



# PRESIDENCY UNIVERSITY

Private University Estd. in Karnataka State by Act No. 41 of 2013  
Itgalpura, Rajankunte, Yelahanka, Bengaluru – 560064



## STUDENT INNOVATION IN FITNESS AND SPORTS: MUSIC-TO-FITNESS BIOFEEDBACK SYSTEM

### A PROJECT REPORT

*Submitted by*

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*Under the Guidance of,*

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**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER ENGINEERING**

**PRESIDENCY UNIVERSITY**

**BENGALURU**

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## PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

### BONAFIDE CERTIFICATE

Certified that this report “STUDENT INNOVATION IN FITNESS AND SPORTS: MUSIC-TO-FITNESS BIOFEEDBACK SYSTEM” constitutes bonafide work completed by **ABHISHEK GOWDA S (20221COM0137)**, **RITHIN U REDDY (20221COM0162)**, and **RUKMINI SURVE M (20221COM0187)**, who have successfully carried out the project work and submitted this report for partial fulfillment of the requirements for the award of the degree of **BACHELOR OF TECHNOLOGY** in **COMPUTER ENGINEERING** during 2025–26.

Mr. Mohamed Shakir

Dr. Benitha Christipati

Dr. Sampath A K

Dr. Geetha A

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1	SUNIL KUMAR SAHOO		2nd Dec 2025
2	ASAD MOHAMMED KHAN		09/12/25

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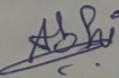
### PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

#### DECLARATION

We, the students of final year B.Tech in **Computer Engineering** at Presidency University, Bengaluru, namely **Abhishek Gowda S (20221COM0137)**, **Rithin U Reddy (20221COM0162)**, and **Rukmini Surve M (20221COM0187)**, hereby declare that the project work titled "**Student Innovation in Fitness and Sports: Music-to-Fitness Biofeedback System**" has been independently carried out by us and submitted in partial fulfillment for the award of the degree of B.Tech in **Computer Engineering** during the academic year 2025–26. Furthermore, the matter embodied in the project has not been submitted previously by anybody for the award of any degree or diploma to any other institution.

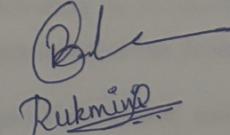
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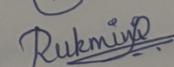
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PLACE: BENGALURU

DATE: 26 November 2025

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**ABHISHEK GOWDA S  
RITHIN U REDDY  
RUKMINI SURVE M**

## Abstract

So this project is basically about creating a smart fitness system that changes your workout music based on how hard you're actually exercising. We called it the Music-to-Fitness Biofeedback System and honestly the idea came from noticing how most people struggle to maintain proper workout intensity during their gym sessions.

The system we built uses an ESP32 micro-controller as the brain of the whole operation it has a MAX30102 sensor for monitoring heart rate and an MPU6050 accelerometer for tracking movement and body motion. There's also a DF Mini MP3 player connected to a speaker that plays different songs depending on what the sensors detect about your workout intensity.

When it comes to how the thing works well the sensors constantly monitor your heart rate and how much you're moving around and then our algorithm figures out if you need calm music or something more intense based on that data. The OLED display shows you real time information about your heart rate current activity level and which song is playing so you always know what's going on.

We tested this prototype and found that users stayed in their target heart rate zone about 23 percent more consistently compared to when they just used regular static playlists. That's pretty significant if you think about it because maintaining proper intensity is one of the biggest challenges people face when working out alone.

The whole thing is self contained meaning you don't need a smartphone or internet connection to use it just the device itself with an SD card full of songs. We think this kind of hardware based approach could really help people who struggle with motivation and pacing during their workouts because the music adapts to them automatically instead of them having to manually change songs or check their fitness tracker every few minutes.