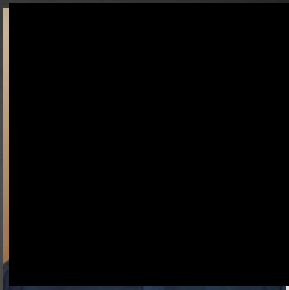


EEE 416 – Microprocessor and Embedded Systems Laboratory
Jan 2022 Level-4 Term-I Section A
Final Project Demonstration

Vending Machine for Hygiene Product

SUBMITTED BY – GROUP A2.8



PARTHA KUMAR

1606110



Md Humyon Hossain

1706049



Md Alamin

1706060



Tamim Ahmed

1706063



BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Outline

1. Summary
2. Introduction
3. Design
4. Implementation
5. Analysis and Evaluation
6. References



1. Summary / Abstract

In this EEE416 sessional course we have built a vending machine that provides sanitary pads for female students in an educational institutions. We have two sections in this vending machine so that additional hygiene product or medicine products can be provided as per demand. First female students register for this machine with their fingerprints. Their fingerprints are stored in the memory of the fingerprint sensor. When a student goes to purchase a product she will first have to recognize herself with her fingerprint. Then she'll select a button among two push buttons. So, a product will be released from the machine and she'll collect the product. We have designed a website for billing. On the website the billing information is saved and later she'll pay the bill through her institutional payment system.



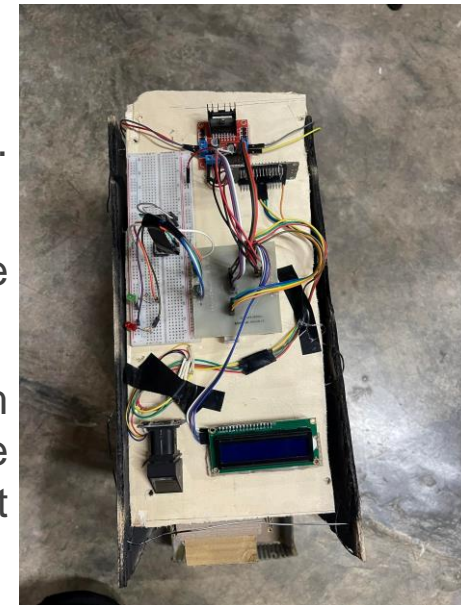
2. Introduction: Purpose of the IDEA

- ▶ Period is a general physical condition in a female body that repeats once in every 28days. In this condition it becomes difficult for them to attend classes regularly. To solve this problem there are sanitary pads that helps them from unwanted leakage. But one problem is there, which often it's tough to detect exactly when leakage happens and in worst case if it happens during class time a student feels discomfort and disturbed. To solve this problem, we have built a vending machine to provide sanitary pads to our female students that will be placed at the campus, and they can get the product whenever required.



2. Introduction: Set UP

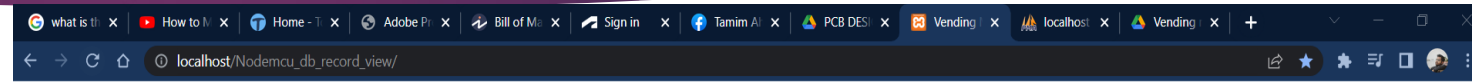
- ▶ The vending machine has two parts: hardware and software.
 - ▶ **Hardware** part is the machine itself.
 - ▶ This machine has a fingerprint sensor that detects its customers. In the LCD display name and id of the student is shown.
 - ▶ Two conveyer belts are placed inside the machine. Products are placed on the conveyer belts.
 - ▶ There are two push buttons to select to select any product from any of the belt. When the customer pushes a button the corresponding belt rolls and the desired product falls into the front basket and the customer collects her product.



2. Introduction

► Software section:

- The machine is programmed with Arduino and data from the machine is sent to a server by a NodeMCU. Codes are written in Arduino IDE.
- There is a website for billing. After every purchase billing information is saved in the website with the customer information.



Tamim's Vending Machine Dashboard

No	Product	Value	Time Stamp
9	B	150	2022-08-31 00:43:05
63	A	100	2022-08-31 01:08:42
49	B	150	2022-08-31 01:10:37
63	B	150	2022-08-31 01:10:53
63	B	150	2022-08-31 01:11:28
49	B	150	2022-08-31 01:12:22
63	B	150	2022-08-31 01:14:15
63	A	100	2022-08-31 01:14:38

Tamim's Vending Machine Dashboard

Student ID	Product	Value
9	B	150 tk
63	A	100 tk
49	B	150 tk
63	B	150 tk
63	B	150 tk
49	B	150 tk
63	B	150 tk
63	A	100 tk

3.1 Design: Methods

► Components

- Arduino UNO
 - Esp8266 NodeMCU
 - Fingerprint sensor R305
 - Motor (2 pcs)
 - Motor driver
 - Push button (2 pcs)
 - LED (2pcs)
 - LCD Display
- Bread board
 - Jumpers
 - P CB board



3.1 Design: Methods

- ▶ Microcontroller

- ▶ Arduino UNO

Fingerprint sensor, motor driver and push button is run by Arduino



- ▶ Esp8266

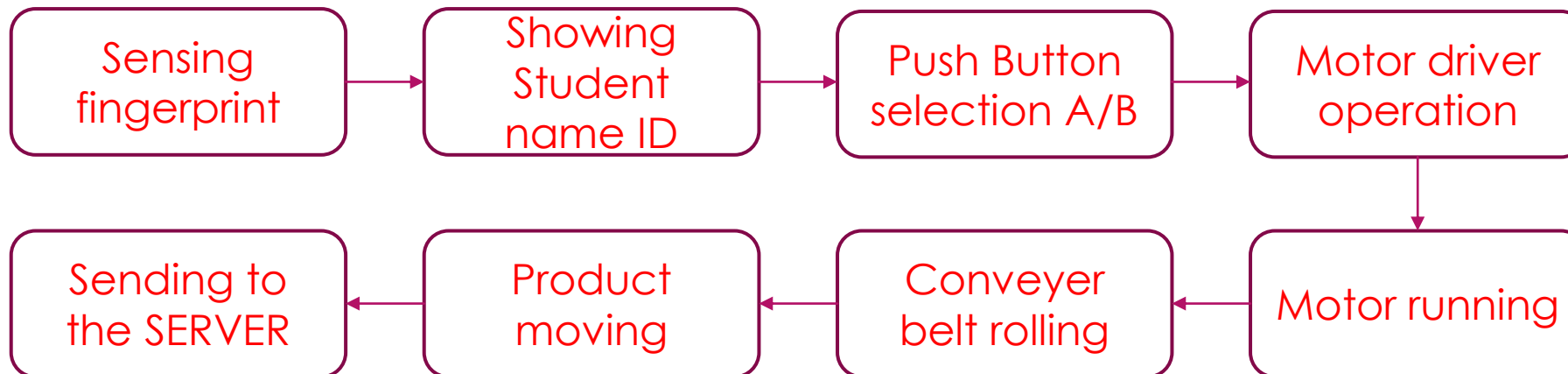
Serial communication with arduino

Data is sent by esp8266 to the server



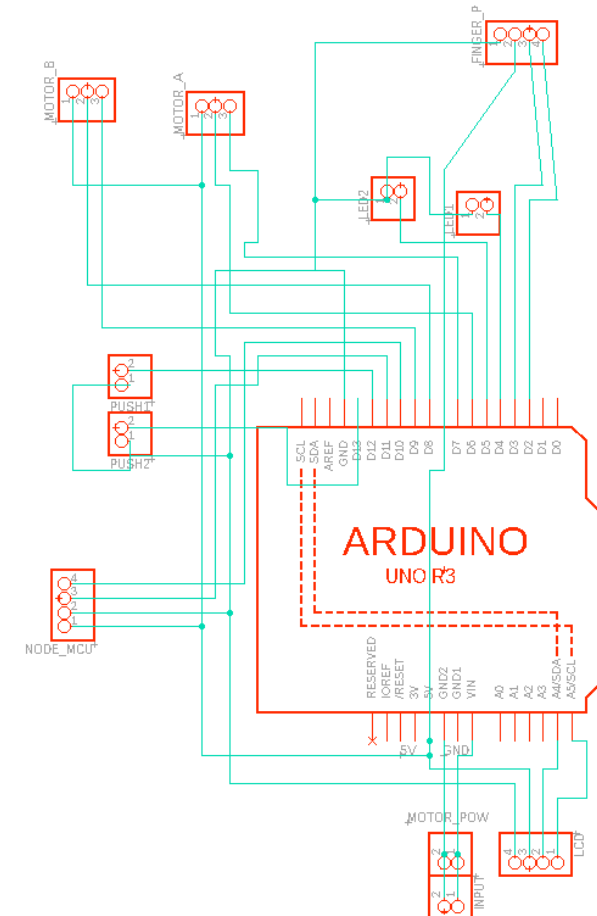
3.1 Design: Methods

Algorithm



3.2 Design: Circuit Diagram

- Circuit diagram of our project:



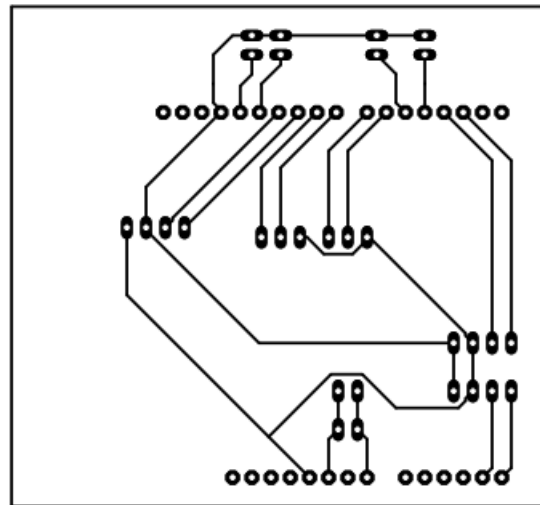
3.3 Design: Simulation (optional)

- ▶ Not applicable

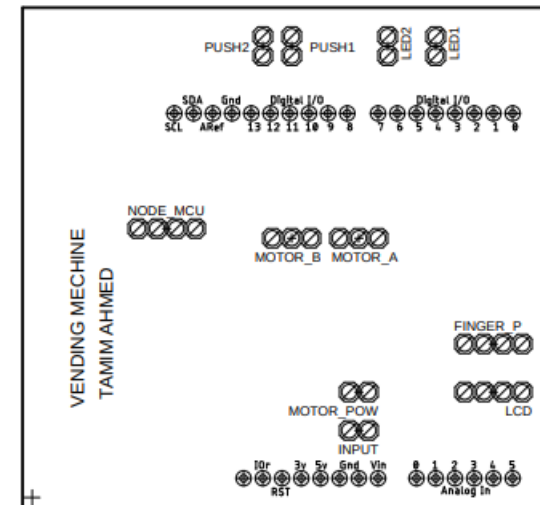


3.4 Design: PCB Layout and 3d rendering

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Bottom

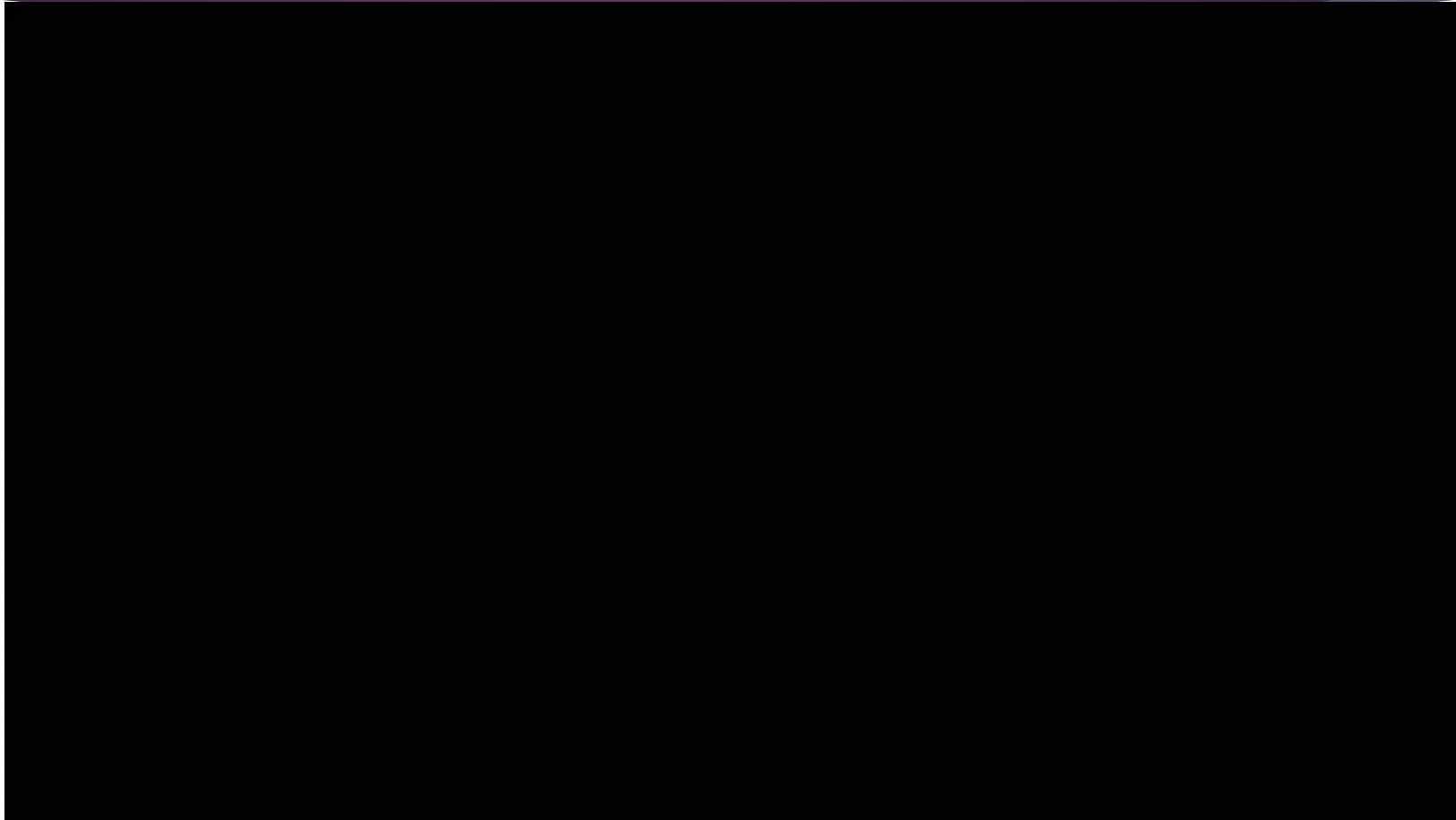


Top

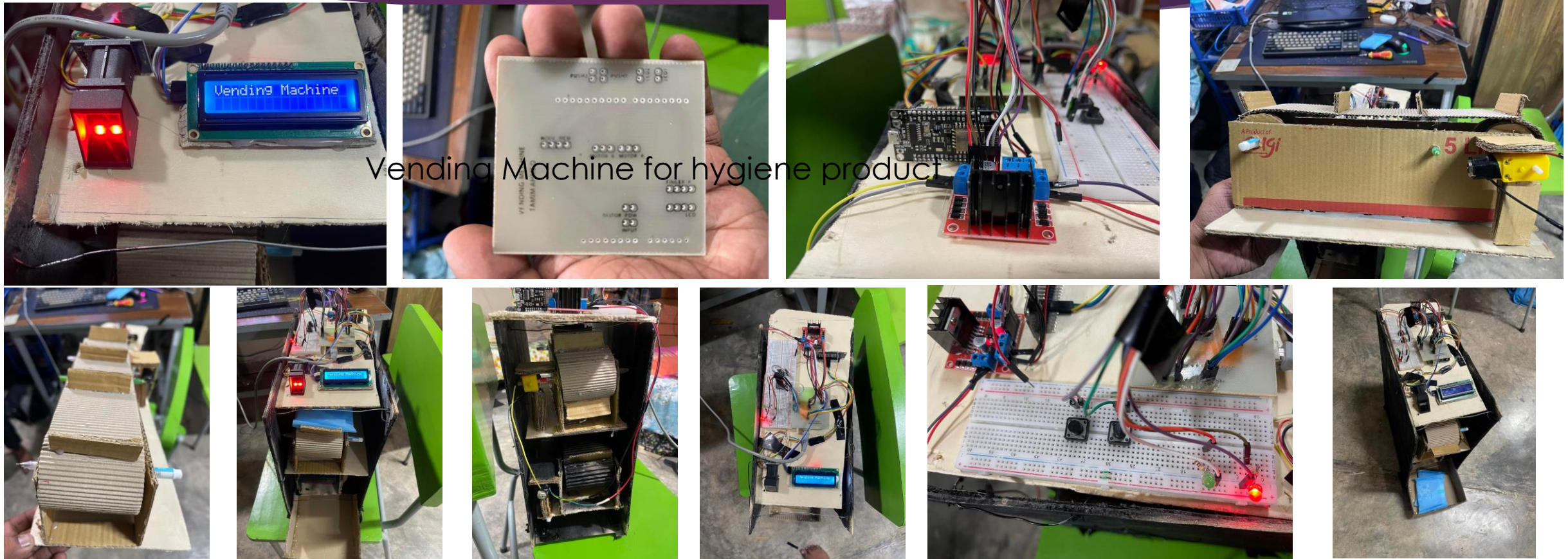
4 Implementation: Demonstration (Hardware)



4 Implementation: Demonstration(Website)



4.1 Implementation: Photo Gallery



4.2 Implementation: External Links

► **GitHub:** <https://github.com/tamimahmed063/Vending-Machine-for-hygiene-product.git>

► **YouTube Link:**

<https://www.youtube.com/watch?v=etOdFjPLh-w>



5. Analysis and Evaluation

- ▶ 5.1 Novelty
- ▶ 5.2 Project Management and Cost Analysis
- ▶ 5.3 Practical Considerations of the Design
- ▶ 5.4 Assessment of the Impact of the Project
- ▶ 5.5 Evaluation of the Sustainability



5.1 Novelty

- ▶ The utilization of vending machine for providing only hygiene product is not so common.
- ▶ In our vending machine we used a conveyer belt instead of rolling spring which is used in as usual vending machines.



5.2 Project Management and Cost Analysis

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Product	Quantity	Cost
Arduino Uno	1	1200 taka
Esp8266 NodeMCU	1	800 taka
Fingerprint sensor R305	1	1700 taka
Motor driver	2	400 taka
DC motor	2	50 taka
Lipo Battery	1	2200 taka
LCD display	1	800 taka

5.2 Project Management and Cost Analysis

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Product	Quantity	Cost
PCB Board	6	600 taka
Breadboard	3	100 taka
Wires and jumpers	4 bundles	300 taka
Wood board	1 (large peiece)	400 taka
Spray Can	1	150 taka
Push button	2	200 taka
LED	2	100 taka

5.2 Project Management and Cost Analysis

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Product	Cost
Vending Machine	9000 taka



5.3 Practical Considerations of the Design

- ▶ In 1 slide, address these points:
- ▶ 5.3.1 Consideration to public health and safety:
Our vending machine supplies sanitary pads for female students increasing female health conditions and reducing fatalities.
- ▶ 5.3.2 Consideration to environment
We did not follow any steps that could jeopardise the surrounding environment
- ▶ 5.3.3 Considerations to cultural and societal needs
It is a taboo in our society. It will prevent female to buy in outdoors and make the confident.



5.4 Assessment of the Impact of the Project

In 1 slide, address these points:

- ▶ 5.4.1 Assessment of Societal Issues

Societal impact of our vending machine is pretty good. It would enhance the hygiene situation in our schools, colleges, universities.

- ▶ 5.4.2 Assessment of Health and Safety Issues

This machine is user friendly and prone to zero risk.

- ▶ 5.4.3 Assessment of Legal Issues

Transparency is maintained.

- ▶ 5.4.4 Assessment of Cultural Issues

This product has the ability to bring about change in people's mindset



5.5 Evaluation of the Sustainability

In 1 slide, address these points:

- ▶ 5.5.1 Evaluation of Sustainability

The box is made of wood, and all the components in the box fit suitably. Lots of trial run was executed to finalize its commission.

- ▶ 5.5.2 Evaluation of Impact of Design in Societal Context

Transparency is maintained

- ▶ 5.5.3 Evaluation of Impact of Design in Environmental Context

No such product is used that can harm environment



6. Reflection on Individual and Team work

- 6.1 Individual Contribution of Each Member
- 6.2 Mode of Team-Work
- 6.3 Diversity Statement of Team
- 6.4 Log-Book of Project Implementation



6.1 Individual Contribution of Each Member

1706063: Arduino+ESP Code, Hardware, Report, Presentation

1706049: PCB, Hardware, Report, Presentation

1706060: Hardware, Report, Presentation

1606110: Report, Presentation



6.2 Mode of TeamWork and Diversity

We four members hold different capabilities.

Id 63 - has an expert in coding. So, he handled the software part. He wrote all the codes to communicate the Arduino with NodeMCU and control the other components like motor, lcd, fingerprint etc.

Id 49 & 60 - Handled the hardware part. They made the box in such a design that a user can have easy access to the machine. ID 49 also design the PCB to compact the overall circuit. Id 60 brought aesthetics to the design.

Id 16110 – He helped purchasing and collecting the component and collaborated with three of us.



6.3 Logbook of Project

Date	Work
18.7.22	Almost all components were purchased
21.7.22	Started working on Arduino to run motor and sense fingerprint with sensor.
25.7.22	How to connect the esp to wifi
30.7.22	How to create a server using XAMP
2.8.22	Create a conveyer belt
6.8.22	Serial communication between Arduino and NODE MCU



6.3 Logbook of Project

Date	Work
25.8.22	Design a box and built it
28.8.22	Assemble all the component to the box
29.8.22	Create a fully running machine
30.8.22	Demonstration video
30.8.22	Draft Report writing
30.8.22	Presentation



7. References

- ▶ <https://randomnerdtutorials.com/esp8266-nodemcu-thingspeak-publish-arduino/#:~:text=To%20send%20values%20from%20the,need%20it%20in%20a%20moment.>
- ▶ <https://www.youtube.com/watch?v=YXCK03O-wjM>
- ▶ <https://www.youtube.com/watch?v=TnWDIHpY56o>
- ▶ <https://www.youtube.com/watch?v=WNK1unCzpbs>



Thank You!!!

