Design and Implementation of a Flat Surface Touch Screen Using State of the Art Sensors

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Introduction

- The purpose of this project is to implement a wooden touch surface, using capacitive touch sensors.
- This design is meant to be used in built-in dishwashers, to remove the buttons on the machine and achieve a more aesthetic appearance.
- Therefore, the wood has been given a touchable feature, to be applied to built-in machines without disturbing their external appearance.

Specifications and Design Requirements

- Since the touch screens are generally made of glass or thin materials, they can easily detect the sensors placed under them and they can be designed easily.
- If a wood material is used when designing a touch surface, the insulating structure of the wood may not allow it.

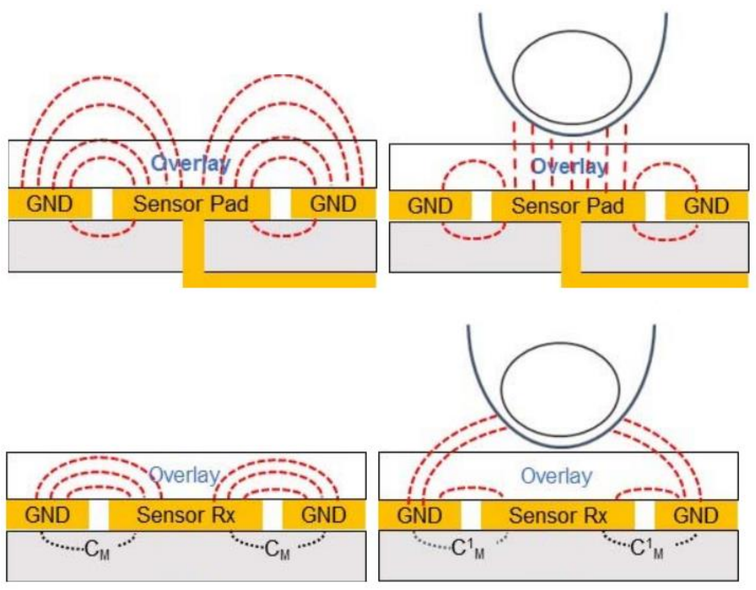


Fig. 1. Button sensor layout of self-capacitance and mutual capacitance sensing without/with finger touch [1]

Solution Methodology

- Main hardware part of the design consists of

TTP223 Capacitive Touch Sensor

Arduino UNO R3

LCD

- The TTP223 is a touch pad detector IC which offers one touch key. These sensors are positioned under the wood.
- Arduino is used to get the inputs from the sensors, and check if these inputs form a gesture that is implemented in the design.
- LCD is used to interact with the user.

Application Areas

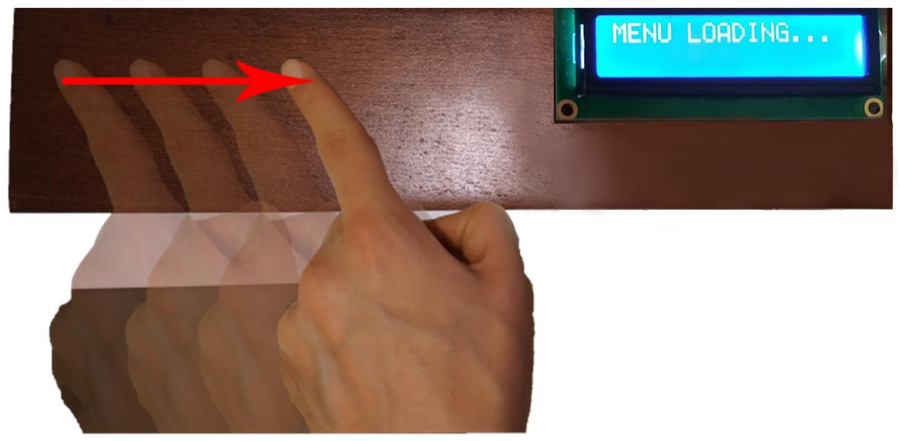
This project is designed to be used in built-in dishwahers, since they have a more aesthetic appearance without buttons.

With the touchable wooden panel

The usage of this design is not only limited to dishwashers, and it can be used in all kinds of household appliances.

Results and Discussion

- Various gestures such as sliding, double tap, long-press are implemented and used to introduce a user interface.
- This interface allows us to select/deselect temperature, duration, program etc. for the dishwasher.
- This project is adaptable to different wood types, so it can be applied to different systems directly.
- The thickness that the touch can be sensed from the wood can be increased in the future work. Also, new gestures can be introduced to make the project more functional.



References

• W. Fan, B. K. Lok, F. K. Lai, and J. Wei ‘Evaluation of Printed Capacitive Touch Sensors for Touch Panel’

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