Kashvi 6-6
Dec/28/2025

Noise-Aware Smart Headphones

Project type: Experimental

Date Started: Dec/28/2025

Schedule:
week 1- Research and collect all materials
week 2- Program micro-bit
week 3- Build model and test
week 4- Presentation

Project Question:
How can headphones automatically reduce volume to avoid unsafe exposure to sound in noisy environments?

Hypothesis:
If the environmental noise level is very loud then the smart headphone system will automatically lower the volume because the micro-bit is programed to detect high sound levels and and will make the servo moter lower the volume.

Background Research:
- loudness or sound intensity is measured as a decibel
- safe sound levels are sounds below 70 dB
- you could damage your ears if the sound levels are 85 dB or more
- A Micro:bit is a programable device
- You can program a Micro:bit to do what you want
- A servo Motor is a device that controls motion
- I have programed a micro:bit to make a game before with coding

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Materials:

Main system.
- Micro:bit V2
- Micro:bit battery Pack (4 AA batteries)
- AA batteries
- SG90 Micro Servo motor
- Servo horn (comes with Servo)
- Jumper wires
- breadboard
- PotentioMeter
- Adapters

Audio & Testing components
- Wired headphones with volume knob
- Music player (audio source)
- Small external speaker (background Noise)
- Decibel meter app on phone

Mounting Materials:
- cardboard
- cardboard tube
- Extra card board pieces
- Foam or folded cardboard
- hot glue gun
- Tape
- Rubber bands

Experimental procedure:

- Plan:
- Research
- collect all materials
- First Make mounting stand
- Next program Micro:bit
- Then build Model
- Run Trials
- Make adjustments

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Experimental procedure:
variables:

• Manipulated variable	• Responding variable
- Environmental noise level:	- Headphone volume level
:Quiet, Medium, Loud	- Servo motor angle:
	:amount of volume reduced

• controlled variable
- Same distance between Noise source and headphones
- Same audio each time (use the same song)
- Same room size
- Same headphone volume at beginig (volume starts at same position)

There are 3 trials total

Daily Notes:

Dec/28/2025

In this Part of My project I made a Mounting stand to hold the headphones securely to it which allows the servo Motor to adjust the volum knob. First I made a strong cardbord base. Next I glued a cardboard tube onto the base vertically and attached two cardboard triangles to the sides of the tube for extra support. At the top of the stand, I placed a slightly curved piece of cardboard to safely hold up the headphones. This stand is designed so the head phones are steady during testing and ensure reliable testing results

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Daily Notes:

Dec/29/2025

- connected Micro: bit to bread board using aligator clips
- ftatched servo Motor to bread board using jumper wires as adapters

Dec/30/2025

- programed Micro:bit to automatically turn the servo horn from servo sg90 Motor
- finished Mounting stand

Dec/31/2025

- collected More Materials such as potentiometer and audio cables

Jan/2/2026

- I attatched the potentiometer to servo Moter
- so it can turn the volume down

Jan/4/2026

- connected headphones to Speaker using the audio cables
- did a test trial (Not actual trial yet)

Jan/7/2026

- First when I tried the servo horn did not respond
- After Som ajustments the servo shaft turned but did Not turn the volume down
- After adding More power it finally worked

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Daily Notes:

Jan/9/2026

- Tested to three diffrent Noise-Levels (soft, Medium, and loud)
- system sucsesfuly Responded and turned the volume down

Quiet	Medium	Loud
• No Responce • because it was a low Noise	• Still No responce	• The Servo, turned the volume knob of potentiometer and turned volume down of headphones

Jan/12/2026

conclusion-

In conclusion this project helped see if headphones could automatically reduce the volume of headphones when too loud. This will help prevent hearing loss. The results I got suported My hypothisis. My hypothesis was if the Noise level is loud then the volume of headphones will automatically decreace because the Micro:bit is programed to do so, this was reasonable. overall this project will help salve real-life problems in the world

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Daily Notes

- Jan / 15-20/2026
- Start presentation
- research
- finish presentation

Jan 21-22 / 2026

- adjust wiring and enhance video
- Then Record video