



**UNIVERSITI TEKNOLOGI MARA**

**MICROCONTROLLER-BASED SENSORY MODULES FOR  
COGNITIVE THERAPY IN MULTISENSORY ROOMS**

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## ABSTRACT

Multisensory room (MSR) is therapy prescription for stimulating senses in stages involving patient and therapist interaction. Therapy sessions are known to take effect at different rate depending on patient's condition and response, often across a long period of for it to be noticeable. Based on this reason, there is a need to improve connectivity and data collection that will allow clinical data analytic. This project presented a multisensory room design that offers added sensory input interfacing, connectivity for data storage and configuration for data analytics. The main objective is to develop effective data collection during multisensory therapy session. Second objective is to provide connectivity for multisensory room activities and patients experience data storage for clinical data analytics to take place. Third is to demonstrate data analytics using the data collected from the multisensory room. Under this framework, the therapy would be divided to five sub-modules. The first is when the patient meet the doctor or therapist assessment, to be given the clinical prescription. Second is therapist assessment, followed by the MSR session, then the post-MSR therapist assessment. The treatment is concluded by data analytics. MSR performed analysis to assist doctor's review of the prescribed MSR using artificial data that is incorporated into behavioural checklist and patient data. Visual representation and linear regression predictive model performed using SAS Viya and Visual Analytics.

*Index Terms—Analytical Data, Cognitive impairment Patient, Doctor, and Multisensory room*

# TABLE OF CONTENTS

<b>TITLE</b>	<b>i</b>
<b>APPROVAL</b>	<b>ii</b>
<b>DECLARATION</b>	<b>iii</b>
<b>ACKNOWLEDGEMENT</b>	<b>iv</b>
<b>ABSTRACT</b>	<b>v</b>
<b>TABLE OF CONTENTS</b>	<b>vi-viii</b>
<b>LIST OF FIGURES</b>	<b>ix-x</b>
<b>LIST OF TABLES</b>	<b>xi</b>
<b>LIST OF ABBREVIATIONS</b>	<b>xii</b>

## **CHAPTER 1**

### **INTRODUCTION**

1.1	INTRODUCTION .....	1
1.2	PROBLEM STATEMENT.....	3
1.3	OBJECTIVES.....	4
1.4	SCOPE OF PROJECT .....	4
1.5	THESIS ORGANIZATION .....	5

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 INTRODUCTION**

The world is full of sensory stimuli such as hearing, vision, smell, taste and touch. Some people are not be able to respond carefully toward this stimuli due to this stimuli due to the accident or illness and some maybe lack the ability to make a choices to balance their sensory lives. They are some categorized as a patient that need a guide from therapist in order to increase their senses towards the stimuli as a normal person again. They maybe think that this world maybe confusing and frightening place or under stimulation. Hence, a Multi-sensory Room is created and designed for them to create equality place for any kind of people [1].

Multi-sensory room also known as sensory room is designed to develop person's sense using sensing equipment usually through special lighting, music and toys. It can be used as a therapy for the brain impairment patient with limited communication skills [2]. This Multi-sensory Room (MSR) purposely used to stimulate, relax, calm or energize as it experiences single sensory focus and adapting the light and sounds depends on the need of the patient. The light and sound such as fiber optic and speaker will be used to relax and calm emotion of the patient [3].