Milestone 1 Report

*COMPSYS 704: Advanced Embedded Systems*

*Project 1*

*Group 7*

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# Introduction

Advantech Ltd., a company for manufacturing and delivery of sensitive and high value bottled liquids, have decided to build a new manufacturing facility that will automate the manufacturing process within the existing facility, provide advanced system for monitoring and controlling environmental conditions and access and security control.

This project is to develop this solution leveraging IoT concepts, synchronous programming and system-level designing. This is a milestone report documenting the progress and decisions made for this project.

# Brief

The solution is facility wide. Incorporated in multiple parts of the physical facility as well as in the purpose of the facility, it has the following requirements:

* A developed Automated Bottling System, as this is facility’s purpose, to output orders of bottled goods
* Be able to monitor who is within the facility as well as specifically where they are
* Be able to provide security in the form of only allowing selected personnel in general and specific areas of the facility (e.g restriced access to the main office)
* Continuously monitor and adjust the facility climate factors such as humidity and heat to desired conditions. Even able to adjust the climate of specific areas differently within the facility
* Receive and process orders from registered customers for bottling

These are the high-level requirements from which more detailed and specific requirements stem from.

# Overall Conceptual design

In this section the overall intended design is explained here. A diagram expressing the overall design can be seen below at *Figure 1* .

As team, we have opted to use a decentralized control system, with the different functionalities of the each part of the system managed separately. This is due to the fact that using a decentralized design allows for a more modular design of the system. Each member of the team will be able to develop functionalities with little concern for clashing with other team members. Additionally, this spreads the burden of processing and running of functionalities which improves overall performance. Finally, this method has security benefits as the failure of one functionality will not necessarily mean a breakdown of the whole system.

The overall design is broken into 4 subsystems:

* Automatic Bottling System (ABS) - A central part to Advantech, this handles the grabbing, filling, capping and passing on of the bottles. From orders received liquids are mixed to create the ordered product
* Access Control System - Access Control System (ACS) controls movement of the personnel in the space. Controlling the main access of the facility as well as specific rooms for all personnel that interact with the facility. In addition, it will continually track the location of all within the facility and make appropriate alerts when required about people entering restricted areas such as the ABS area. It will leverage the use of ID tags and badges.
* Environment Control System (ECS) – The Environmental Control System is used to manage the temperature, humidity, and lighting of the facility, while also managing a fire and smoke alarm system. It will ensure a stable temperature and humidity while the facility is in use or is operational, and lighting conditions will be be managed to be appropriate to the time of the day. It will also monitor for fires or smoke in the premises and will raise an alarm then alert emergency services when either is detected.
* Purchase Order System -

Links are used for communications between subs-systems. The system will receive data from sensors embedded within the physical environment and output signals that will drive actuators.

<<Overall design diagram here (Figure 1)>>

<<GUI here>>

# Completed Parts

# Task Allocation

Below is a table showing how each task is categorised, as well as who is currently selected to complete this task

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Allocated to** |
| *ABS Tasks* |  |  |
| Lip Loader |  |  |
| Bottle Unloader |  |  |
| Rotary Table |  |  |
| Conveyor Belt |  |  |
| Filler |  |  |
|  |  |  |
| *Group Components* |  |  |
| GUI |  |  |
| Report (Main Editor) |  |  |
|  |  |  |
| *Individual Components* |  |  |
| *ECS* |  | *Frank* |
| *POS* |  | *Beck* |
| *ACS* |  | *Rufaro* |