



*Team
2Stroke*

HALO HELMET

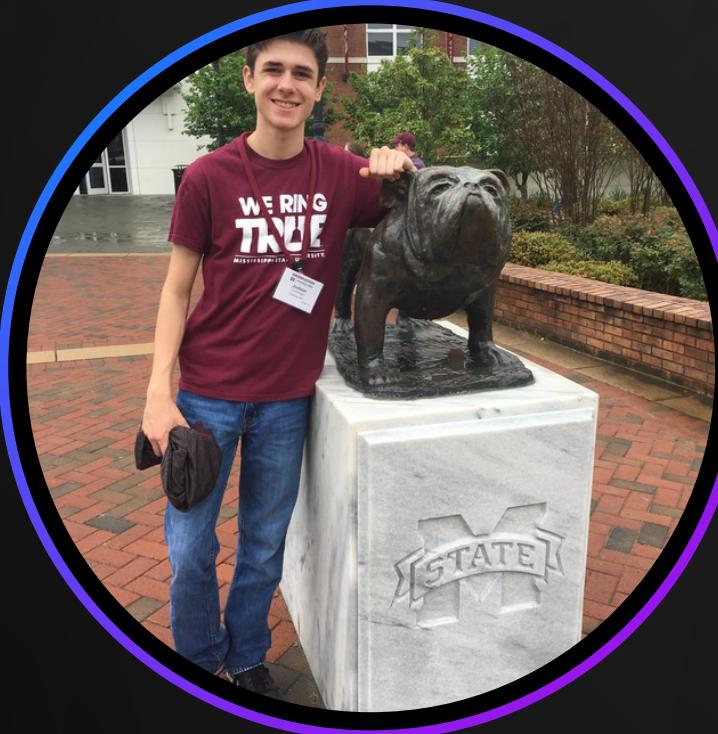
*Presented by: Ben Brooks, Judson
Cavanaugh, Lucas Fisher, Gregory Smith, Kyle
Russell*



Our team



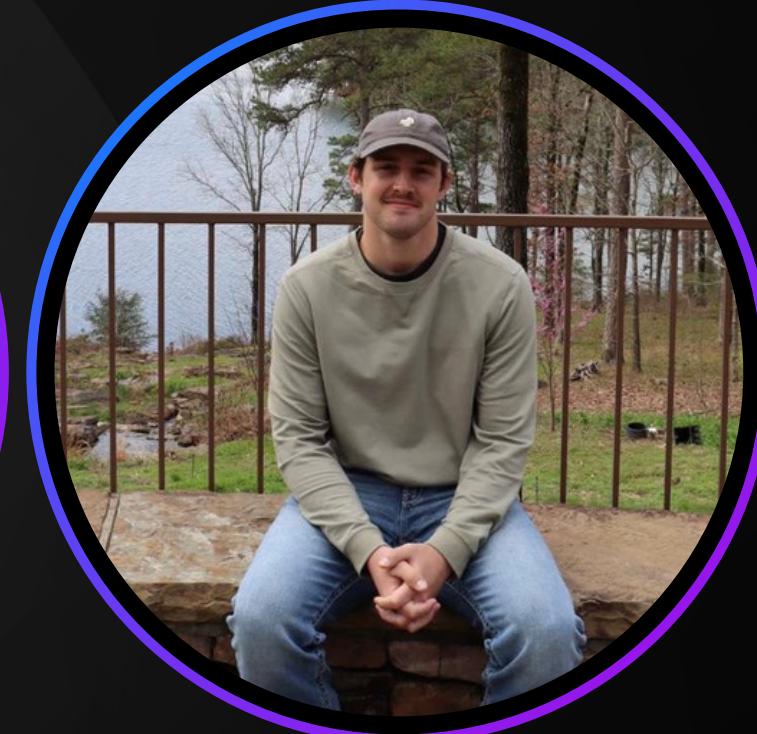
Ben Brooks
Team Lead
Communications Lead



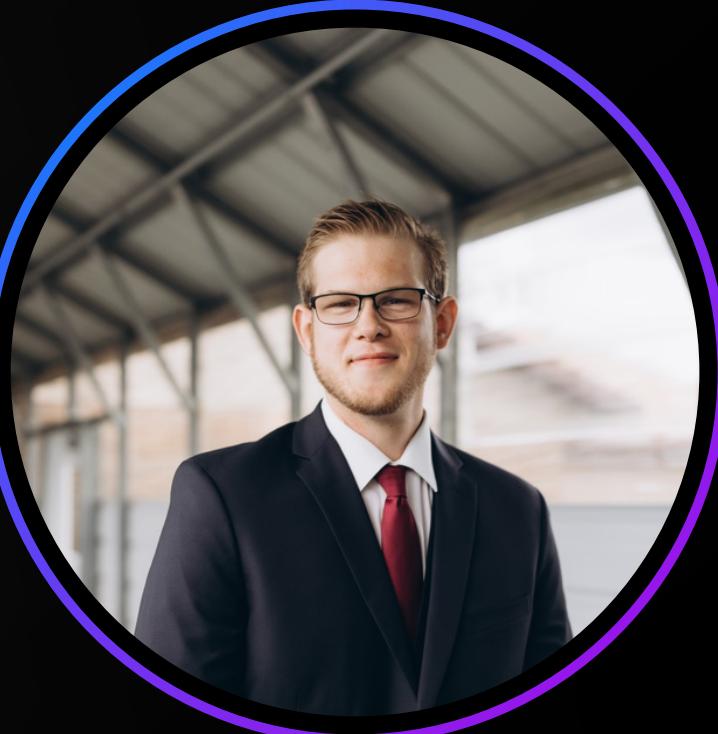
Judson Cavanaugh
Lighting Lead
Microcontroller Lead



Lucas Fisher
Sensing Lead



Gregory Smith
Circuits / Power Lead



Kyle Russell
Code Lead
Web Design Lead

About Us

- Motorcycle accidents are among the highest fatality rates of all motor vehicle accidents on the road today.
- Halo Helmet is an innovative wearable safety technology aiming to improve rider safety.
- Halo Helmet will be equipped with sensors for blind spot detection and a highly visible LED to ensure they don't go unnoticed to other drivers on the road.



Marketing/Engineering Requirements

- Highly Visible
 - Comfortable
 - Weather Resistant
 - Blind Spot Detection
 - Portably Powered
 - Indicates Approaching Objects
- Flashing LED's (mcd)
 - Helmet Weight
 - IPX3
 - Sensor Detection Distance
 - Battery Time
 - Luminous Lens Area
-
- The diagram consists of two columns of bullet-point lists. The left column represents Marketing requirements, and the right column represents Engineering requirements. Blue horizontal arrows connect each requirement in the left column to its corresponding requirement in the right column, indicating a mapping or relationship between them.

Constraints

Social	DOT Regulations for lighting/safety		Welfare	User protection from electric shock
Economic	Production costs do not exceed \$1000		Safety	Original helmet safety is not compromised
Environmental	Interchangeable system reduces waste		Health	Lightweight system avoids causing neck strain

Engineering Standards

IP-X3	Ingress Protection Standard 60529	Heavy rain does not cause device malfunctions
USB	USB Implementers Forum Standards	Rechargeable batteries using USB interface
Modular Transmitters	Code of Federal Regulations 47 CFR 15.212	Internal wireless communication using Bluetooth

Subsystems



Communications



Power/Circuit



Web Design/Code



Lighting

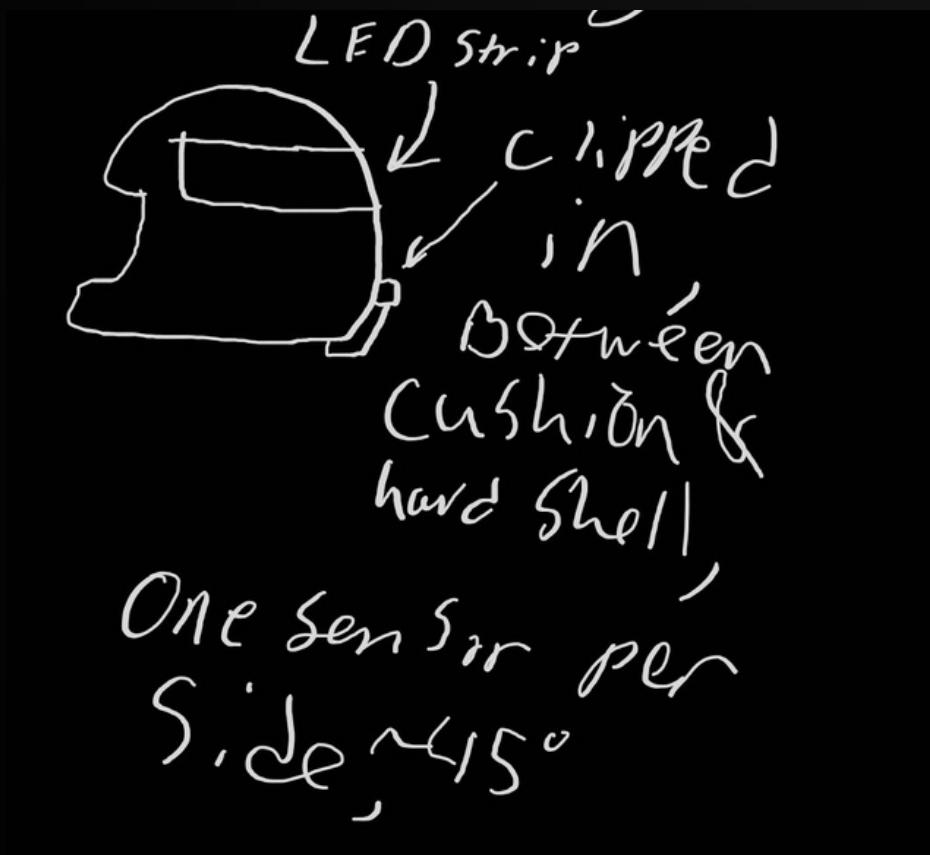


Microcontroller



Sensing

Diagrams



First tentative
design diagram



Halo Helmet idea
put together with
real images
Fig. 1. Adapted from
[1], [2], [3].

Subsystem Updates: Communication

- Bluetooth for wireless communication
- No wires needed between rider and bike
- Two HC05 modules utilized in design
- General:
 - Can initiate BT signal
 - Compatible with Arduino
 - Small
 - Ordered: 10/6/23

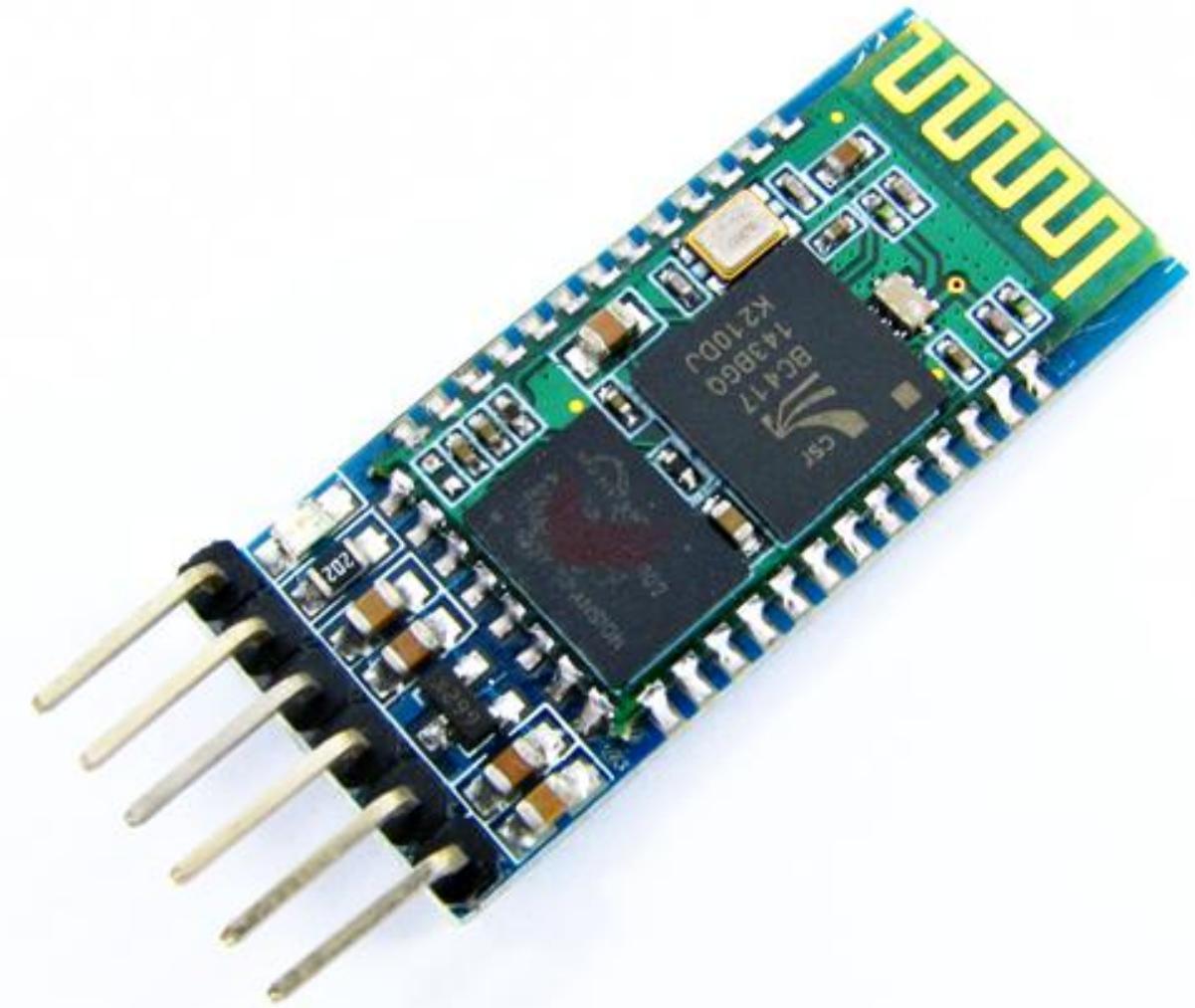


Fig. 2. Adapted from[4]

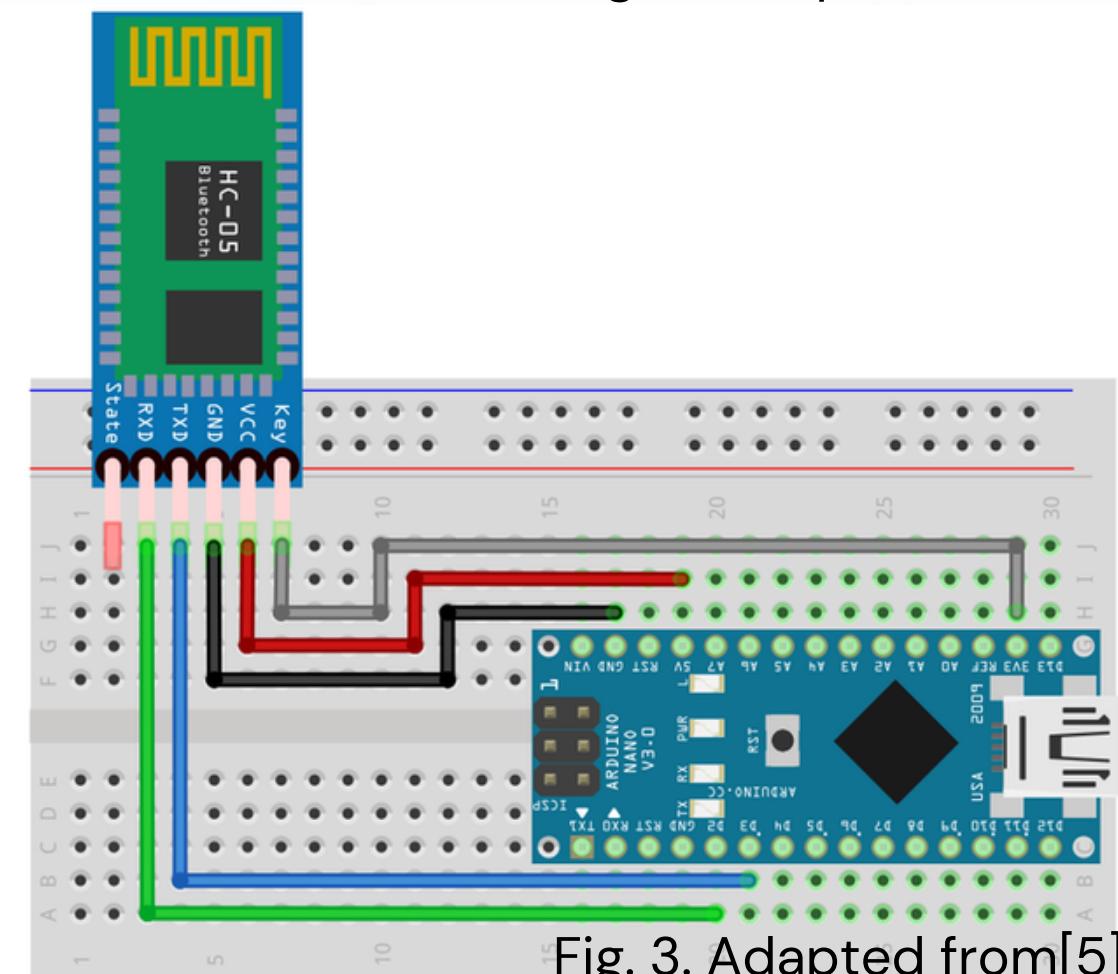


Fig. 3. Adapted from[5]

Subsystem Updates: Microcontroller

- The LAFVIN Nano microcontroller board is used for its small size.
- It needs to fit inside of a helmet.
- A second one will be positioned on the bike.
- 45mm by 18mm
- Mini-USB powered
- Arduino IDE compatible
- 5 Volt
- Bluetooth communication compatible
- Ordered: 10/6/23

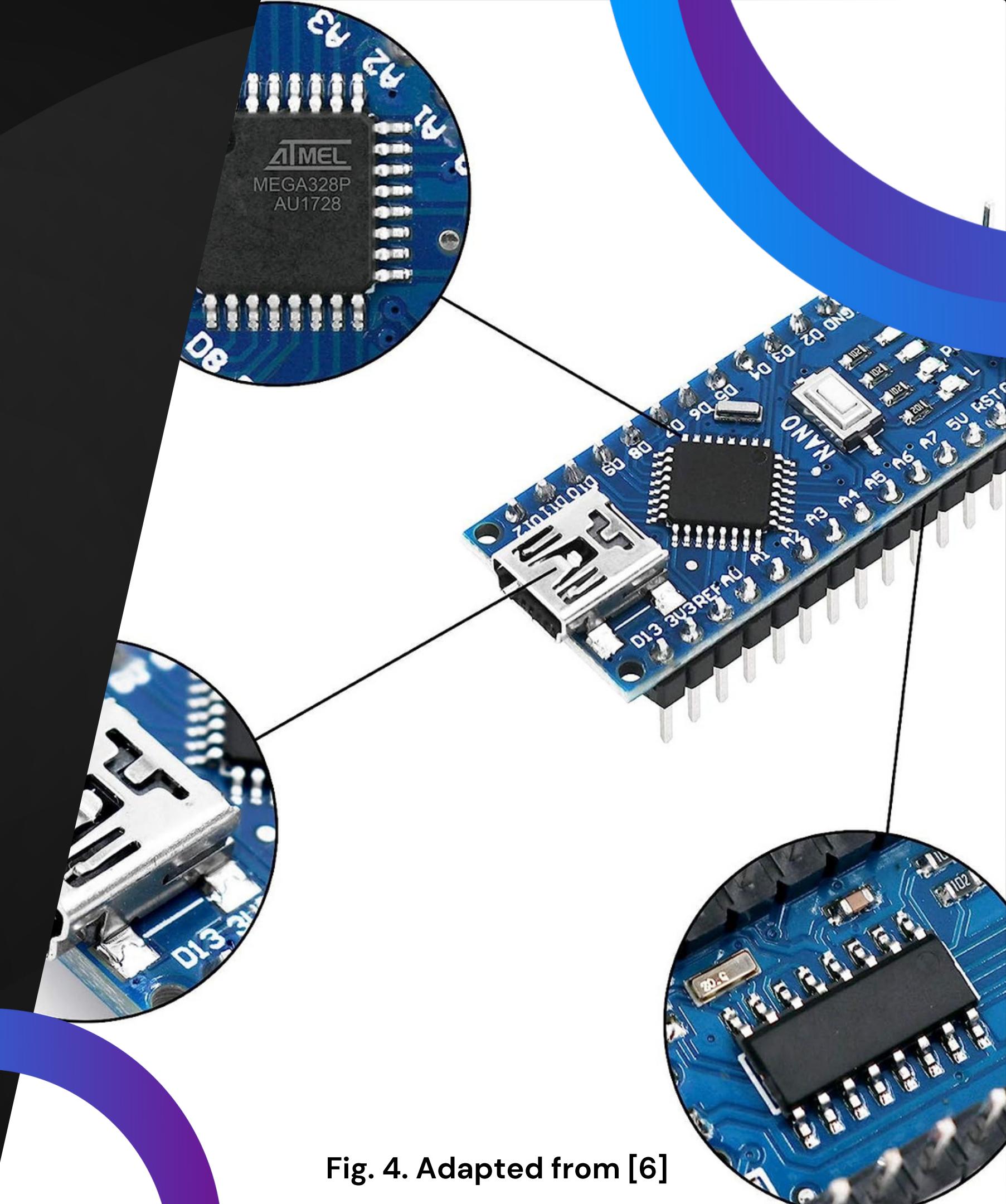


Fig. 4. Adapted from [6]

Subsystem Updates: Lighting

- Halo Helmet turn signal communication is done through a LED matrix.
- Can be used to convey more information than just arrows.
- **In-Helmet lighting** is done through simple LEDs.
- Since the LEDs are so close to the face, they do not need to be powerful or bright.
- Ordered: 10/6/23

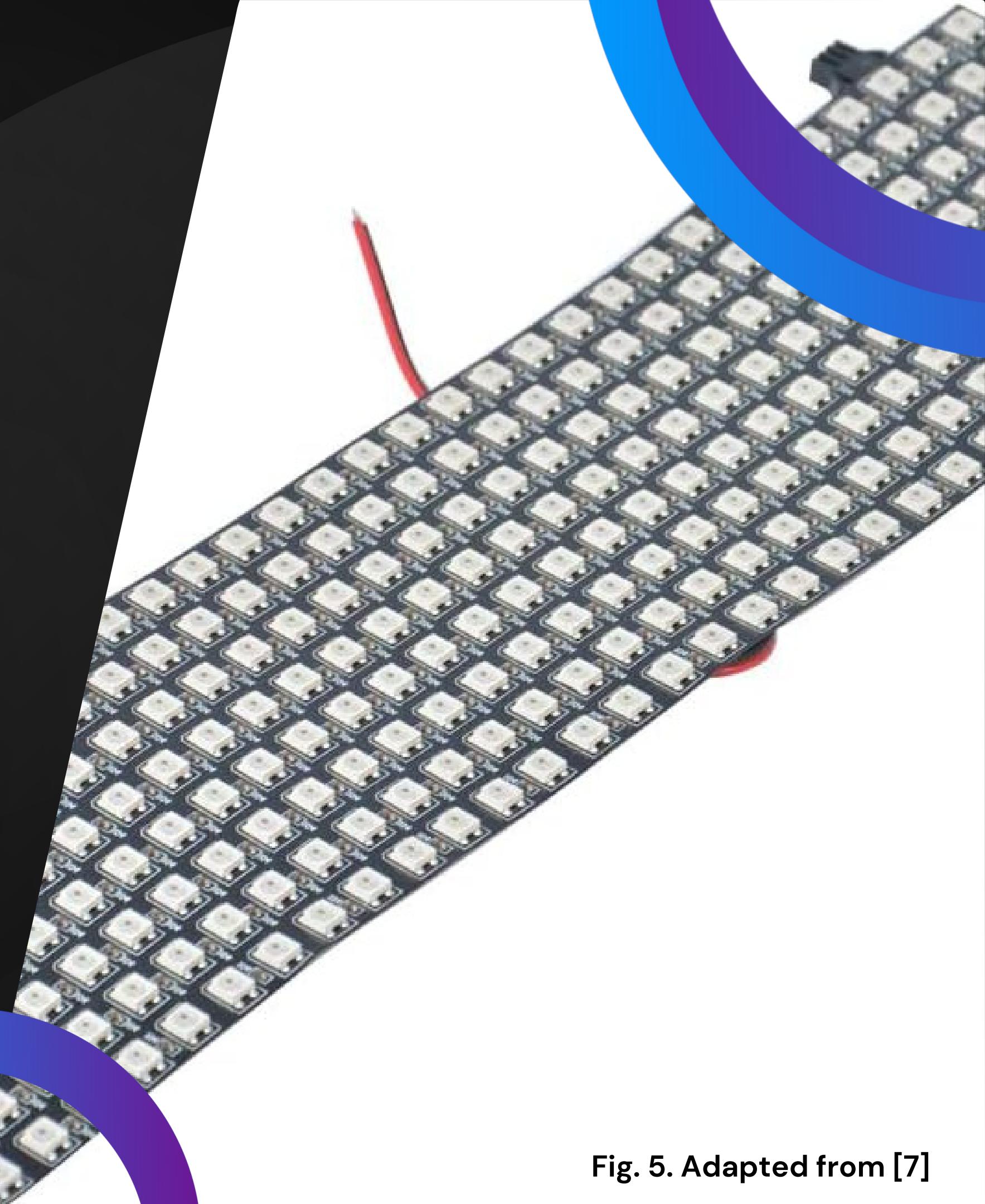


Fig. 5. Adapted from [7]

Subsystem Updates: Sensing

- SENO311 AO2YYUW - Waterproof Ultrasonic Sensor from DFRobot
 - Two sensors utilized in design
- Ranging Distance: 3 – 450 cm
 - Meets 10 feet distance requirement
- Protection Rating: IP-67
 - Exceeds IP requirements
- General:
 - Quick response time
 - Wide operational temperature range
 - Compatible with many microcontrollers
- Ordered: 10/6/23



Fig. 6. Adapted from[8]

Subsystem Updates: Circuitry / Power

- QTshine 26.8 Ah Portable Power Bank (2)
 - Double Lithium-Polymer rechargeable batteries
 - Dual USB outputs
 - 5.91" L x 2.95" W x 0.6" Th
 - 11.8 Ounces
- Location:
 - (1) Secured to motorcycle
 - (2) In rider's possession
- Ordered: 10/6/23



Fig. 7. Adapted from [9]

Subsystem Updates: Code / Web Design

- C++ for Programming the Microcontroller
this will be in arduino IDE
- Website - Display pertinent information to
our target market.
 - HTML
 - CSS
 - GitHub - Open Source

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    ringilla iaculis eros in co
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    meta name="author" content-
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    "og:url" conte
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Team
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REFERENCES

- [1] Goliath Automation & Robotics, Ultrasonic Range Sensor Module HC-SR04.
- [2] LED Lighting Hut, Flexible 18x32 WS2812C 2020 RGB LED Matrix, 90mm*160mm, 5V DC.
- [3] Rich, AGV-K5-Matt-Black-Motorbike-Crash-Helmet-Rear-View.
- [4] ElectronicWings, Sensors Modules Bluetooth Module Hc 05 | Sensors Modules.
- [5] A. Inventor, HC-05 Wiring | AT Command.
- [6] Amazon, Nano V3.0, Nano Board ATmega328P 5V 16M Micro-Controller Board
- [7] Amazon, WESIRI 8x32 LED Matrix 256 Pixels WS2812B Digital Flexible LED Panel
- [8] DFRobot, A02YYUW Waterproof Ultrasonic Sensor Wiki
- [9] Elegant Themes, BACKSTOPCAMERAMOUNTS.COM.