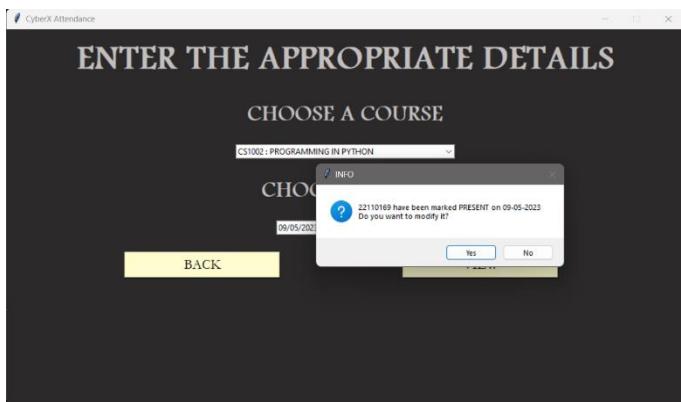


## ADD FRAME - CAMERA

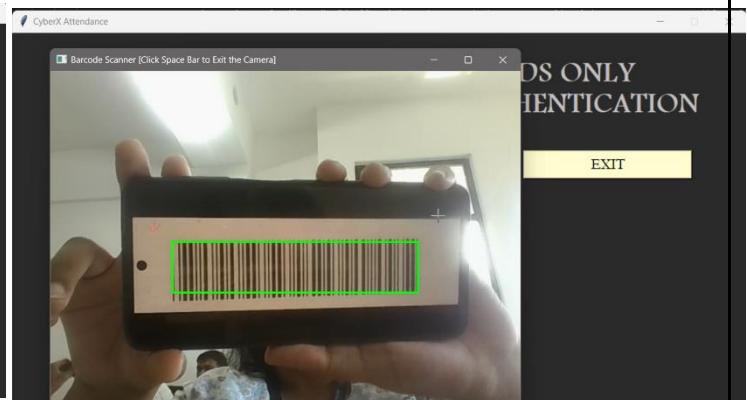
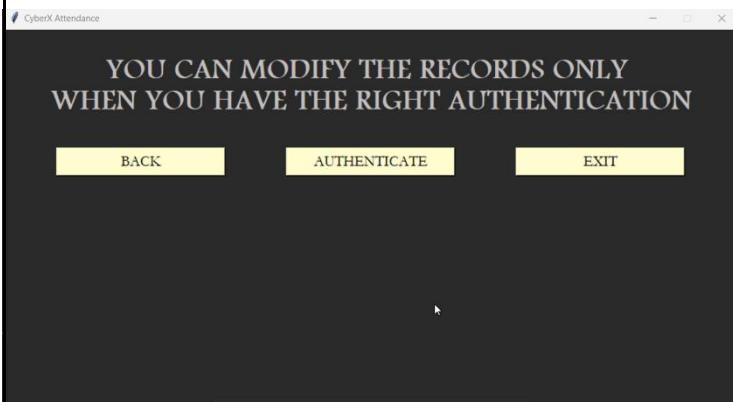
## MODIFY ATTENDANCE:



## MODIFY FRAME

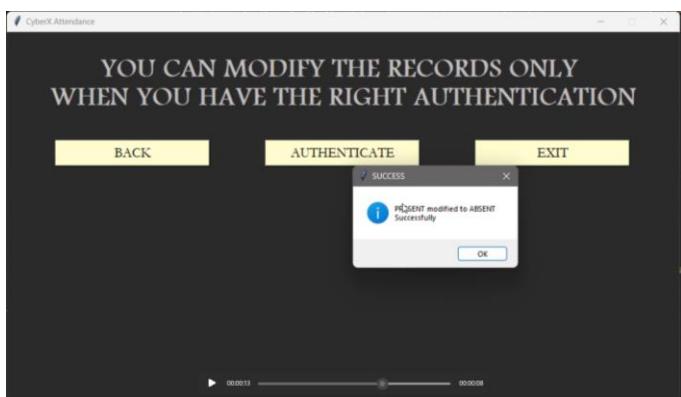


**MODIFY FRAME - YES**



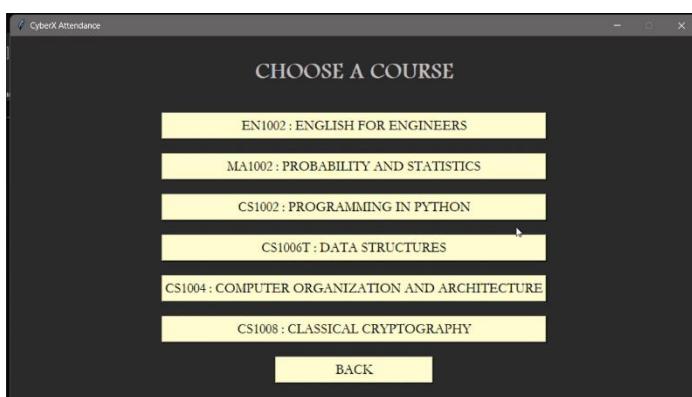
**MODIFY FRAME - AUTHENTICATE**

**MODIFY FRAME - CAMERA**



**MODIFY FRAME - MODIFIED**

## **VIEW ATTENDANCE RECORDS:**

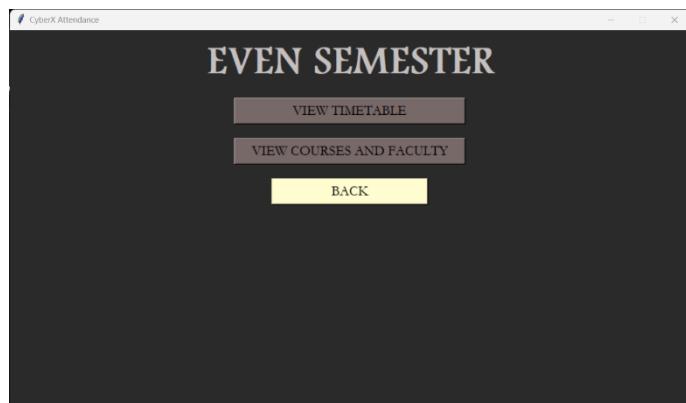


**VIEW RECORD FRAME**

A	B	C	D	E	F	G	H	I
REGISTRATION NO	ROLL NO	NAME OF THE STUDENT	09-05-2023					
220111030901	22110445	A SHANGRUTHAN	A					
220111030902	22110064	ABHIJITHSARAVANA P						
220111030903	22110180	ADITHYA A						
220111030904	22110133	ADITYA B						
220111030905	22110015	AKHILA RAYALA						
220111030906	22110247	B ABHINAV						
220111030907	22110157	BREJESH V D						
220111030908	22110372	DANUSH S V						
220111030909	22110404	DEEPIKA P						
220111030910	22110097	DEEPITHI I						
220111030911	22110426	DESHNA BHARAT RAMANI						
220111030912	22110232	DIHNAKAR S P						
220111030913	22110173	DHYANEWSWARAN T						
220111030914	22110047	ELESWARAPU KRUTHIKA						

**EXCEL FILE**

## VIEW TIMETABLE:



## VIEW TIMETABLE:

Day	8.00-9.00		9.00-10.00		10.10-11.00		11.00-12.00		12.00-1.00		1.00-2.00		2.00-3.00	
	C1002	C1003	C1004	C1005	C1006	C1007	C1008	C1009	C1010	C1011	C1012	C1013	C1014	C1015
MON														
TUE	C1006	C1007	C1008	C1009	C1001	C1002	C1003	C1004	C1005	C1006	C1007	C1008	AECACM activities Training & Awareness	
WED	C1001	C1002	VV	VV	X	C1003	C1004	C1005	C1006	C1007	C1008	C1009	VV	C1001 (T)
THU	C1002	C1003	VV	VV	X	C1004	C1005	C1006	C1007	C1008	C1009	C1001 (T)	C1002 (T)	C1003 (T)
FRI	M1001	M1002	VV	VV	X	C1004	C1005	C1006	C1007	C1008	C1009	C1001 (T)	M1002	C1004 (T)
SAT						C1001	C1002	C1003	C1004	C1005	C1006	C1007	C1008	C1009

Class: B, 2nd Year, Semester 2  
Room No: 401  
Shift: C  
Class Teacher / Convener Chairman: Dr. T. Nagalingam  
Class Advisor: Dr. S. Sudhakaran  
School of Engineering - Department of Computer Science and Engineering  
Srinivasa Ramanujan Institute of Technology  
With Effect from 02/2023

## VIEW COURSES AND FACULTY:

S.NO.	COURSES	NAME OF THE FACULTY	PHONE NUMBER	IMAH ID	CLOIDS
1	The Class Advisor	7001410994 Dr. S. Sudhakaran Vellore Institute of Technology		self.yash@srinivasotech.edu.in	
2	UNI300 English for Engineers	7004056192 Dr. Cherry Mathew Vellore Institute of Technology		cherryms@srinivasotech.edu.in	3

## CONCLUSION:

The Barcode Scanning based Attendance System is an efficient way to manage attendance records in a college setting. The system uses Python, OpenCV, and Excel to automate the attendance process, saving time and reducing errors. The system uses SVM Classifier to recognize barcodes and a dataset of barcode images to train the classifiers. The system uses various image processing techniques to improve the quality of barcode images before classification.

**GITHUB LINK:** <https://github.com/fromjyce/BarCodeAttendanceSystem>