Project Proposal

Course Code: CSE-360

Tentative Title: Project Thermique

Group No.: Foxtrot

Section: B

Group Members:

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MILITARY INSTITUTE OF SCIENCE AND TECHNOLOGY
Department of Computer Science & Engineering
Idea Proposal of IDP

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This is an application form for the approval of the idea proposal of IDP by the Course Teachers. All the criteria which are applicable from the following list must be mentioned and filled in properly.

Date: August 13, 2020

1. **Group No:** Foxtrot
2. **Section:** B

Session: 2017-2018

3. **Program:** CSE-18
4. **Tentative Title:** Project Thermique
5. **Background & Present State of the Problem**

The thermal scanning system comprises a handheld thermal scanning device with wheels and three infrared sensors that are spaced to scan skin temperature. (4) Radio Frequency Identification refers to using transponders or tags affiliated with an object for the purpose of identification and tracking by means of radio waves.(1) An RFID based system can be built in order to produce a time-attendance management system. (3) Very important and initial challenge in the epidemic of Covid-19 is to identify more probable patients out of a crowd of people. Once identified, probable patients may be sent for more Covid-19 test for identification.(2)

6. **Objectives with Specific Aims & Possible Outcome:**

- Objectives:
    - Using radiometric thermal imaging sensor to obtain a heat map of a specified region
    - Using RFID to log the entry of anyone entering a facility (for example, a campus building) and to log their temperatures in real time while they enter
    - Using facial detection to understand which area of the face to get the temperature from
    - Logging the personnel entry into a database, to be viewed by a moderator in real time

- Outcome:
    - In situations like a global pandemic/epidemic, fever is indicative of a person having the risk of being infected. This will help alert people to be more proactive and not allow an infected person to enter a populated working environment
    - A detailed log is always maintained, and is accessible to the moderator or authority of an establishment, regarding who entered the building at what time, without the need for paperwork

- Future plans may include real time facial tracking, and contact tracing for a pandemic scenario, which may aid in understanding the spread of a virus
- This is an unmanned solution, and is projected to be fully autonomous

7. **Outline of Methodology/Experimental Design:**

A person, when entering a facility such as a campus, will need to scan their ID card (with RFID chip) against a scanner near the doorway. But before scanning, he/she has to look towards a camera (with thermal imaging capabilities) which will identify whether or not they have a fever. By facial detection, their exact facial features can be scanned and false positives can be avoided. Their entry time, ID number, and corresponding temperature is stored in a database, from which it can be viewed by authorized personnel. In the future, this idea can be extended further, to include contact tracing abilities for a pandemic/epidemic scenario.

8. **Please select the covered domain of your project (At least 04 or you can add any other domain(s) that is not included in the following list)**

☐ **Theoretical CS and Algorithms**	☐ **Information Security**
☐ **Networking**	☒ **Computer Vision**
☒ **Database and Data Mining**	☒ **Pattern Recognition**
☐ **Cloud Computing and Big Data**	☐ **Internet of Things (IoT)**
☒ **AI and Robotics**	☐ **Human Computer Interactions (HCI)**
☒ **Digital Image processing**	

9. **References:**

1. Hu L, Shi X, Voß S, Zhang W. Application of RFID technology at the entrance gate of container terminals. InInternational Conference on Computational Logistics 2011 Sep 19 (pp. 209-220). Springer, Berlin, Heidelberg.
2. Rane KP. Design and Development of Low Cost Humanoid Robot with Thermal Temperature Scanner for COVID-19 Virus Preliminary Identification. International Journal. 2020 May;9(3).
3. Chiagozie OG, Nwaji OG. Radio frequency identification (RFID) based attendance system with automatic door unit. Academic Research International. 2012 Mar 1;2(2):168.
4. Gentempo P, Brody L, inventors. Thermal scanning system and method. United States patent US 6,440,084. 2002 Aug 27.

10. **Cost estimate:**

Ser no	Items	Cost (Taka)
1	Radiometric Sensor (Lepton 3.5)	39,000
2	STM32F411 development board	3,300
3	Nvidia Jetson Nano Dev Kit [Model B01]	13,900
4	USB RFID Reader	900
5	Pi Camera (aka PiCam) V2	2,600
6	Specialized cables for camera connection, if required	1000
	Total	60,700

11. **Market Analysis:**

Existing projects/ currently existing solutions	**Features**					
	Has Thermal Imaging capabilities	**Has normal imaging with facial detection**	**RFID logging**	**Database integrated**	**Automated**	**Cost (in BDT)**
4beauty Thermal Scanner	✓	X	X	X	X	2250
Elara™ FB-Series O	✓	✓	X	X	✓	2,84,000
Kisi Reader Pro (KRP)	X	X	✓	✓	✓	50,964
Nest Camera IQ Outdoor	X	✓	X	X	✓	30,580
Our project	✓	✓	✓	✓	✓	60,700

12. **Signature of the group members:**

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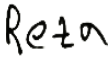
03	201814021	Md. Rokonuzzaman Reza	emonreza86@gmail.com	
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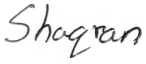
05	201814059	Shaqran Bin Saleh	shaqran39@gmail.com	
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