

Flow Bangladesh - A Multipurpose End-to-End Industry Management Solution

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1 Introduction

Supply chain management is important for businesses as it manages the flow of goods and materials from production to consumption. However, the current system has problems that can cause inefficiencies, delays, and increased costs. To fix these issues, we plan to use blockchain and IoT technology to automate the supply chain and create a more efficient, cost-effective, transparent, and secure system. Our solution combines the digital, virtual, and physical worlds with RFID, blockchain, and IoT technology as part of Industry 4.0.

2 Project Overview

Our project is based on three important modules. Those are -

1. Blockchain based personal authentication
2. IOT Based Factory Safety System
3. Supply Chain Management

3 Challenges In The Current Industry

We have identified four common problems with the current supply chain system and how blockchain technology and IOT can help to solve them:

- Lack of transparency and traceability
- Inefficiencies and delays
- Counterfeit goods
- Lack of Automation with factory dangers

4 Solution

Using blockchain technology and IOT we will be providing some key improvements to the current supply chain system. Some of the ways we will be impacting the current system include:

- Increased efficiency
- Reduced costs
- Improved transparency and traceability
- Enhanced security
- Work safety

5 Architecture

The architecture of the system is described with diagrams in 1 and 2.

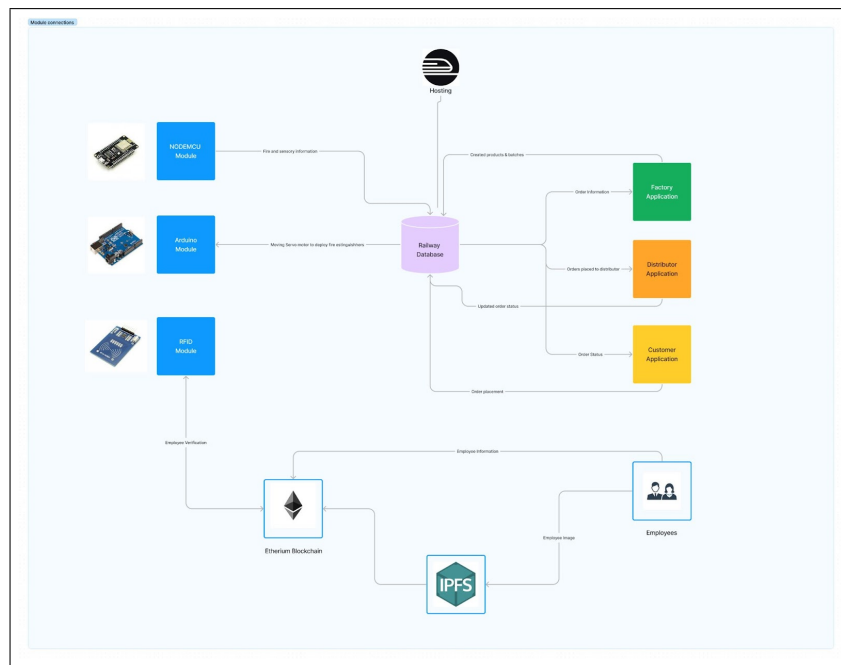


Figure 1: Architecture of the proposed system

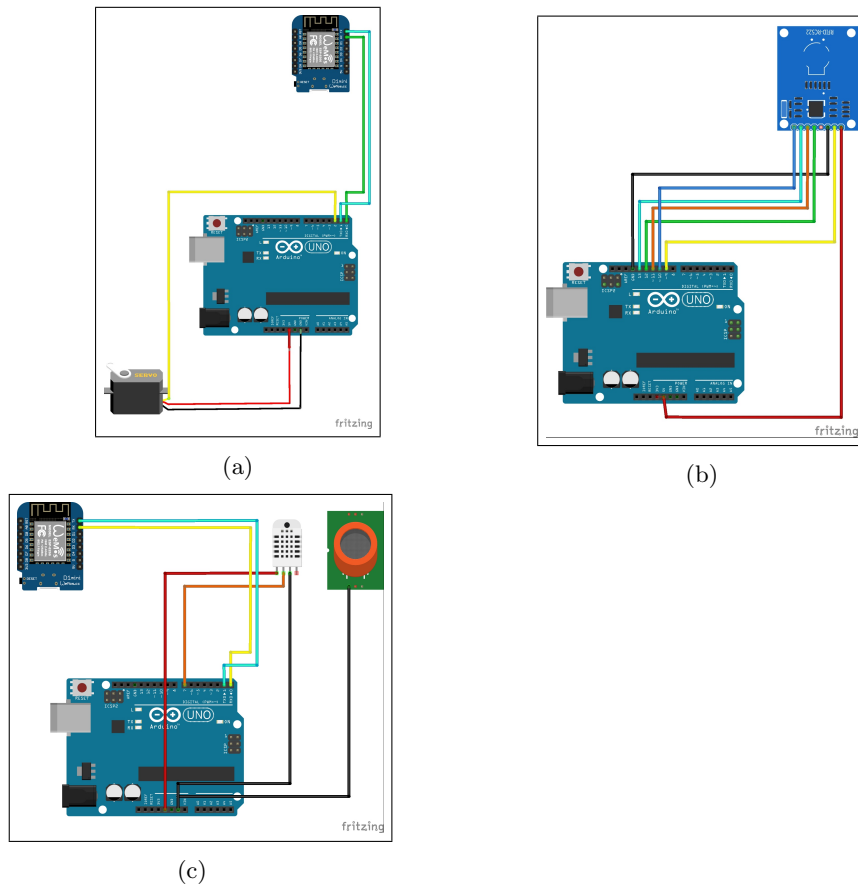


Figure 2: IOT based system diagrams

6 Detailed Product Description

6.1 NodeMCU Module

- Will track the temperature, humidity along with flame detectors and send that information to the database

6.2 Arduino Module

- These will include several devices that will be responsible for controlling various parts of the factory like doors, machines etc
- Primarily we will build devices that will be able to lock doors

6.3 RFID Module

- This will authenticate workers and authority personnel
- Will grant access to different classes of rooms to different classes of workers
- Will track who entered and exited rooms along with timestamps to the database

6.4 Factory website

- Factory website
- Manages batch creation
- Manages warehouse management
- Manages orders
- Manages sensor information
- Manages worker information
- Controls IoT devices throughout the premises

6.5 Distributor website

- Manages orders
- Important for tracking products

6.6 Customer website

- Order placing
- Product authentication using QR code scan
- Storing previous orders and their authenticity status

7 Target Audience

Our target audience will include all categories of factories. Especially those who require sensory information tracking and warehouse management. We have chosen pharmaceutical industries as our initial customers as they will be most suited for all the devices that our system supports. This will also help customers to track authenticity of drugs which is much more important than tracking authenticity of any other products.

8 Business Model

Our business model will work in 2 categories

8.1 Subscription Based Service

- Factories that buy our IoT solutions will get subscriptions of our service
- We will primarily sell our IoT devices and after installation, will provide interface and other support for managing those devices as well as the data provided by the sensors
- There will be 3 categories of services:
 1. Silver RFID Package
 - (a) RFID Modules
 - (b) Door Mechanisms
 - (c) Interface to add and remove workers
 2. Gold Worker Package
 - (a) Track people entering different rooms along with timestamps
 - (b) Manage different categories of workers and rooms
 3. Silver Factory Automation Service
 - (a) Devices to lock and unlock doors controller system
 4. Gold Factory Automation Service
 - (a) Devices to automate different machines across the factory
 5. Silver Sensory Module Service
 - (a) Flame sensors and devices
 - (b) IOT based fire safety protection
 6. Gold Sensory Module Service
 - (a) Humidity and temperature sensors
 - (b) Data analysis with sensory data
 - (c) ML models generated to give business insights
- Based on the size of the factory, we plan to charge the following-

	Small	Medium	Large
Silver Subscription	50,000-100,000	75,000-200,000	100,000-500,000
Gold Subscription	100,000-175,000	125,000-250,000	200,000-1,000,000

8.2 Percentage Based Service

Our solution will primarily cover the warehouses for our all-under-one solutions including smart entry service, automatic logging service, IOT-based fire safety service etc. For this, we plan to charge

- 5% from the factory transactions
- 3% from the distributor transactions
- 0.3% from customer transactions

9 Conclusion

In this work, we have summarized the plan of work for the project submitted for the SUST SWE TECHNOVENT 2023. The work focuses primarily on Factory and Warehouse management, safety, and digitization, and is built on IOT, blockchain, database, and machine learning technology stacks. We plan on implementing the work in the in-house 36 hour hackathon.