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Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

School of Information Technology and Engineering

Curriculum Assisted Learning project (J- Component) – Winter 21-22

Review - 1

Programme: B. tech Branch: IT

Course Title: Human Computer Interaction

By

Ankit Prakash - 19BIT0159
Omkar Kulkarni - 19BIT0196

Under the guidance of - Prof. Rajeswari C.

Description

A microwave oven (also known as a microwave) is a gadget that uses microwaves, a kind of radio wave, to cook food. When a scientist experimenting with radio waves noticed that his chocolate bar in his pocket had melted, he came up with the idea. He realized that radio waves might be used to cook food and developed the microwave oven as a result.

An electron rod called a magnetron produces microwaves inside an oven. These waves travel quickly between the food and the oven's metal walls before being absorbed by the food. These waves cause the water molecules in the meal to vibrate, causing heat to be produced.

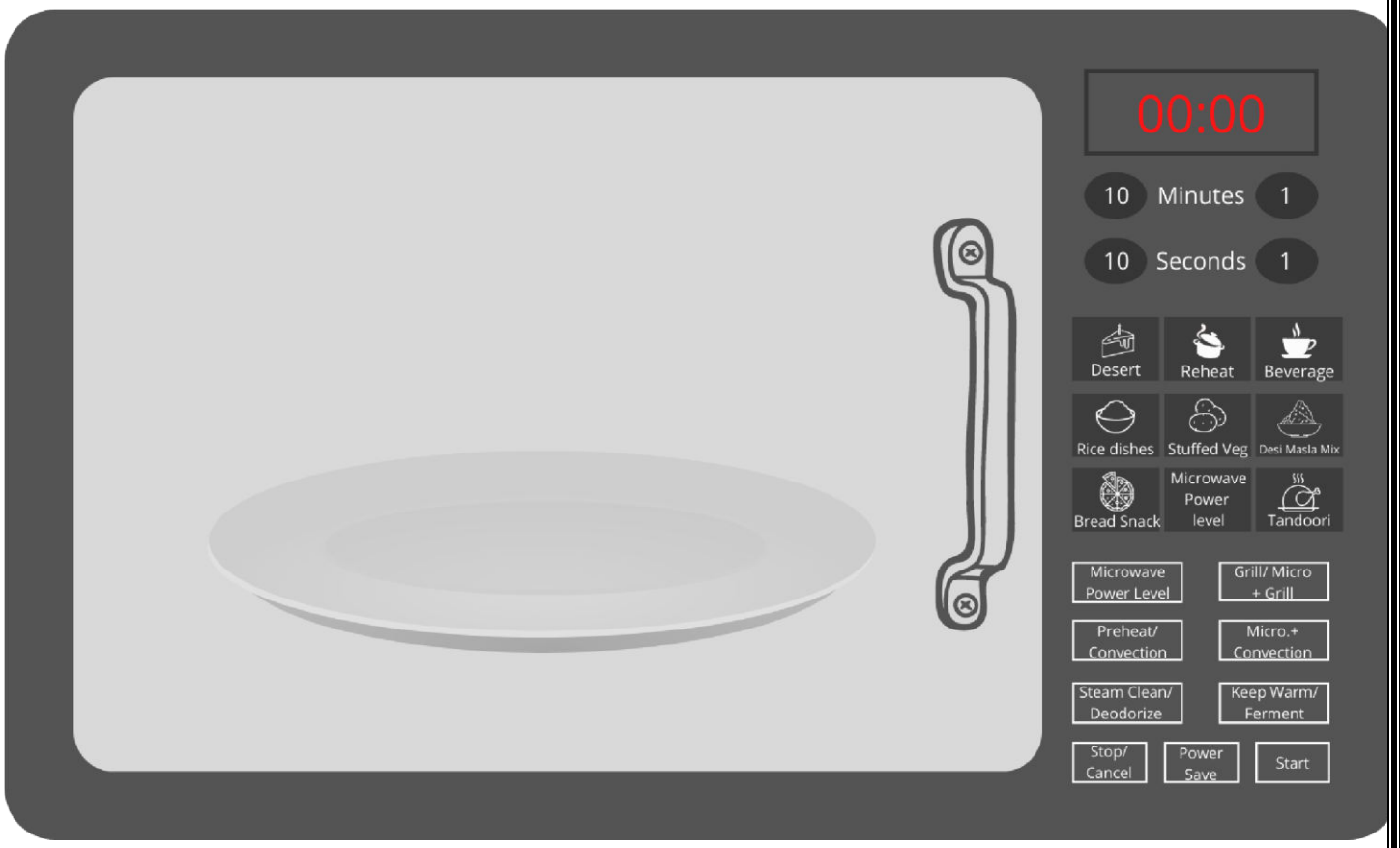
Instead of waiting around a smokey fire to heat and reheat food, our ancestors would have welcomed a microwave. Microwaves were popular in the previous decade or two, and they were termed the "next big thing" in terms of convenience and technical developments in the home.

An oven's key selling feature is that it can cook meals both inside and outside without the use of a gas burner. Other considerations were energy conservation, immediate cooking, keeping things as warm as we like, and cooking whatever we desire.

Target User Community:

1. Mothers
2. Single Men
3. Teenagers

Existing Product Design:



Limitations Faced by the target community:

1. Portability:
   Average microwave weighs around 30 kgs which can be very heavy for others and is not easy to move from one place to another. Also it cannot be plugged into a normal socket as it requires a high output socket which also affects its portability.

2. Needs special containers
   When cooking with a microwave, you must be extremely cautious with the equipment or containers you use. Microwave bowls specifically designed for this purpose are safe to use. In a microwave, using incorrect materials might be quite harmful. Glass, ceramic, and some types of plastic are commonly used in microwave-safe cookware.

3. It leads to dehydration, as the water content decreases and food is more prone to drying, and the cooked food is sometimes unevenly cooked.

4. It cannot be used for deep frying.

Suggestions to overcome limitations:

To make microwaves more portable its weight could be reduced so that the target users can move it around easily while cleaning.

Another suggestion could be that if utensils other than glass, ceramic, and some types of plastic are put inside a microwave it should give a warning beep so that the user can understand that there is something wrong.

A fry mode can also be added just like grill mode.

Main Functionalities:

1. Baking
2. Grilling
3. Reheating
4. Defrosting

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Review - 2

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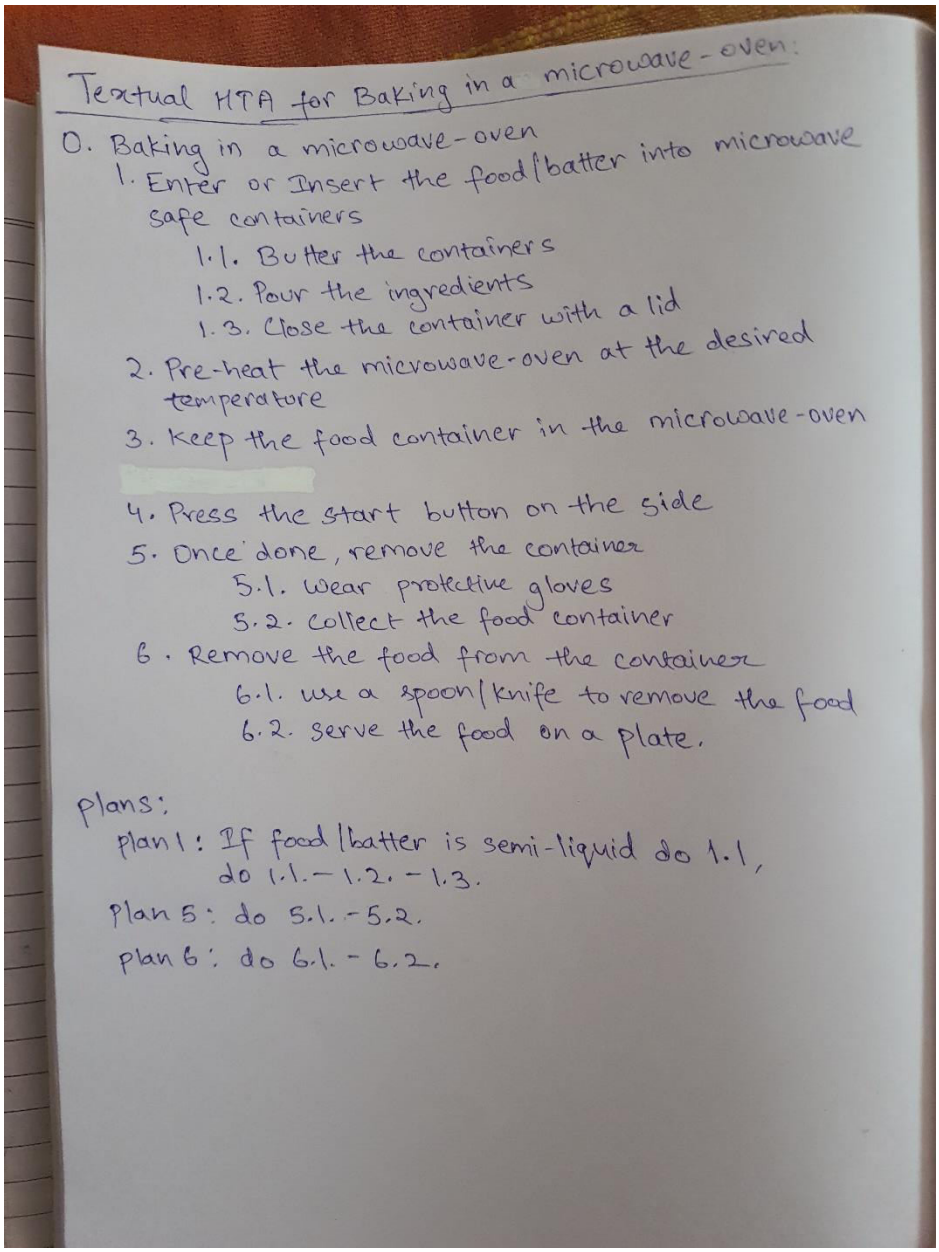
Course Title: Human Computer Interaction

By

Omkar Kulkarni - 19BIT0196

Under the guidance of - Prof. Rajeswari C.

Task Analysis (Textual HTA for Baking Functionality):



Textual HTA for Baking in a microwave-oven:

0. Baking in a microwave-oven
   1. Enter or Insert the food/batter into microwave safe containers
      1.1. Butter the containers
      1.2. Pour the ingredients
      1.3. Close the container with a lid
   2. Pre-heat the microwave-oven at the desired temperature
   3. Keep the food container in the microwave-oven
   4. Press the start button on the side
   5. Once done, remove the container
      5.1. Wear protective gloves
      5.2. Collect the food container
   6. Remove the food from the container
      6.1. use a spoon/knife to remove the food
      6.2. serve the food on a plate.

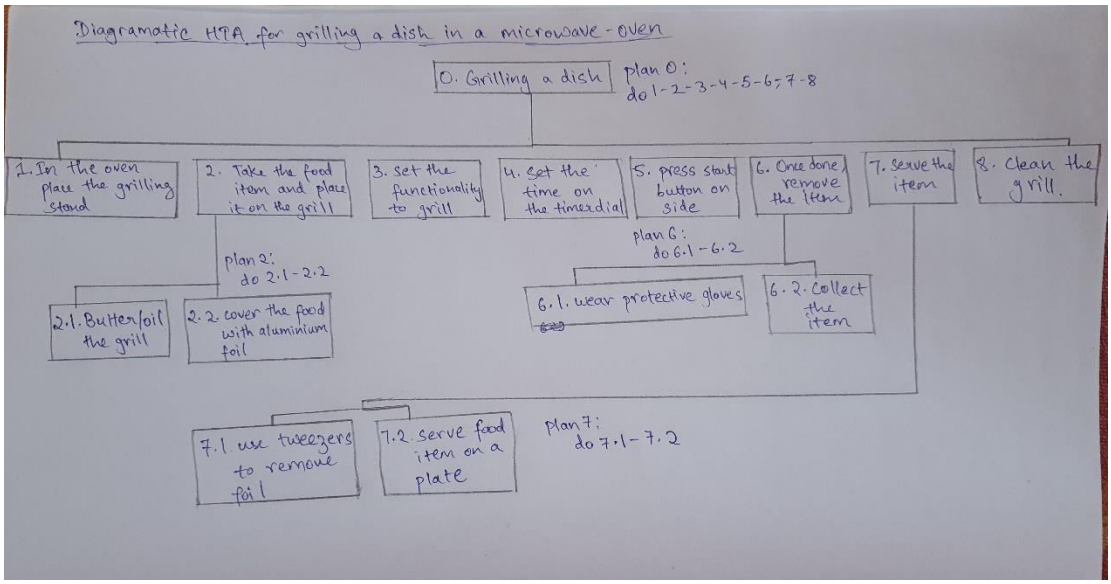
Plans:

Plan 1: If food/batter is semi-liquid do 1.1, do 1.1. - 1.2. - 1.3.

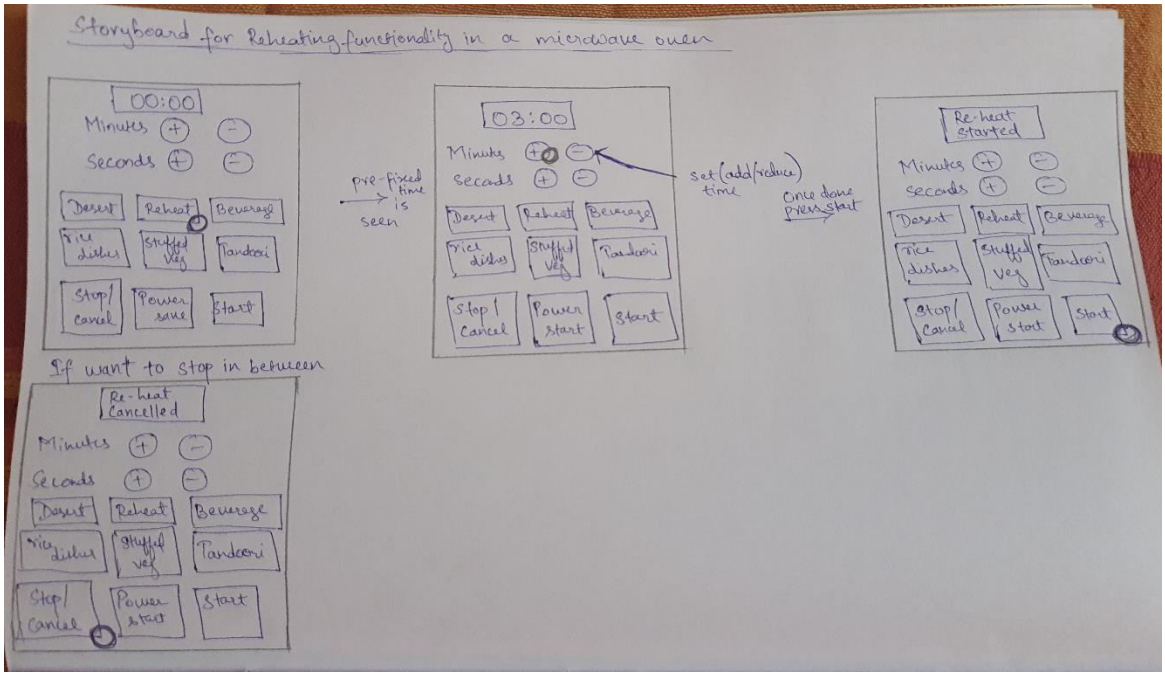
Plan 5: do 5.1. - 5.2.

Plan 6: do 6.1. - 6.2.

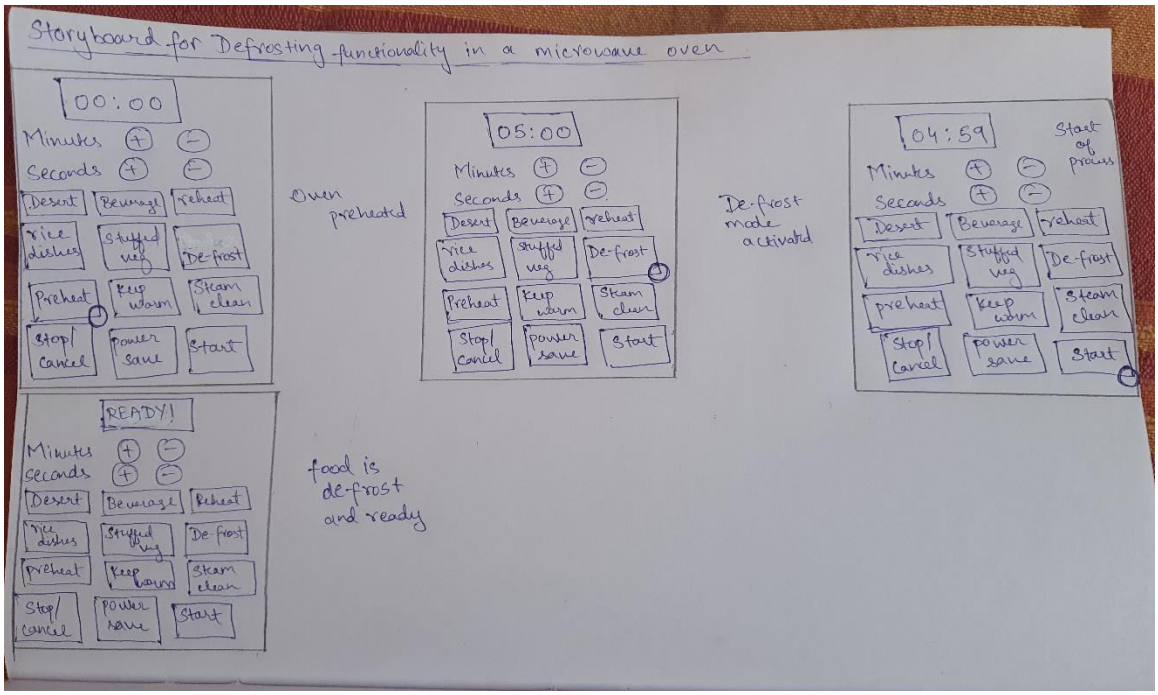
Diagramatic HTA for Grilling Functionality:



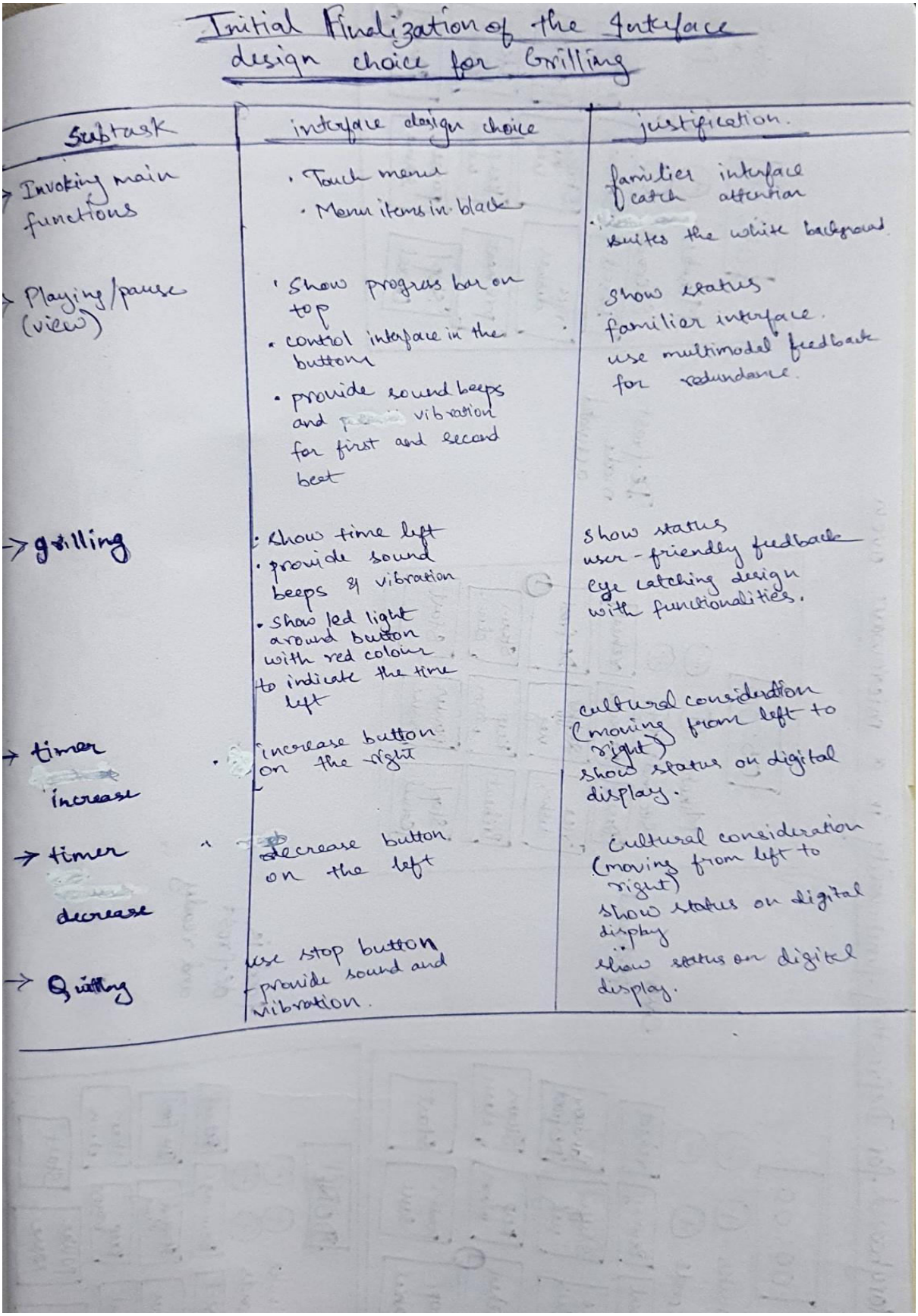
Story Boarding for Reheating Functionality:



Story Boarding for Defrosting Functionality:



Initial Finalization of the Interface design choice for grilling:



Initial Finalization of the Interface design choice for Grilling

Subtask	interface design choice	justification.
→ Invoking main functions	• Touch menu • Menu items in black	familier interface catch attention suites the white background.
→ Playing/pause (view)	• Show progress bar on top • control interface in the buttons • provide sound beeps and vibration for first and second beat	show status familier interface. use multimodal feedback for redundance.
→ grilling	• Show time left • provide sound beeps & vibration • show led light around button with red colour to indicate the time left	show status user-friendly feedback eye catching design with functionalities.
→ timer increase	• increase button on the right	cultural consideration (moving from left to right) show status on digital display.
→ timer decrease	• decrease button on the left	cultural consideration (moving from left to right) show status on digital display show status on digital display.
→ Quitting	use stop button provide sound and vibration.	

Initial Finalization of the Interface design choice for reheating:

Initial Finalization of the Interface design choice for Reheating

Subtask	interface design choice	justification
→ Invoking main functions	• Touch menu • Reheating function with heating indicators in 3 levels yellow, orange, red	→ familier interface → catch attention → red colour indicating the highest level to reheat.
→ Playing/pause (view)	• show progress bar on top • control interface in the buttom • provide sound beeps and vibration for first and second best	→ show status → familier interface → use multimodel feedback for redundance
→ reheating button	• button has 3 levels of heating indicators in yellow, orange, red colour • Watt levels for reheating available 250, 400, 600 watt.	→ show status → user-friendly feedback → detailed design with user meeting functionality
→ timer increase	• increase button on right	→ cultural consideration (moving from left to right) → show status on led buttons and digital display.
→ timer decrease	decrease button on the left	→ cultural consideration (moving from left to right) → show status on led buttons and digital display
→ Quitting	use stop button	→ show status on digital display

Comparison between the two functionalities:

Comparison :-

The Interface design choice for grilling functionality and reheating functionality are almost the same with the tasks such as playing/pausing, timer increase/decrease etc. But in the grilling, the oven must/can have a led light around the button to indicate the progress of the dish. Whereas, in the Reheating functionality, design choices with different LED lights for the progress can be seen. Also, there are buttons with different watt intake, so that reheating can be done at different temperatures.

REVIEW-3

USABILITY HEURISTICS (MICROWAVE – OVEN)

By- Omkar Kulkarni (19BIT0196)

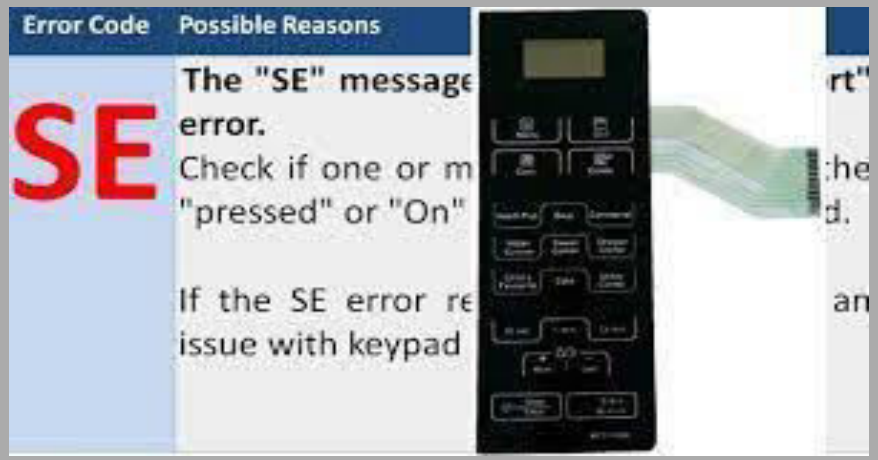
Jakob Nielsen's 10 general Heuristics

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Provision of Help and documentation

Visibility of system status

- system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
- more information translates to better decision making.
- A lack of information often equates to a lack of control.
- In my system, the digital display shows the updated status to the user.

- Immediate feedback is provided to the user through the alert beeps and display of the microwave to identify the source of errors and fix them as soon as they were made.



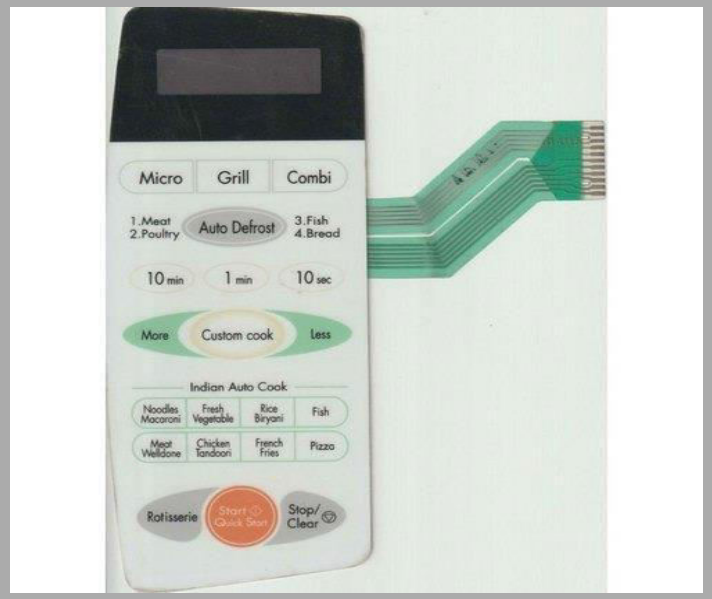
Match between system and the real world

- The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms.
- The Microwave is one such item which has always had one common design. Such as:

- But nowadays, as the functionalities have improved, the designs of microwave oven are changing and some designs are different from the real world designs. These will make the user very hard to understand how the device works. Such as:

User control and freedom

- Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
- In such scenarios, the microwave oven nowadays have always had the functionality of start/ stop or nowadays even remote control feature to cancel the process is available.



Consistency and standards

- Users should not have to wonder whether different words, situations, or actions mean the same thing.
- In a microwave it is very easy to usually understand what the functionality is due to the symbols and the functionalities are written clearly on the microwave.
- Valid:

Invalid:

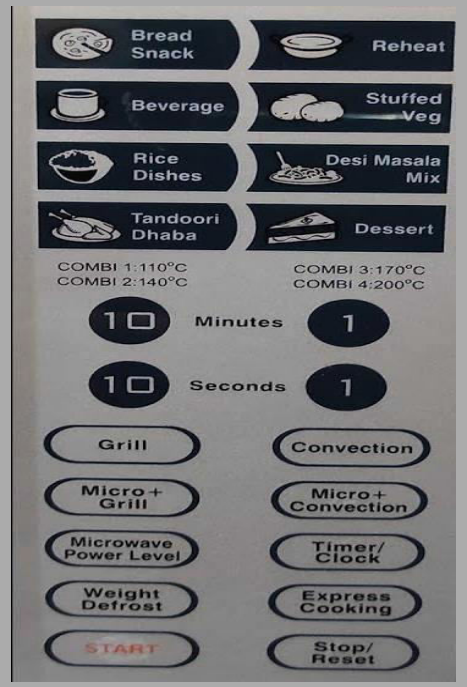
Error prevention

- Microwave ovens have error codes to indicate that there is some error in the process of doing a particular task.
- If a specific task isn't possible in functioning, then the device beeps with different beeps.
- The Manual given by the company gives a decent knowledge of what error are we talking about.
- The codes are usually short forms of big words so that user catches the error easily. Such as "Loc" is lock.

Failure Codes/Indications

Display	Likely Failure Condition	The technical details
F1	Thermistor open	No heat or thermistor sensing error.
F2	Thermistor short for cooking	No heat in 10 seconds after cooking starts.
F3	Thermistor short after cooking	Thermistor temp. does not go down after cooking ends.
F4	Sensor open	Humidity sensor sensing error
F5	Damper switch sensing error	

Recognition rather than recall

- Usually a good microwave digital display usually have all the functionalities shown clearly so that the user doesn't hesitate in understanding what the symbol or logo of the functionality meant.
- User memory load can be reduced if the functionalities are written and specified clearly in a button way so that he/she can perform the task quickly.
- 

bad design:

Flexibility and efficiency of use

- Users are having the flexibility to open the microwave door whenever they feel that their item is ready/prepared.
- The speed of the functionality can also be modified according to the customers requirement as he/she needs by using the speed dial.
- The microwave can also have “alarm functionality” to remind the user when the dish is ready. The efficiency of the product is good when all such requirements are met.

Aesthetic and minimalist design

- The Microwave oven is a device with a simple and minimalistic design. In General a good design for this product would just include the following characteristics or Functionalities:
- A digital display
- Buttons for different functionality with information about what functionality it is.
- Speed and Timer dial or number pad to enter the details.
- A handle to open the door
- Any such design would easily meet the user's requirements for a microwave oven
- Any extra / irrelevant information shouldn't be present.

Help users recognize, diagnose, and recover from errors

- Usually Microwave has a small digital display and it usually displays error codes.
- This scenario of error codes can be understood by the user if the user has read the user manual at least once. But this scenario is still not the best suitable to recover from errors.
- With advanced technology, voice assistant can be integrated in such systems so that users can recognize, diagnose and recover from errors.
- Even sound alerts for different scenarios can be implemented in the system for users to get a clear understanding of what is going on.

Help and documentation

- A good and understandable documentation or a help manual can always come handy for any user.
- Microwave Oven is one such device where a documentation is very much required.
- A good design must always be easy to understand for the user. But due to people from different regions and different beliefs, the given functionalities might not be understood by everyone in the same way.
- In such scenarios, documentation is very much important for any product.

Microwave Oven

Omkar Kulkarni | Prof. Rajeswari C.| SITE

INTRODUCTION

Microwave Oven is one of the devices which has become a daily life commodity for may users. In this project we devise different ways to understand the design and characteristics of the product. We will understand how the product meets the user's requirements in different factors such as task analysis, features, prototype. This will help us get to know the analysis of the product on a deeper level.

SCOPE OF THE PROJECT

The Scope of the project is to learn about the microwave oven, understand and collect details about the target user community, analysis of the design of the device , user/device requirements, perform task analysis and storyboarding and evaluate the interface using Nielsen's Heuristics. These steps will define the way how the product works for better understanding.

PROBLEM STATEMENT

To understand the user's requirements from the particular product by analysing different characteristics. The aim is to provide a deeper understanding of what the product is and how the limitations of the product such as:

Portability, Ease of Comfort, requirement of special containers and so on.

FEATURES

The Features of a Microwave oven include:

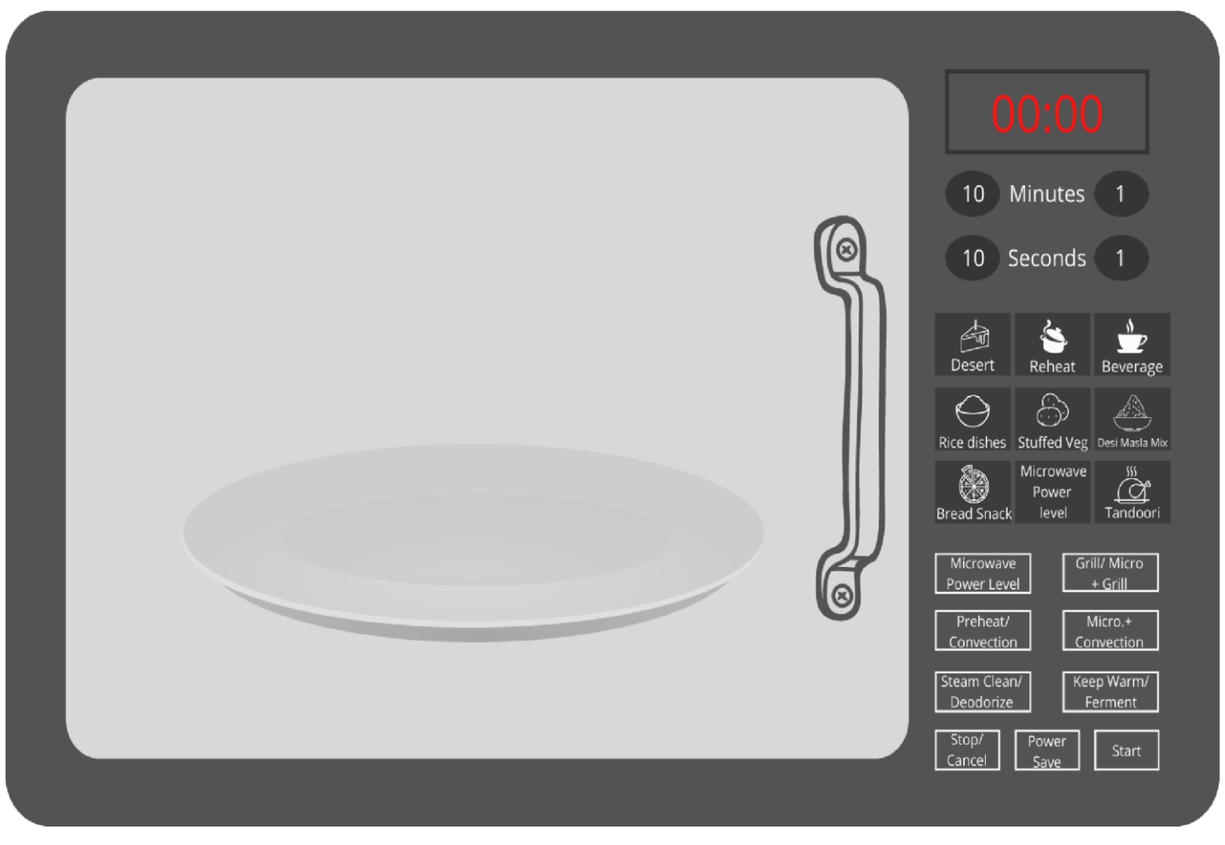
Grilling

Reheating

Baking

Defrosting

PROTOTYPE



PERSONA

Age	12 to 22	50-80+	22-50
Sex	Male and Female	Male and Female	Male and Female
Physical Limitation	A person can easily use if there's no physical limitation. The person can still use the device through voice recognition, if the user has a disability. People with both visual and hearing disability cannot use the device.	More helpful for senior citizens as it helps in automating tasks all from one device, voice recognition makes it easier to use. People with both visual and hearing disability cannot use the device.	Person can easily use if there's no physical limitation. The person can still use the device through voice recognition, if the user has a disability, people with both visual and hearing disability cannot use the device.
Educational Background	Minimal/No Education Qualifications.	Minimal/No Education Qualifications.	Minimal/No Education Qualifications.
Computer/IT Use	Probably have the moderate to highest experience among other age groups.	Probably have little to moderate experience of Computer use.	Probably have little to moderate experience of Computer use.
Motivation	Would have the highest motivation to use the device and explore all the features. Would take the maximum advantage of the device.	Would have moderate to no motivation, user would not be able to quickly adapt to such a device. Would prefer traditional method.	Would not have the highest, but would be motivated to use the device and explore all the features. Would take the maximum advantage of the device.
Attitude	Would be satisfied about how tasks are performed with ease.	Most of these group would prefer traditional method, but once in use , it would not be very hard for them to adapt.	Majority of this group would be satisfied (mostly the working people) as it provides them the ease of comfort.

Conclusion/ Summary

The data was collected from the target users and analyzed. The Prototype was successfully designed and incorporated. The users were able to perform all the sufficient tasks . When the users were given the scenarios they were able to do it successfully.

Contact Details

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