CASE STUDY

Study on an existing working module of Microwave oven.

- A microwave oven (commonly referred to as a microwave)

is an electric oven that heats and cook food by exposing it to electromagnetic radiation in the microwave frequency

range.

- This induces polar molecules in the food to rotate

and produce thermal energy in a process known as

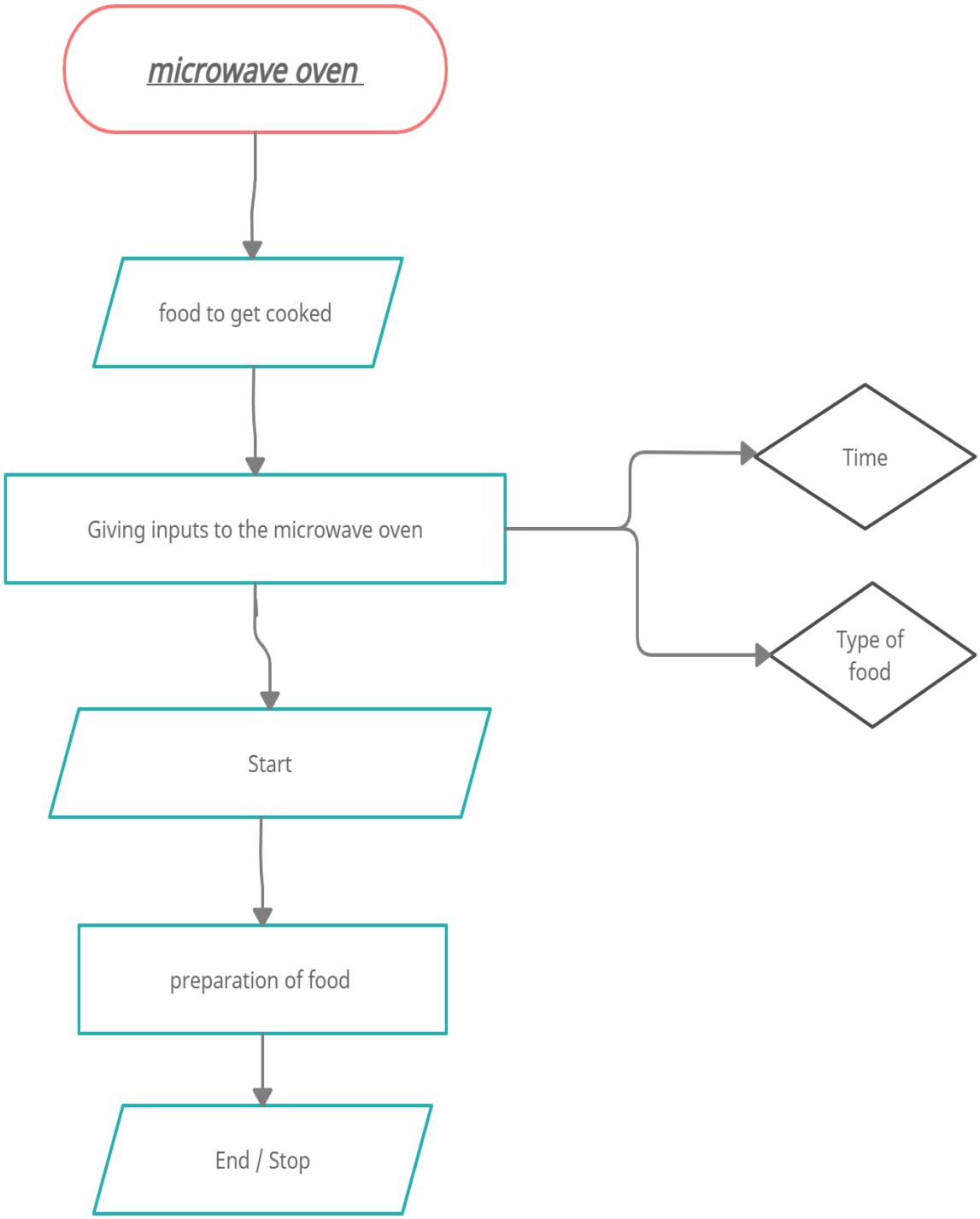
dielectric heating.

- Microwave ovens heat foods quickly and

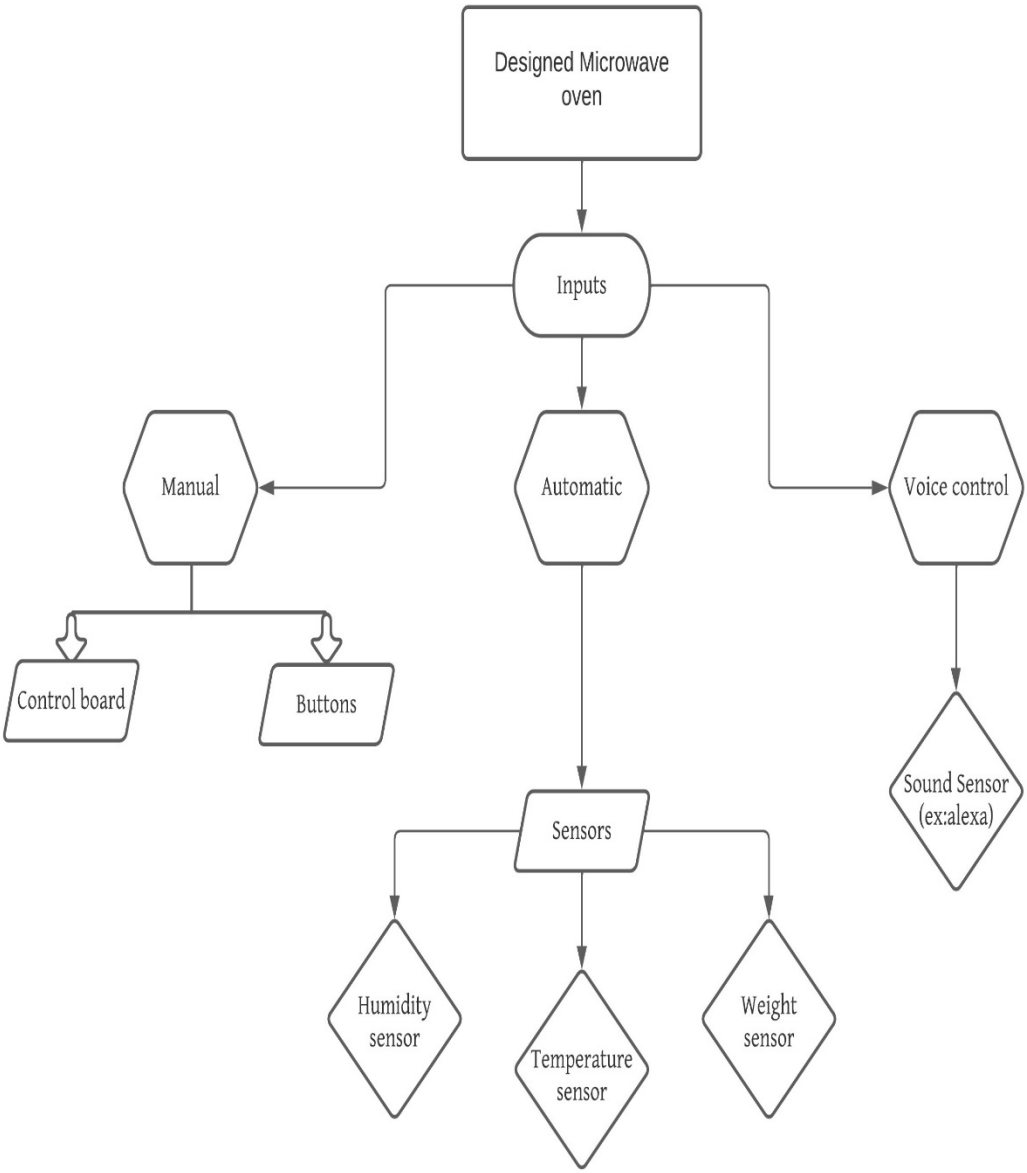
efficiently because excitation is fairly uniform in the outer

25–38 mm (1–1.5 inches) of a homogeneous, high water content food item.

Block diagram 1



Block diagram 2



Manual mode

In a Manal mode the user will be setting the time limit and the type of food which is need to be prepared.

Usually microwave ovens comes with many functional buttons where each button perform different functions like start/stop, setting time etc.

Once we give input to the microwave oven then it will start cooking food.

Automatic mode

(Includes performance of sensors)

Automatic modes in microwave oven can perform various functions by its own when we implement certain sensor in it.

Up to my idea i have included 3 different sensor.

AH sensor (humidity sensor):

Humidity sensors are electronic devices that measure and report the moisture and air temperature of the surrounding environment where they are deployed e.g., in air, soil, or confined spaces. Humidity measurements indicate the concentration of water vapor presented in the air.

Weight sensor :

Weight sensors can be implemented in microwave oven so that the weight of the food will be calculated and it automatically set the time to make sure that the food kept inside is cooked perfectly.

Temperature sensor :

Temperature sensor playes a major role in a microwave oven, there will be situations like food may be in a moderate heat. So if a microwave oven doesn't analyse it and heat the food at a very high level then there are chances in which the food gets spoiled.

Voice control

Let's take an perfect example Alexa

We all know about alexa which works on voice commands basis.

Imagine if a microwave works under voice commands.

Example: The user kept the food inside the microwave oven before he leave home to office. When he come home again he can just give a voice command to the microwave telling " cook my food for 1min" so that the microwave start it's work with a voice command.

This can be implemented if we place a sound sensor to the microwave oven.

Requirements

High level requirement

ID	DISCRIPTION
HLR1	Sensors
HLR2	Control board/buttons
HLR3	Power source
HLR4	Voice controller
HLR5	Microcontroller

Low level requirement

ID	DISCRIPTION
LLR1	Power
LLR2	User
LLR3	Inputs
LLR4	Sound sensor
LLR5	Temperature sensor
LLR6	Humidity sensor

5W and 1H

WHAT : M2_embsys casestudy

WHERE : Used in Microwave

WHEN : while cooking food

HOW: with the help of sensors, microcontrollers and manual input board

SWOT- Strengths, and Weakness, Opportunities Threats

Strengths

- User Friendly
- Very convenient to an user to operate a microwave
- Modular Approach
- Works in different forms like manually and automatically

Weakness

- Cost of this will be higher

Opportunities

- It can be implemented to make cooking easy.

Threats

- Cost of designing this convertible microwave oven will be very high.