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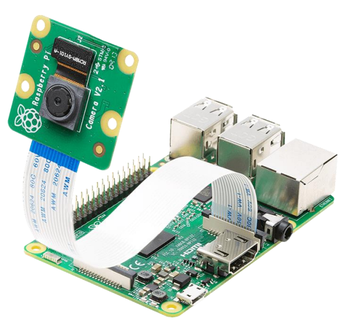
DEVELOPMENT OF IOT-BASED SOLUTION FOR CHECKING STUDENTS' ATTENDANCE

INTRODUCTION

Building a digital solution based on an IoT model to support student attendance using a combination of traditional attendance methods: student ID and facial recognition ...



python

SPECIFICATION REQUIREMENTS AND CHALLENGES

Requirements

- Complete implementation of the solution model proposed by the group in the outline stage.
- Conduct experiments and record feedback from users
- The system functions worked as designed.
- Students must have empirical results on the performance of the algorithms that the team has implemented (processing time, accuracy).
- There are test cases of intentionally tampering to deceive the system in order to evaluate the practicality of the solution.

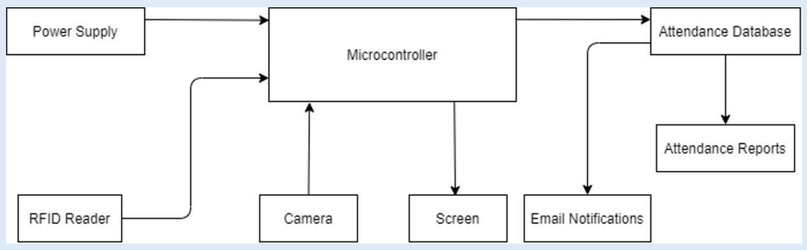
Challenges

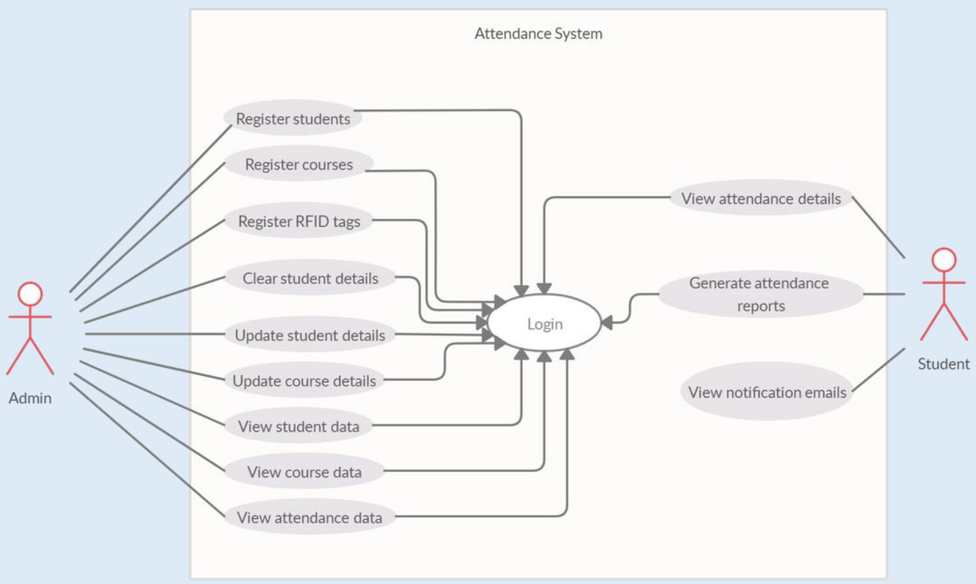
- There are many way for students to do a fake attendance.
- Limitations of traditional check attendance, RFID card, fingerprint and facial recognition.
- Limitation of hardware devices and camera.
- System stability and continuity.

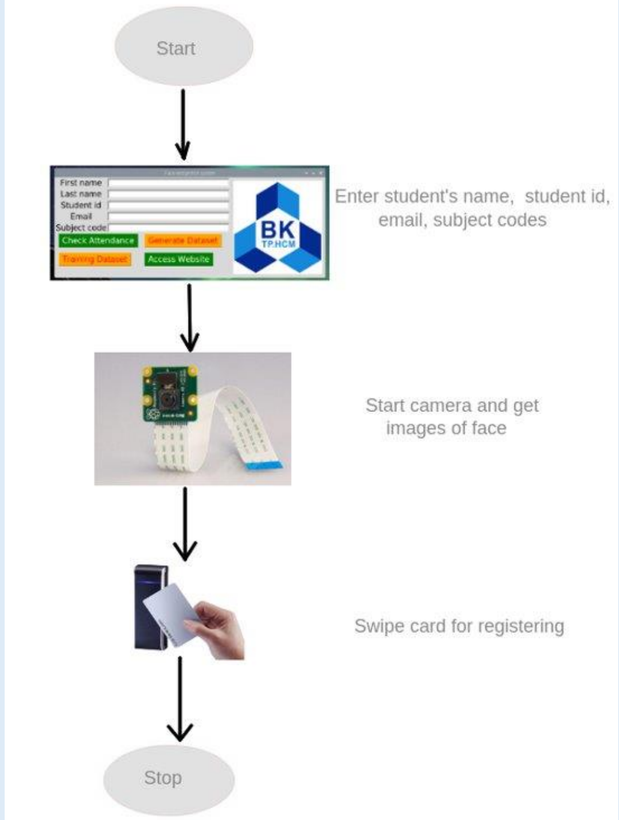
METHODOLOGY

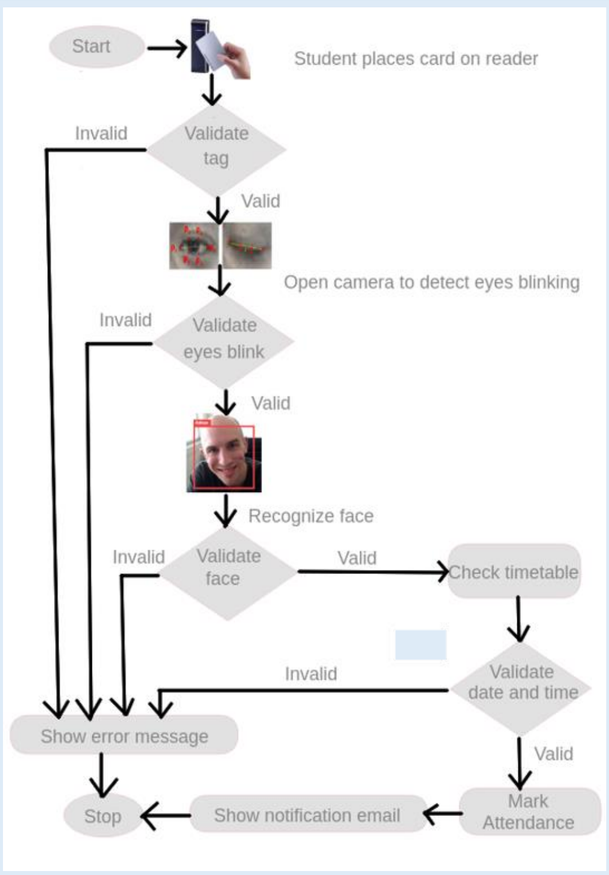
- Combining the two solutions is RFID tag scanning and facial recognition.
- Using Raspberry 3B +, module RC522 for scanning RFID tags and Pi cam.
- Using LBP (Local Binary Patterns) cascade classifier for facial recognition.
- The system can track user's eye blink for preventing fake checking attendance by facial landmarks.
- Building a Python application for checking attendance and new registration
- Building a database and a web application.
- Hashing passwords after save to the database.
- Web app has login, logout, register page.
- Web app has 3 roles: admin, teacher and student.
- Teachers and students can view charts and data about attendance...

SYSTEM ARCHITECTURE

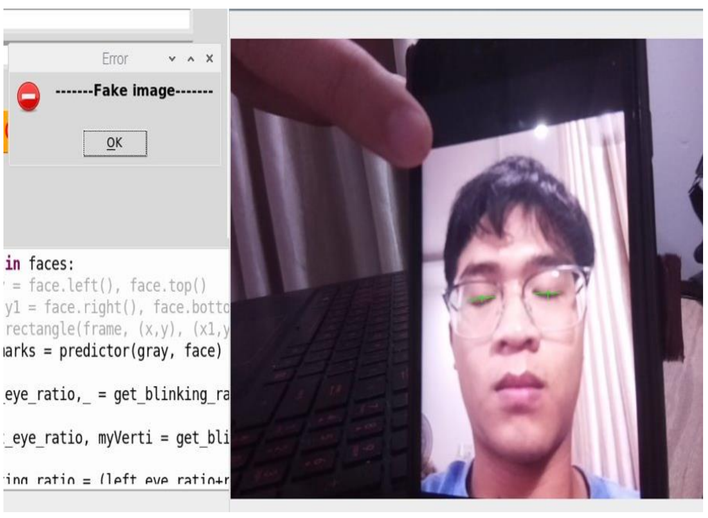


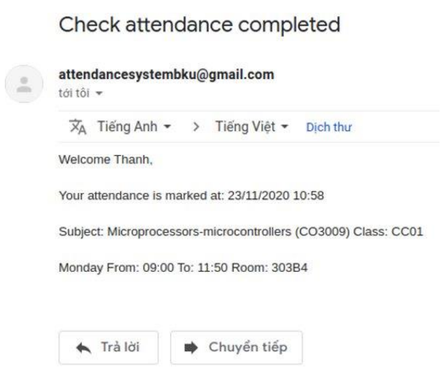






RESULTS





Time (s)	1	2	3	4	5	6	7	8	9	10	Average	Accuracy
Register	87	93	86	72	100	69	91	110	98	105	91.1	\
Correct all	56	58	43	61	63	54	59	60	64	62	58	47/50 = 94 %
Wrong timetable	50	41	48	42	39	46	43	39	49	34	43.2	49/50 = 98 %
Other face in db	32	30	34	42	37	43	34	30	41	29	35.2	46/50 = 92 %
Unknown face	30	32	37	40	33	44	45	51	38	33	38.3	49/50 = 98 %
Unregistered card	26	25	31	28	27	29	31	28	25	29	27.9	50/50 = 100 %
Fake image	75	78	80	77	81	79	86	76	84	87	80.3	50/50 = 100 %

CONCLUSION

Advantages:
- Easy to setup
- Low cost

Disadvantages:
- Timing constraint
- Localhost
- User interface is not good

Future Works:
- Improve hardware components, camera
- Remote host for database and web app
- Improve user interface