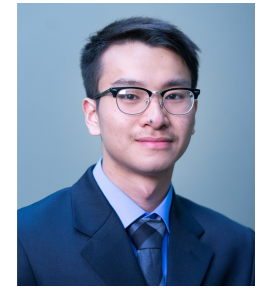




Tetra Board

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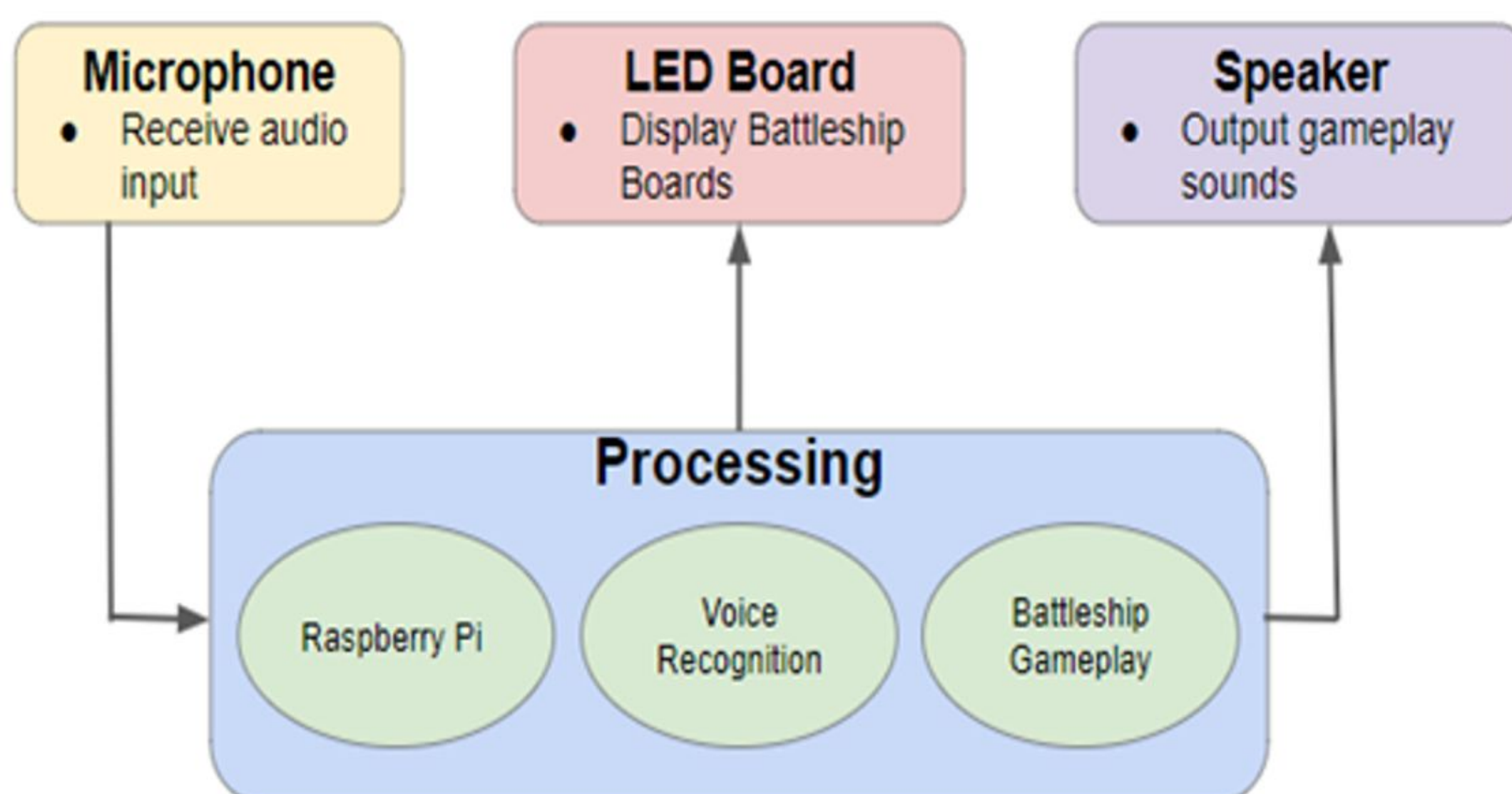
Abstract

Since its emergence in the 1930s, the household game Battleship has evolved from a pencil and paper game into a fully-fledged board game. In its current iteration, the board game requires the use of physical pieces of ships and pegs to play. This requirement may prove to be quite demanding for those with physical disabilities. Our focus is to create an authentic Battleship experience without the use of physical pieces. We will replace the traditional board game pieces with LEDs and implement a voice recognition system to play the game. In keeping with the traditional aspects of Battleship, we will also implement a speaker to output the results of the player's movements.

System Overview

Tetra Board consists of four boards with 64 LEDs each to represent the pieces of the game. One microphone is attached onto the briefcase handle so both players can speak into it. Once a key is pressed, the microphone listens for 2 seconds to record that player's move. After retrieving the player's command, the location on the grid corresponding to the command will light up, based on hits and misses. Once one player's move is complete, the second player will then be prompted to play his/her move until a winner has been declared.

Block Diagram



#	Class of Ship	Size
1x	Carrier	5
1x	Battleship	4
1x	Destroyer	3
2x	Submarine	2

	1	2	3	4	5	6	7	8
A	●	●	●	●	●			
B								
C	●					●	●	
D	●							
E	●			●				
F	●			●				
G								
H						●	●	●

Specifications

Requirements	Specification	Value
Portability	Double-Sided Briefcase	12" x 6" x 9"
Game Board	4 Boards	8" x 8" per board
Display	DotStar LED	5V supply
Sound	Speaker	"Hit" "Miss" "Sunken Ship"
Voice Control	1 Microphone	Alphanumeric Commands i.e. Alpha 3
Power	PCB Power Supply	15W supply

Results

Tetra Board helps physically disabled people play board games that they would otherwise be unable to play. For the game of Battleship, single player with three different ranges of difficulty and multiplayer were successfully implemented. Moreover, the game board was originally supposed to be completely local. However, we decided to utilize a more accurate online speech-recognition software that yielded better results in tandem with preprocessing speech using a Butterworth filter and postprocessing using a database we generated with common mistakes.

Acknowledgements

We would like to thank our advisor, Professor Polizzi, for his supervision and insight on completing and improving the Tetra Board. We would also like to give special thanks to Professor Kelly and Professor Hollot for their advice and support on our speech-recognition software. We would also like to thank Professor Liu from the Mechanical Engineering department for giving us this great idea.