

Mobile Air Purifier

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Electrical and Computer Engineering

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Background

* Millions of people suffer from in home air pathogens

- Dust

- Gases

- Bacteria



* These pathogens cause allergies and the use of costly medicine.

Problem Formulation



*** There is a need for a cost effective air purifier**

*** Goal**

1. Not limited to one room

2. Simple

3. Reliable

4. Cost Efficient

Design Requirements



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Function	Requirements
Functionality	<ul style="list-style-type: none">➤ When the beacons sense the air quality goes under the threshold the purifier will come and clean the air.
User Interface	<ul style="list-style-type: none">➤ Able turn on/off
Capabilities	<ul style="list-style-type: none">➤ Able to turn on and off by itself when the sensors alert the system➤ Able guide through obstacles to purify air
Compliance	<ul style="list-style-type: none">➤ Purification rate based the standard air quality for a space

Current Status of Art

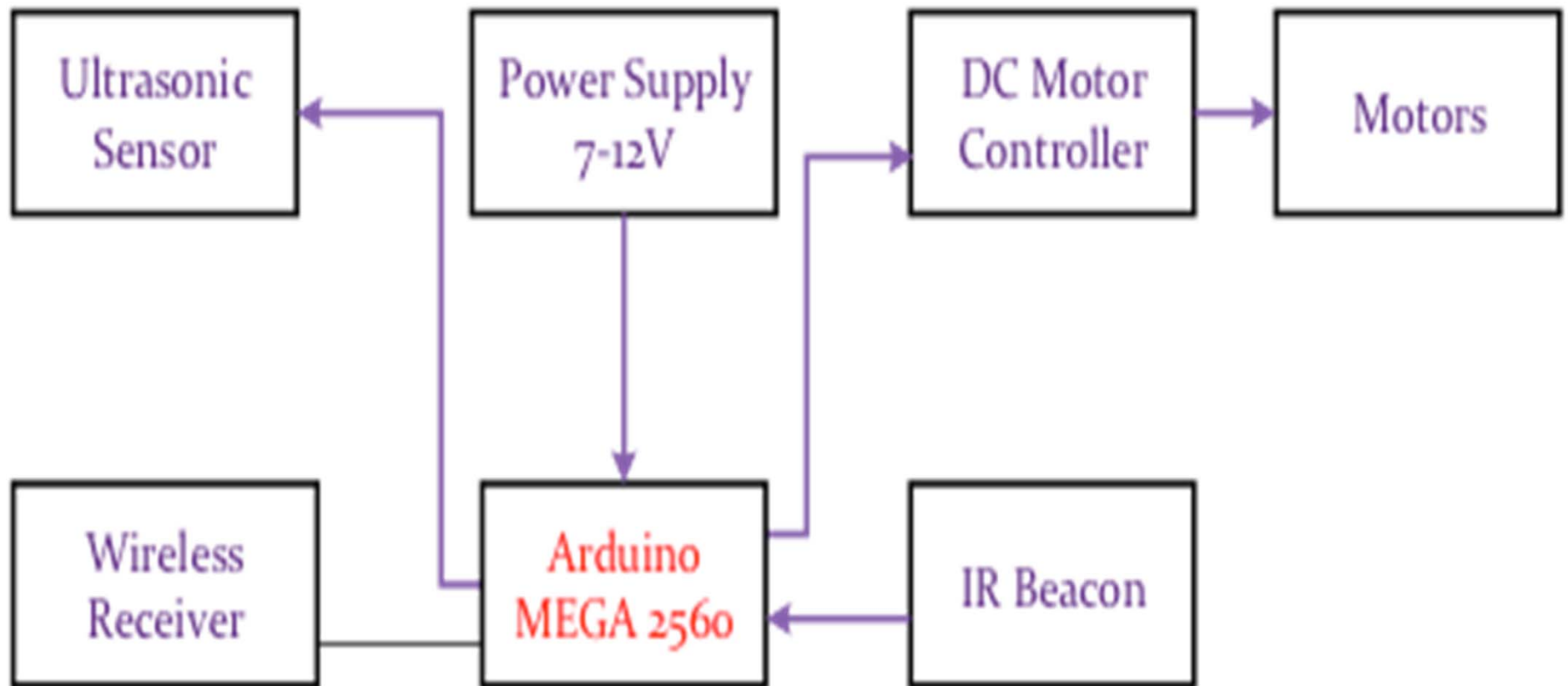


Standard

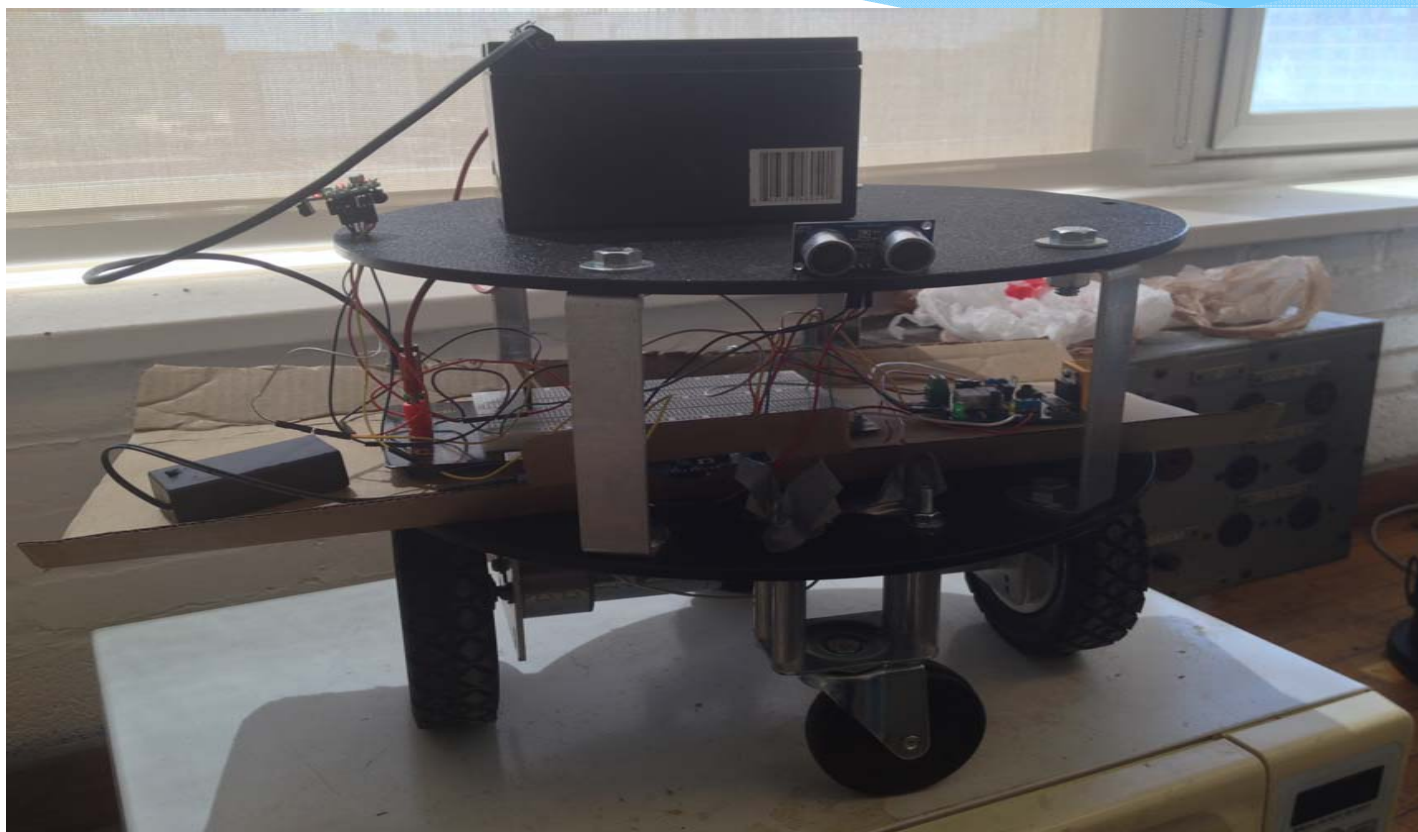
- ❖ 1. Equal 2. Not Equal

	Cost	Simplicity	Mobility	Reliability
Blue Air Purifier 203	\$329.95	2	2	1
Monueal R700 Air	\$2500	2	1	2
Rabbit Air MinusA2	\$545.99	2	2	1
Austin Air B4000	\$538.99	2	2	1

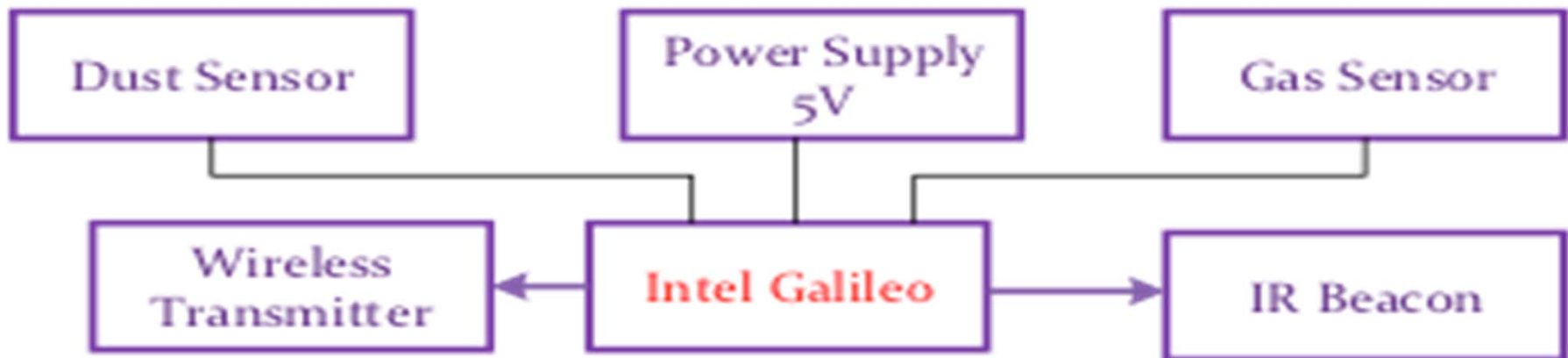
Solution Approach Base



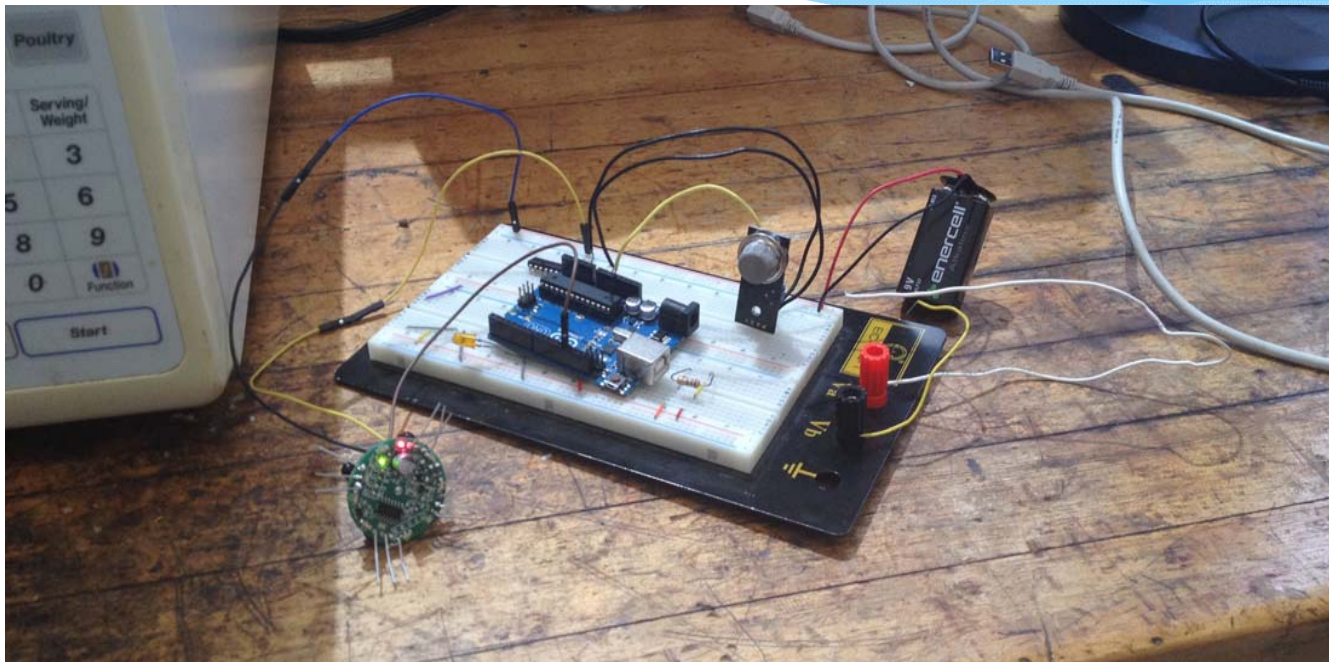
Solution Approach Base



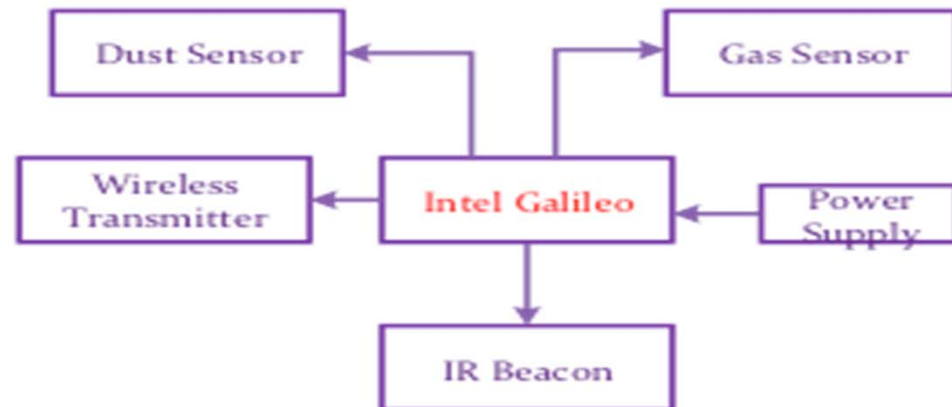
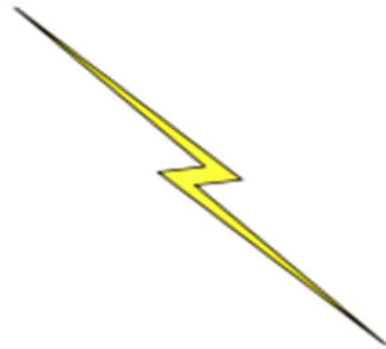
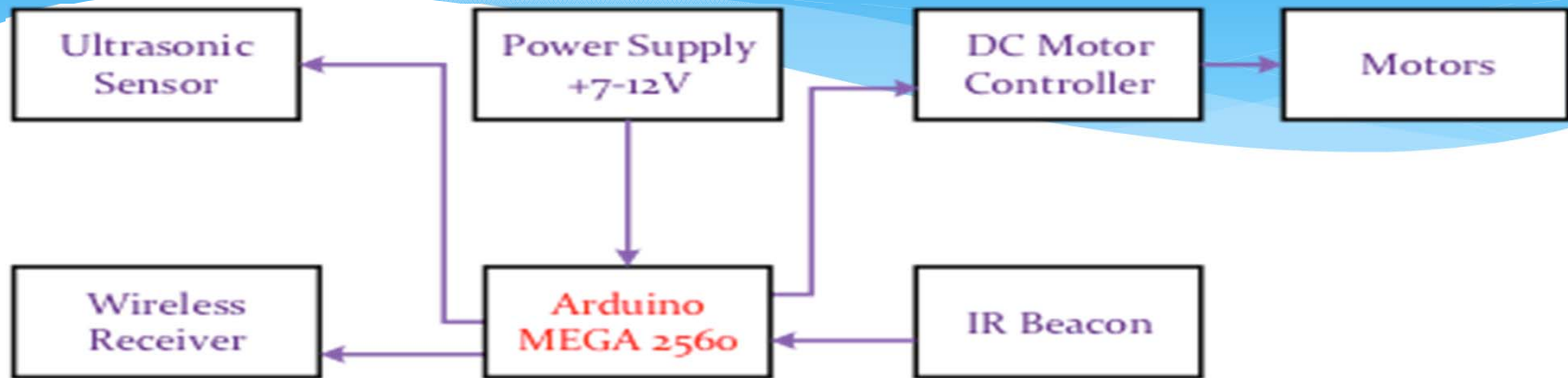
Solution Approach Sensor Array



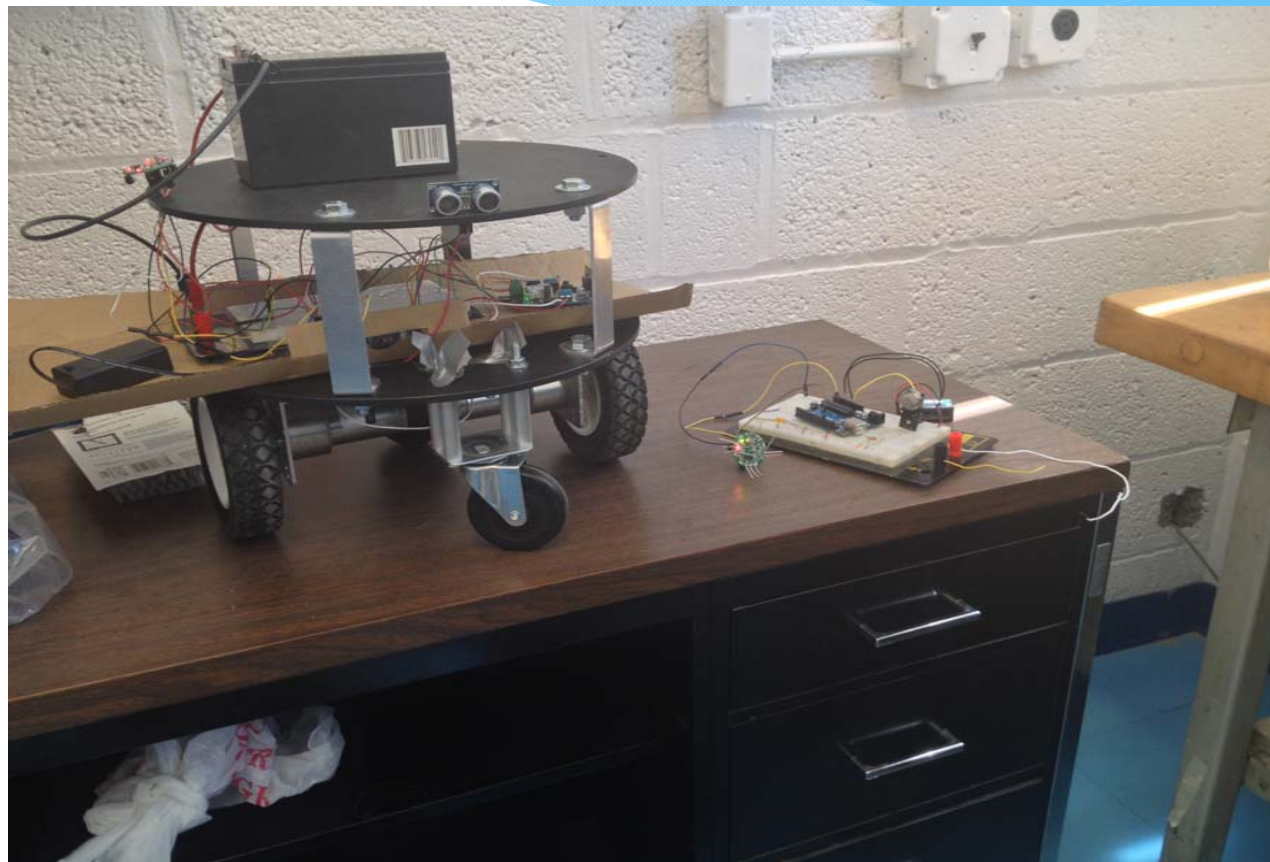
Solution Approach Sensor Array



Final Solution Approach



Final Solution Approach



Base Design Matrix



Base	Cost	Maneuverability	Max - payload	Reliability	Power – Consumption	Program -ming	Total
Treaded Base-Drive	1	3	2	3	3	3	15
2 motor drive	3	3	3	2	2	3	17
4 motor chassis	2	2	2	3	3	3	16

Motion Sensor Decision

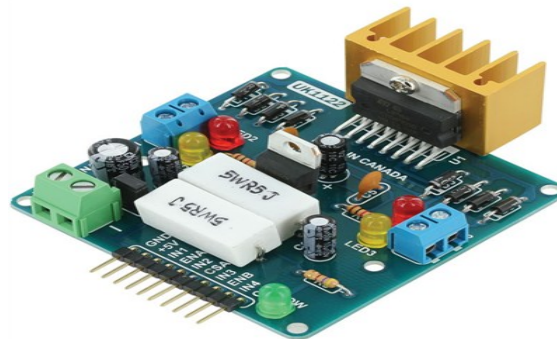


Matrix

	Cost	Power Consumption	Reliability	Compatibility	Accuracy	Range	Programming	Total
Light Sensors	3	2	2	2	3	3	2	16
X-band Motion Detector	2	2	2	2	2	2	2	14
GPS Receiver w/ Antenna	1	2	3	2	3	3	2	16
Ultrasonic	2	2	2	2	2	2	2	17
Infrared	1	2	2	2	2	2	2	13

Solution Implementation

- * PART A
 - Directions to location (BASE)
 1. Ultrasonic Sensor
 2. Arduino Microcontroller
 3. Arduino Mega 2560
 4. IR Beacon



Solution Implementation



* PART B

■ Relay(SENSOR ARRAY)

1.IR Beacon

2.MQ 135 Gas Sensor

3. Galileo



Cost and Resources



Components	Physical and Technical Resources
SainSmart Air Quality Sensor (5) \$7.77=\$38.85	4WD Robot Chassis
Arduino Ultrasonic Sensor (4) \$5.55=\$22.20	Arduino Board
Arduino Micro-Controller (2) 39.95=\$79.90	Bread Board
total=\$140.95	

DEMO



Conclusion



- * This was an helpful insight into Design Experience
- * We learned a lot individually and as a team
- * Project could be implemented for commercial use

Future Plans



- * Incorporating more than one sensor array
- * Working direct to direct pairing of sensor arrays and direct base
- * Condensing of purifier system

Acknowledgements



- * Dr. Charles Kim
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Questions



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