

1 Introduction

Looking for home appliances is not always an easy process. Along with one's personal preferences, a multitude of factors including cost, use, durability, serve as guidance for best decision making on item-purchase. Among the numerous features that homeowners desire the most, kitchen holds an important position. However, the characteristics and functionalities of some kitchen appliances do not meet everyone's needs, especially those of people with certain disabilities. We propose in this document the implementation of an easy-to-use blender/mixer that allows the ADEC clients (and potentially a larger audience) to remotely control the operations of the mixer through the push of a couple of buttons.

2 Problem Description

ADEC refers to its Adult Habilitation Services as Day Services. The goal is to give developmentally disabled adults meaningful day-to-day work. Some of these include art, cooking, photography, sewing, or woodworking.

One such project is baking dog biscuits. However, the KitchenAid mixer used to combine the ingredients for the dough is not set up well for the clients to use independently. ADEC requests a method to turn on the mixer and select its speed easily.

3 Proposed Solution

ADEC suggested a method using a large, easily visible button that is not directly attached to the mixer. Our initial solution follows this, instead using two large buttons. One button functions solely for on/off purposes; the other controls the speed of the mixer with 5 discrete states. Additionally, we would include a switch that selects whether the mixer speeds will cycle from slower to faster, or the opposite. To further assist the users, we would include an LCD screen and/or LEDs to indicate the state of the machine. Finally, we intend to use a wireless communication component to connect the control to the mixer.

4 Demonstrated Features

In May, we would like to demonstrate a fully working prototype of the machine, including the two buttons, speed control, increment/decrement switch, and wireless control.

5 Available Technologies

In order to accomplish these tasks, we will be using the same kind of mixers as ADEC uses, assuming the cost is within budget constraints. This will allow us to avoid having to develop a mixer of our own. Furthermore, since the clients wants large buttons that are not directly attached to the mixer, we will be using wireless technology in order for our device to communicate with the mixer. Likely, we will use bluetooth to accomplish this, but will consider using infrared. Further, we will be using basic switches, buttons switches, and LED's in order to create our portable mixing controller that is easy to use and visually stimulating.

6 Engineering Content

In terms of engineering content that this project requires, we will need advanced knowledge of circuitry to be able to be able to design a circuit board that captures our intents. This includes a button that represents on and off, a button for speed control, as well as a switch to determine if the speed control is incrementing or decrementing. Further, for ease of use, it needs an LED showing that the board has power as well as a battery sensor that shows when batteries are low (as opposed to the signal isn't being sent, etc.). The circuit also needs to accommodate and power some sort of communication system.

On another level, we need to use either bluetooth or infrared in order to allow our device to communicate with the machine without having to be directly touching it. The mixer is complicated, and allowing it to be fully removed reduces the likelihood that the other settings which should remain constant will be disrupted or the machine will be harmed in any way. This will be a test of communication systems.

Moreover, we will be hacking and modifying an existing machine in order to make it easier for our clients to operate. We need to tear apart the machine and its circuitry, make significant alterations, and then remake it without ruining its effectiveness. Some of these alterations include being able to remotely alter the on off switch, which could be a simple remotely controlled switch, and being able to remotely control the speed control sliding switch. This could either entail having our device temporarily break the circuit that that switch creates with the mixer so that our device supersedes it, or it could be actually moving the slider to mirror the speed setting our device sets it to. Further, we will need to add in our infrared/bluetooth sensor into the circuit, while also siphoning a tiny bit of power so that our internal devices don't need to be independently powered, charged, or replaced.

7 Conclusions

The discussed features and technologies we intend to build on the existing mixer technology will allow our clients to benefit from a more interactive experience with their appliance. Given our budget constraints and engineering capabilities, we hope to build a

relatively adequate model incorporating a remote control system and a LED display that permits a better usability of our product to our ADEC clientele.