Department of Electronic and Telecommunication Engineering

University of Moratuwa

Conceptual Designs for the Sound Pollution Monitoring System

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This report is submitted as a partial fulfillment of the module

EN2160 – Electronic Design Realization

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Content

1. Introduction

- In the conceptual design cycle of designing concepts and making prototypes, different circuits, enclosures, and functional parts (If available) are considered by brainstorming ideas among the members of the design team.
- Then those ideas are combined to make a complete solution to the problem which is addressed.
- The underlying ideas are then grouped and using hand sketches those ideas are presented to get the optimal solution.

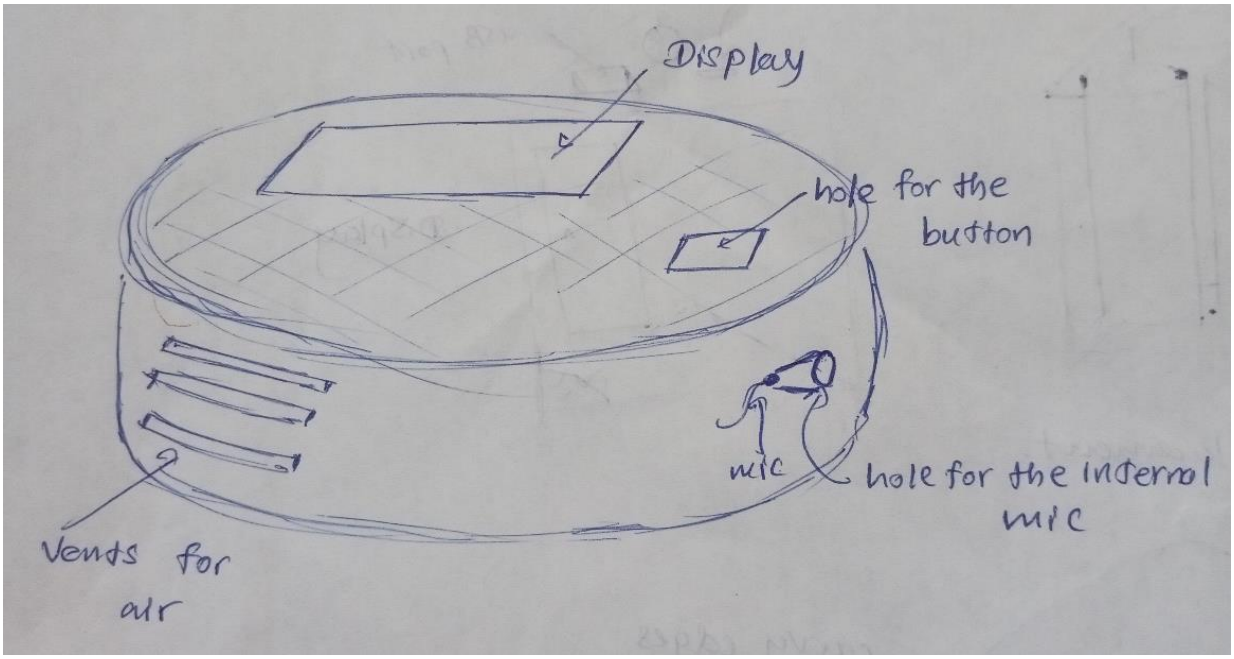
2. Design Driven Innovation

- Apart from user centred design technique, there is a second important route to creativity, though: Design-driven innovation which is also known as radical product innovation.
- Instead of being a response to existing user demands, this innovation represents a manufacturer's new vision for what a product could potentially imply for consumers. [1]
- There is an interpreter for the customers who interprets what is new in the product which is not seen in the user centred design.

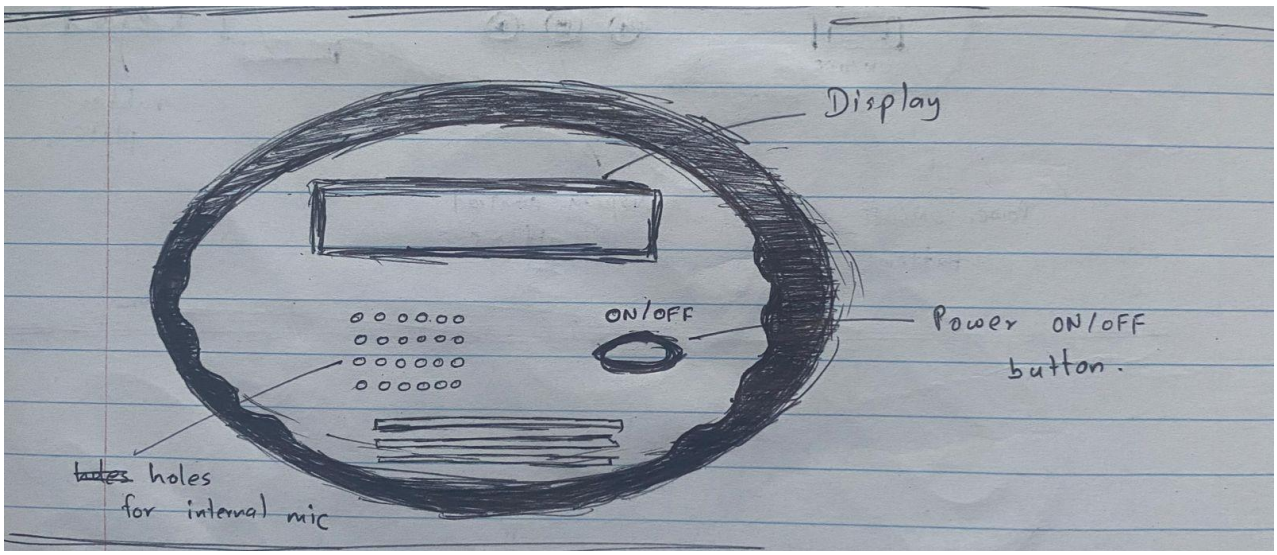
i. Conceptual Designs Drawn by Peers

After having many brainstorming sessions and discussions among the group members, the following conceptual designs were developed for the sound level monitoring system.

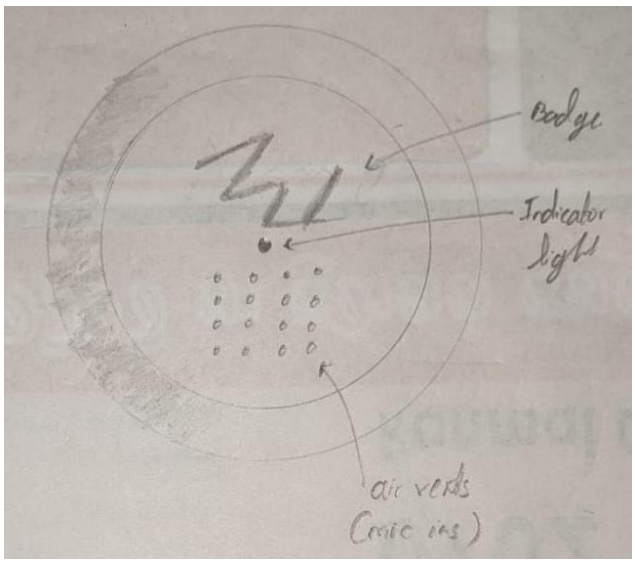
a) Design - 1 (Inspired from Amazon ALEXA)

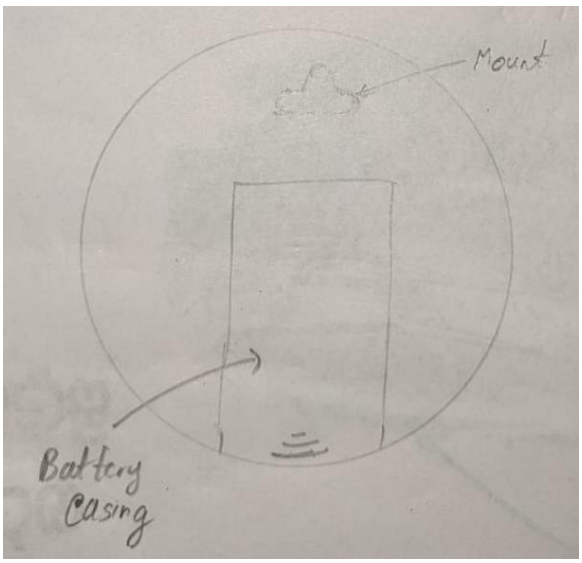


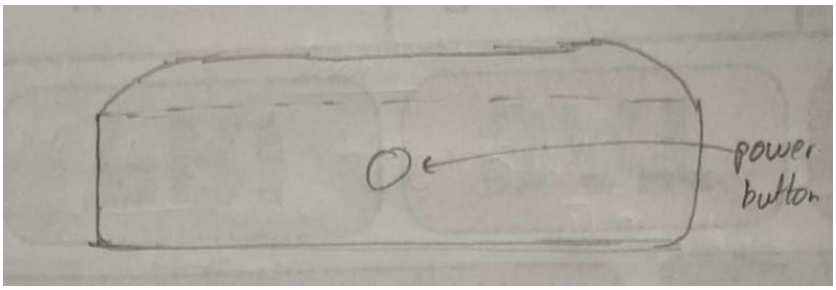
b) Design - 2 (Handheld type design)



c) Design - 3 (Wall mount design)

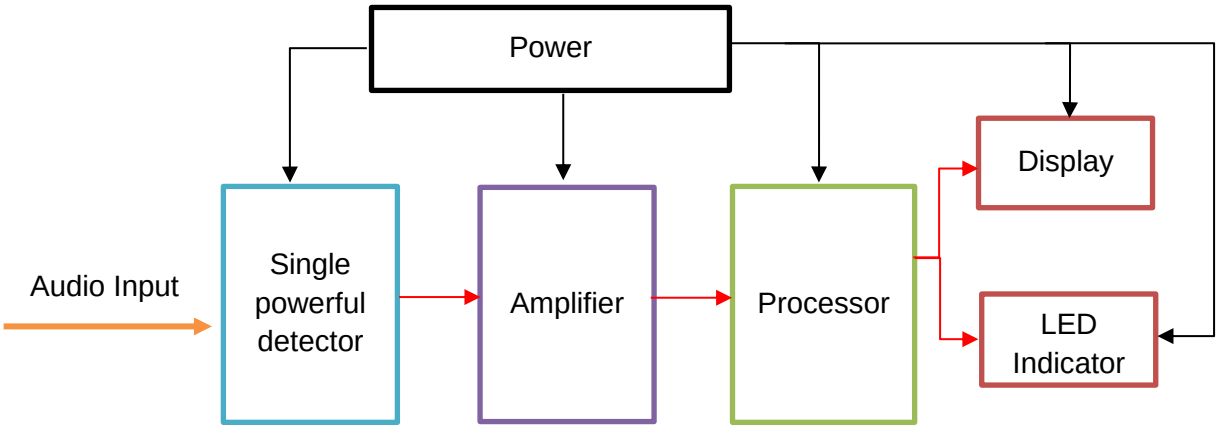




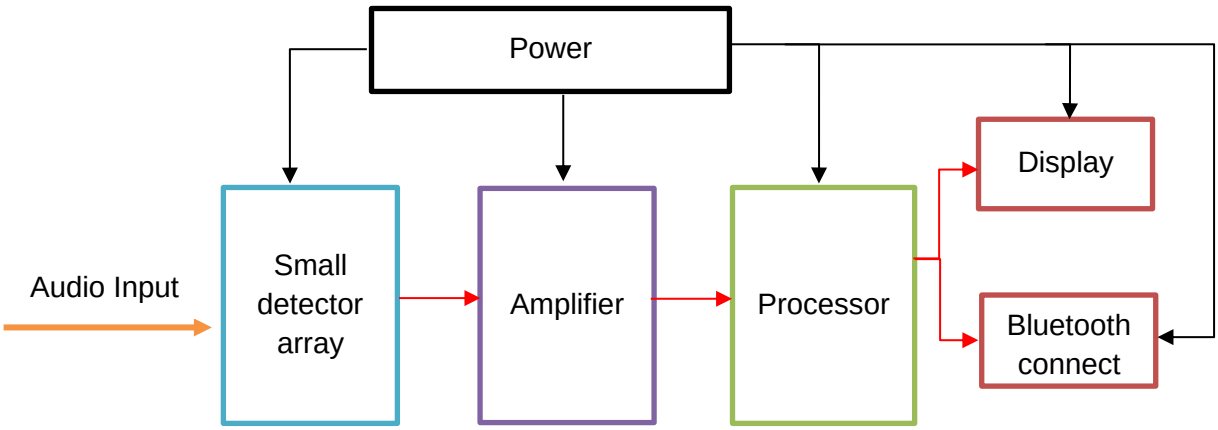


ii. Block Diagrams Drawn by Peers

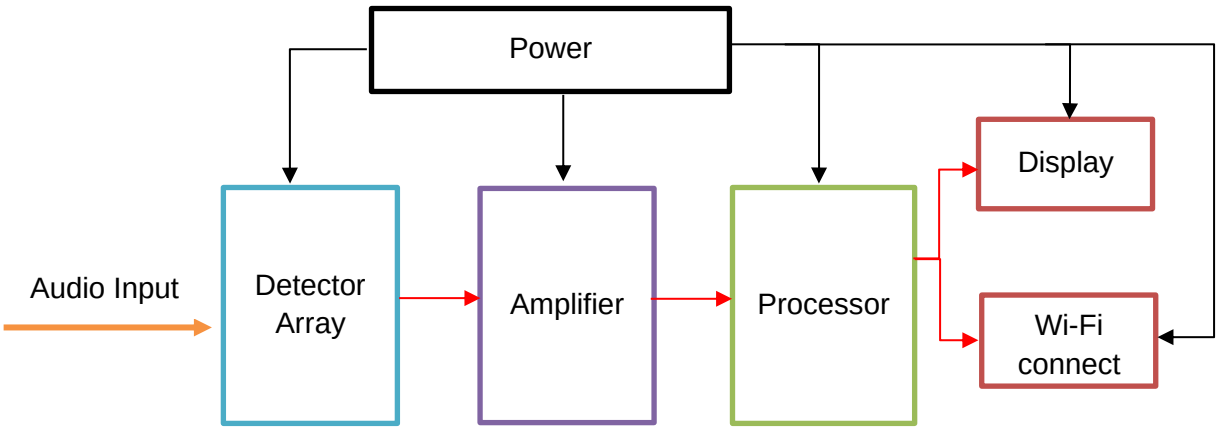
a) Block Diagram - 1



b) Block Diagram - 2

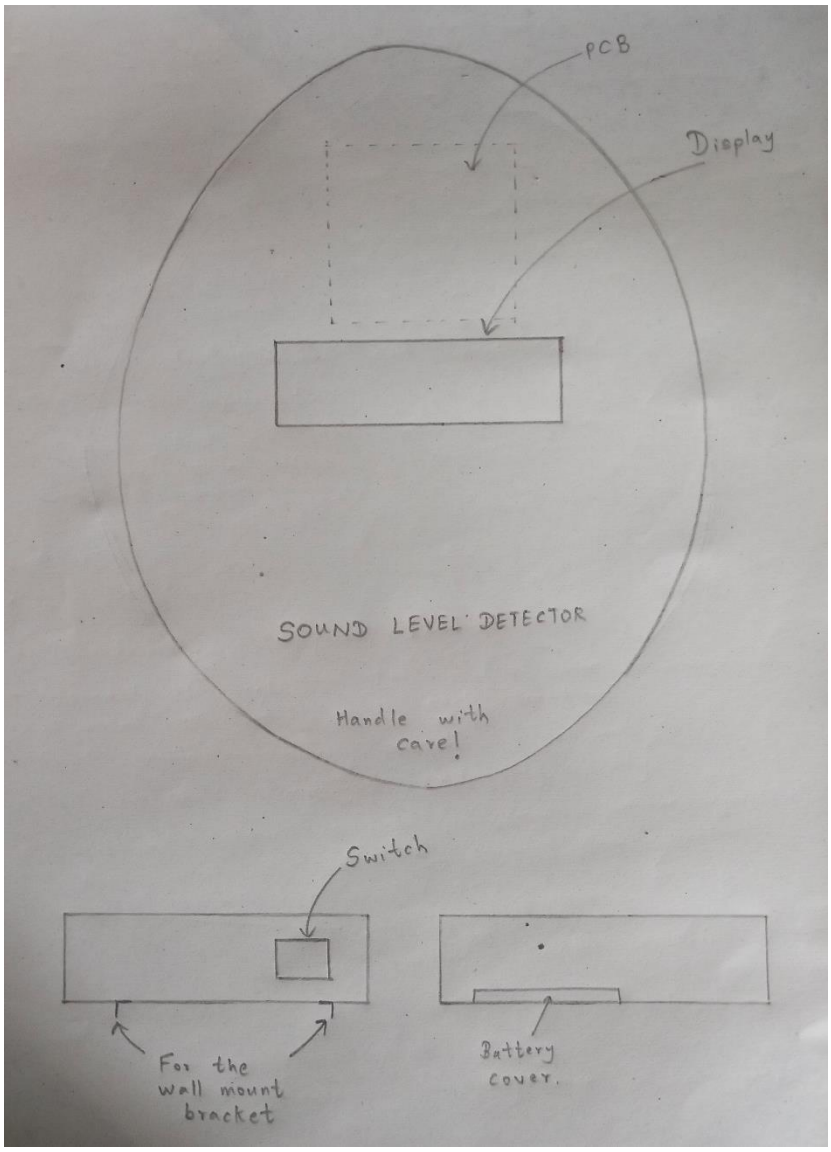


c) Block Diagram - 3

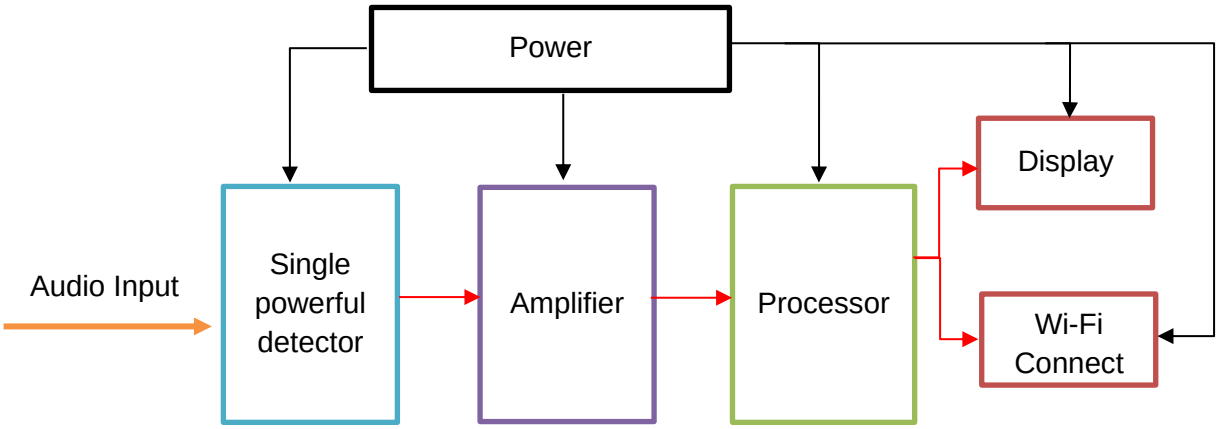


3. User Centred Design

i. Sketch



ii. Block diagram



4. Evaluation Matrices

a. For the conceptual designs

No.	Criterion	Design - 1 (Inspired from Amazon ALEXA)	Design - 2 (Handheld Type Design)	Design - 3 (Wall Mount Type Design)	Design - 4 (User Centred Design)
1	Portability	0	10	0	0
2	Simplicity	9	4	8	7
3	Repairability	8	8	8	8
4	Manufacturability	7	7	7	7
5	Indoor use	10	8	10	10
6	Outdoor use	0	4	9	0
7	User friendliness	5	3	8	6
8	Aesthetic view	5	4	7	5
9	Competitiveness with existing products	6	3	8	8
10	Eco friendliness	6	6	6	6
	Total Marks	**56**	**57**	**71**	**57**

b. Features added and removed in each design

Criterion	Design - 1 (Inspired from Amazon ALEXA)	Design - 2 (Handheld Type Design)	Design - 3 (Wall Mount Type Design)	Design - 4 (User Centred Design)
Added features	• Indoor use • Simplicity	• Portability • Indoor use	• Both indoor and outdoor use	• Indoor use • Competitiveness with existing products
Removed features	• Outdoor use	• Simplicity	• Portability	• Portability • Outdoor use

c. For the block diagrams

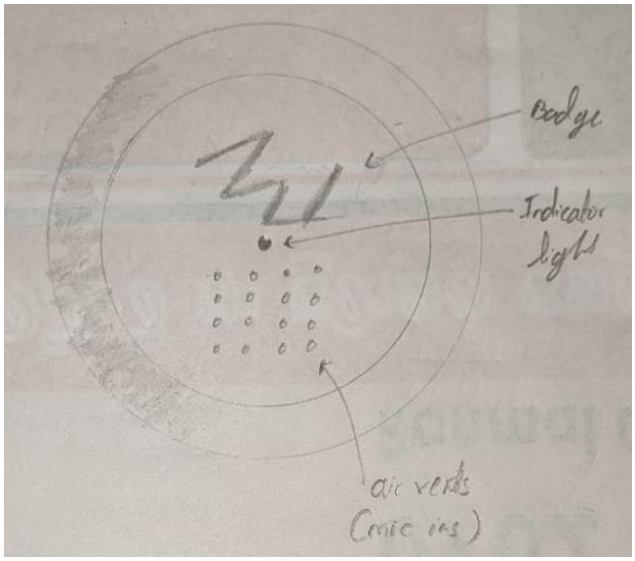
No.	Criterion	Block Diagram - 1	Block Diagram - 2	Block Diagram - 3	Block Diagram - 4 (User Centred Design)
1	Battery life	8	6	6	6
2	Simplicity	6	6	5	5
3	Repairability	5	5	5	5
4	Manufacturability	6	6	6	6
5	Indoor/Outdoor use	5	3	5	5
6	User friendliness	4	7	8	6
7	Response time	6	7	7	7
8	Reliability	4	6	8	8
9	Accuracy	5	6	6	5
10	Range	4	8	7	6
	Total Marks	**53**	**60**	**63**	**59**

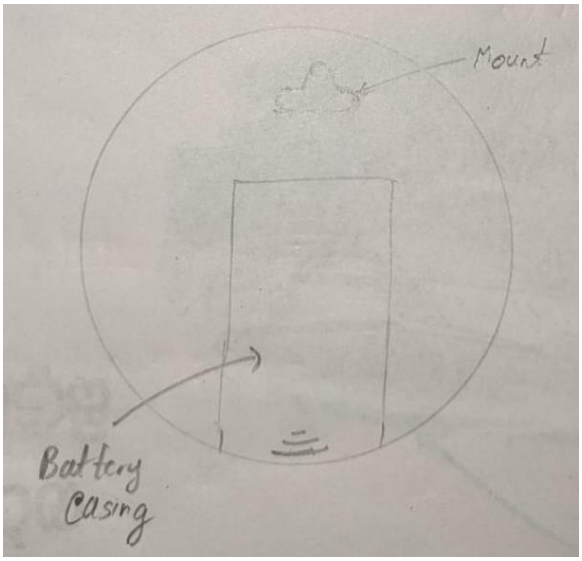
d. Features added and removed in each block diagram

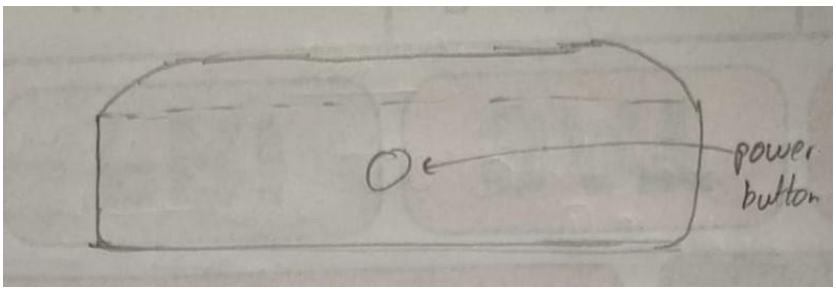
Criterion	Block Diagram - 1	Block Diagram - 2	Block Diagram - 3	Block Diagram - 4 (User Centred Design)
Added features	• Only one powerful detector to detect sound	• A detection array instead of a single detector for sound detection	• A detection array instead of a single detector for sound detection	• A detection array instead of a single detector for sound detection
Removed features	• No Wi-Fi or Bluetooth connection can be enabled.	• No Wi-Fi connection can be enabled.	• No Bluetooth connection can be enabled.	• No Bluetooth connection can be enabled.

5. Selected Design for the Product

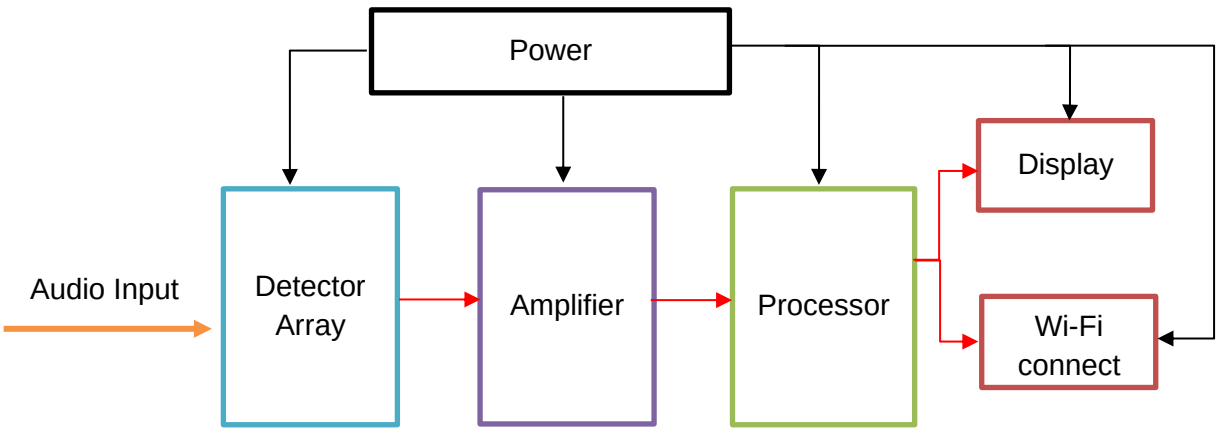
i. **Conceptual design -** Design - 3 (Wall mount design)







ii. **Block diagram -** Block diagram - 3



6. Contribution from Each Group Member

- **Group members**

  - Bandara D.M.D.V. - 200061N
  - Bandara H.M.S.D. - 200064C
  - Chandira R.M. - 200082E
  - Hewavitharana M.I. - 200220D
  - Marasinghe M.M.H.N.B. - 200381U
  - Pramuditha A.A.H. - 200476P
  - Samarasekara A.M.P.S. - 200558U
  - Wijetunga W.L.N.K - 200733D

Index Number	Name	Contribution
200061N	Bandara D.M.D.V.	Criteria for both evaluation matrices, Block diagram - 2
200064C	Bandara H.M.S.D.	Criteria for both evaluation matrices, Block diagram - 1
200082E	Chandira R.M.	Criteria for both evaluation matrices, Conceptual design - 3
200220D	Hewavitharana M.I.	Criteria for both evaluation matrices, Conceptual design - 2
200381U	Marasinghe M.M.H.N.B.	Criteria for both evaluation matrices, Block diagram - 1
200476P	Pramuditha A.A.H.	Criteria for both evaluation matrices Conceptual design - 1
200558U	Samarasekara A.M.P.S.	Criteria for both evaluation matrices, Block diagram - 3

References

[1] R. Verganti, “Research Summary - Design Driven Innovation,” [Online]. Available: https://www.hbs.edu/faculty/Pages/item.aspx?research=7465. [Accessed 4 6 2023].

[2] Engineering Design Centre, Department of Engineering, University of Cambridge, “Inclusive Design Toolkit,” [Online]. Available: http://www.inclusivedesigntoolkit.com/GS_overview/overview.html. [Accessed 3 6 2023].