# GESTURE BASED MUSIC CONTROL SYSTEM

[1] B.BALAKRISHNA, [2] MD.ASMA, [3] B.VENKATEASWAR ARO, [4]P.SAI CHARAN REDDY, [5]R.SATHVIK

[1]Assistant Professor, EEE Department,CMR College of Engineering & Technology

[2]Assistant.Professor, CSE Department,CMR College of Engineering & Technology

[3]Assistant Professor, ECE Department,CMR College of Engineering & Technology

[4-5]B-TECH,Dept.of CYBER SECURITY, CMR COLLEGE OF ENGINEERING & TECHNOLOGY

**Abstract**

Speakers are the most widely using these days. Their compact size with portability and long battery life have made them a center of attraction. Well, we are here to take speakers to the next level by integrating touchless operations. The speaker allows user to change music by just swiping their hand over the speaker. Also, the speaker allows user to adjust volume by just raising and lowering their hand over the speaker. The user can thus operate the complete speaker operation without even having to touch his/her phone or speaker. The gesture-based speaker takes to the next level of modernization. The device makes use of 3-watt speaker with subwoofer along with Arduino, battery charging board, audio amplifier IC, Bluetooth module and Battery Set. The system uses to allow phones to connect to the speaker for audio input. The Lidar sensor is mounted on top of the Bluetooth speaker. The input from sensor Is processed by Arduino and passed onto the controller to increase/reduce volume, switch song or turn on the speaker. This allows for a contactless speaker operation. The battery pack issued to supply power to the entire device. The battery power and discharge are controlled by battery charger and protection circuitry. This circuitry also includes simple built logic system to turn off the system automatically to save power when not in use for over 5 minutes.

## 1. INTRODUCTION

When a person is cooking or working, it can be hard to interact with an audio system. Specifically, a person’s hands are rarely free when cooking or working. Additionally, a noisy environment can render traditional “smart assistants” and their voice commands useless. A gesture-based system would be much more useful in such a situation. It is also very common when a person is trying to connect more speakers to enhance the listening experience during social gathering events, but he or she just doesn't have the right types of smart speakers to pair several speakers together. Smart speakers that are able to be paired together are usually expensive as well. We designed a cheaper way to distribute music without requiring any modern smart speakers. In other words, a basic magnetic speaker would be sufficient to bring the stereo effect to the end-users. Thus, a gesture-controlled audio system with full stereo capability would be appealing to many users. There has not been an existing product in the market right now which would offer the convenience of both features.

Our proposed system consists of three subsystems: human gesture capturing and recognizing system (vision subsystem) which employs a camera along with an embedded system to segment human gestures and convert them to control signals in real-time, distribution and receiving system (transmission subsystem) which contains one broadcaster and multiple receivers, and signal processing and output system (audio subsystem) which process the data received by each receiver and send the signal to speakers. The setup requires no pairing procedure and music tracks are automatically synchronized. The whole audio system is controlled by human gestures from the master node. Our solution is designed to receive user input via captured and recognized human gestures and distribute audio signals via external RF receivers plugged into the speakers. These choices give us numerous advantages. Our design offers better robustness in noisy environments since it is vision enabled. Our design provides better accuracy in controlling from long distances since given enough resolution the accuracy of vision recognition will remain undiminished while vocal control accuracy will be impaired. Our design is compatible with more devices since its connection is external for each device Our design offers the potential of human triangulation with respect to each audio device, which can lead to further and more accurate amplitude distribution to provide better stereo effect for users.

## 2. RELATED WORK

Our design is composed of three subsystems. The vision subsystem is designed to capture human gesture by constantly observing humans in its eyesight and doing inference to control the audio signal that should be played. The transmission subsystem will preprocess the control signal determined by the vision subsystem and transmit it to audio subsystems. Audio subsystems will then process the signals transmitted and play audio signals from the audio storage module accordingly. The modularity will be demonstrated by the physical diagram and block diagram as follows.

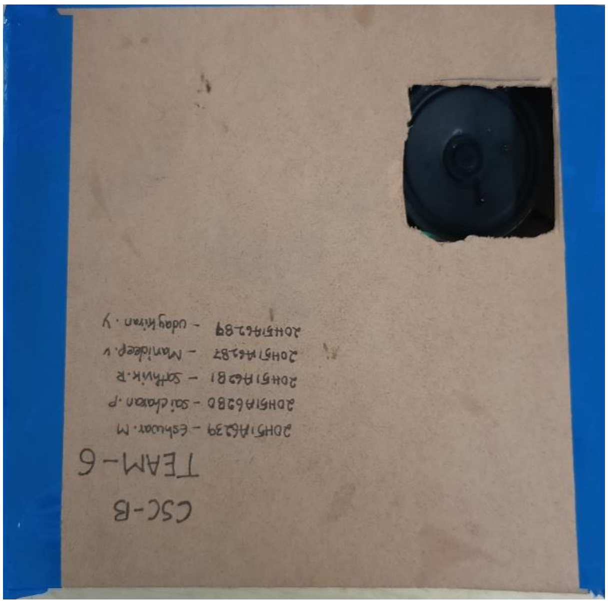
## 3. IMPLEMENTATION

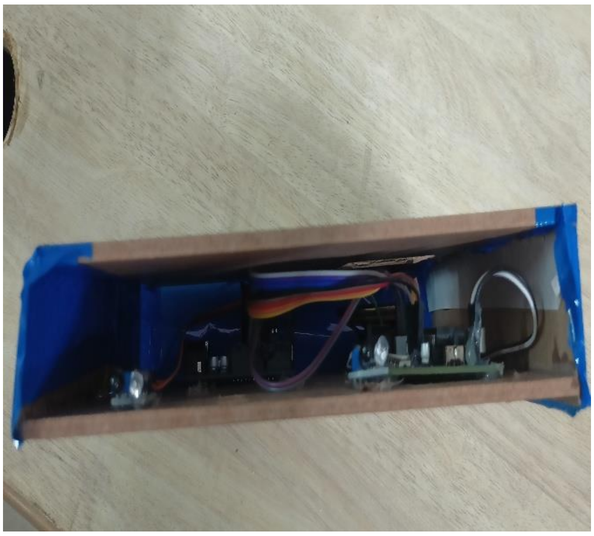
During the course of implementing the system, we unit tested modules individually to test if our design was viable in reality.

3.1 Vision Subsystem We designed our vision subsystem to capture human hand gestures visually in real time, so we tested the accuracy of the model we adopted to accomplish this [1].

3.2 Transmission Subsystem The transmission system is designed to transmit and receive control signal generated by the inference module, so we thoroughly test the transmitting and receiving accuracy to see if there is any information distortion or loss in the process of data transmission.

## 4. EXPERIMENTAL RESULTS





## 5. CONCLUSION

After the design, implementation, and testing of the whole system, we have accomplished 1) coding a key point-based hand gesture recognition system that is capable of capturing and classifying hand gestures in real-time, 2) assembling a series of circuits that is able to read in data through serial port and communicate via RF signal, and 3) designing a series of circuits that manage audio signal storage and amplification.

## REFERENCE

[1] Media Pipe documentation, web page. Available at: https://google.github.io/mediapipe/solutions/hands.html.

[2] Moran, Jerry. "Text - S.3456 - 116th Congress (2019-2020): Consumer Data Privacy and Security Act of 2020." Congress.gov, 12 Mar. 2020, www.congress.gov/bill/116th-congress/senatebill/3456/text#toc-ida8f663638e0.