Hazard Analysis
MECHTRON 4TB6

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Table 1: Revision History

Date	**Developer(s)**	**Change**
10/12/2022	Ahmed	Added FMEA analysis
Date2	Name(s)	Description of changes

Contents

1 Introduction

A hazard is the combination of a system property with an environmental condition that can cause harm to the intended user.

Hazard analysis is a critical consideration in the design of all systems. When done correctly, hazards to the end user are identified and can be mitigated or eliminated completely. While it is not possible to guarantee the safety of a system, applying hazard analysis methods is a neccesary step in supporting the safety of the system.

Formulate's area of work combines hardware and software sub-systems and as a result, requires hazard analysis to obtain a comprehensive understanding of the overall system.

2 Scope and Purpose of Hazard Analysis

In this document, Formulate details the hazards a user can experience through the Failure Mode and Effect Analysis method. As a result, the group systematically outlined the hazards and measures that were considered to mitigate or eliminate the hazard.

3 System Boundaries and Components

4 Critical Assumptions

5 Failure Mode and Effect Analysis

Component	Ref	Failure Mode	Effects of Failure	Cause of Failure	Recommended Actions
Hardware	H1.1	Sensor data is not sent to PC	Test data is not captured by our device	• Wi-Fi Module is broken • USB Device is not connected • Device is not connected to Wi-Fi network	Using the LCD display show the systems connectivity
	H1.2	System does not have power	Device is off and not operational	• Battery died • Power cables are disconnected • Too much current is drawn from Arduino	• Add a battery indicator to the screen to alert the user if the battery is low • Make the sensors get their power directly from the power source and not the arduino
	H1.3	Hardware falls off the mount	• Hardware device breaks/gets damaged • Sensors capture incorrect data • Potential injury to those in vehicle	• User didn't affix Hardware properly • Mounting mechanism failed	The mounting mechanism should give the user feedback when the device is mounted correctly
	H1.4	Display turns off	Cannot view the status of the device	• LCD display failure • LCD is improperly connected • Arduino is drawing too much current	
	H1.5	Threshold alert not displaying	User will not be notified	• Sensor failure • Refer to H1.4 • Threshold not set up by user in the Desktop App	
Desktop Application	H2.1	App cant see hardware device	Refer to H1.1	• Refer to H1.1 • COM Port is being used by another application	

	H2.2	Data from the hardware device is lost	Test results will all be lost	• Application suddenly closes during test • Hardware device disconnects from PC	Store last test data into local storage
	H2.3	Cannot view live data	User will not be able to see data during test runs	• Sensors are not connected • Refer to H1.1	
	H2.4	Data cannot be sent to database	Test results will all be lost and will not be viewable in the analytics platform	• Database failure • Connection failure • PC not connected to the internet	
Database	H3.1	Too much data is sent to the database	The database is getting overloaded with data causing it to crash or freeze	User submits too much data within a very short time period	Add a cool down timer after the user submits the data to the database so they wont be able to spam it constantly
Data Analytics Website	H4.1	User cannot login	User will not have access to dashboard	• User does not have an account • User's credentials don't match	
	H4.2	User cannot view the dashboard	Users cannot view KPIs of tests	• User does not have required permissions	
	H4.3	Data not being displayed		• Database failure • Authentication error	

6 Safety and Security Requirements

7 Roadmap

Checking to see if this document has been edited before