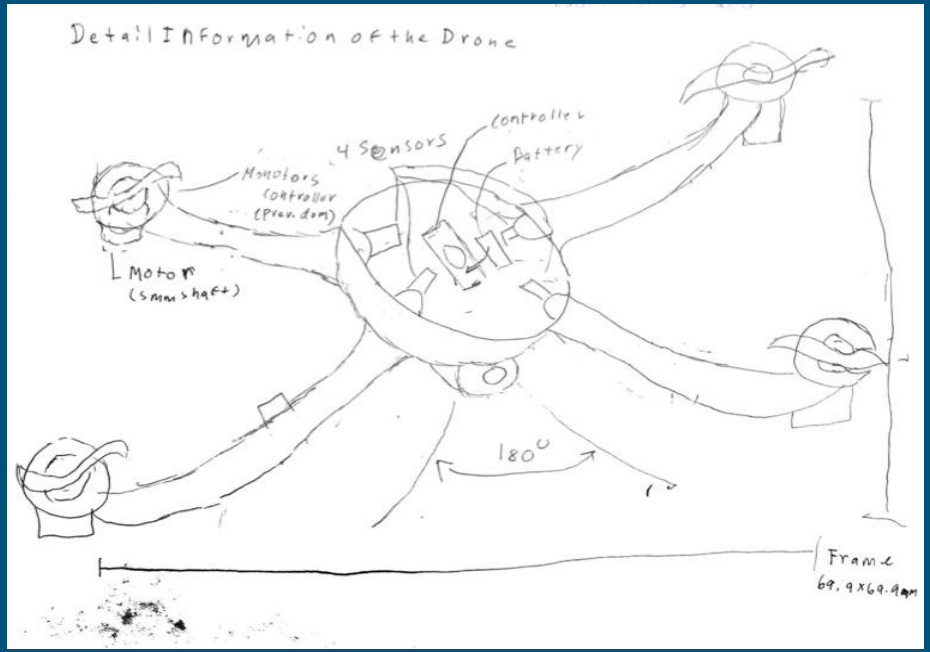
Creation of Drone: Final Project Portfolio

Rayshad Lindsay

Project Aims

- **Creating a customized product drone using the cheapest parts and materials with low qualities.**
- **Included multiple features to operate the drone**
- **Gain attention toward the customers**
- **Functional and innovative drone**

Ideal Sketch and design of the drone



- Motors going on top of the motor to avoid crash impact damages or midair collisions
- 4 sensors on the same plane as the nano battery in case of high heat performances
- Easy to remove the battery
- Open excellent sensors for battery functions

Drone Background Knowledge

- In 1849, an engineer named Nikola Tesla invented the drone as an aerial vehicle that controls remotely using a wireless beam transporting information and pictures from a short distance in 1898 (Nye).
- In 1916, the first drone developed known as the ‘Fairey Rotors’ enables the drone to fly themselves using gyroscopes to help take control of the flight, becoming popular in military and toy companies.
- In the 1980s, drones became helpful for filming movie scenes and surveillance with a camera installed within the drone’s system (“Complete Evolution & History of Drones: From 1800s to 2022”).
- By the 1990s, drones quickly became helpful for the CIA as spy planes allowed small-scale drones with high-resolution cameras. Today, drones can be used for aerial mapping, inspecting power lines, and delivering goods (“Complete Evolution & History of Drones: From the 1800s to 2022”).

List of materials and parts

- NewBeeDrone BeeEye Nano 600TVL FPV Camera
- Turnigy nano-tech 600mah 1S 35~70C Lipo battery (Nine Eagles Solo Pro 328, Eflite MQX, 120SR)
- Arduino Camera Sensor Module Framecapture
- DSD TECH HC-05 Bluetooth Serial Pass-through Module Wireless Serial Communication with Button for Arduino
- Pluto Controller
- Gy-521 MPU-6050 MPU6050 Module 3 Axis Analog Gyro Sensors+ 3 Axis Accelerometer Module
- 4 plastic blades Propellors
- Barebones code framework
- 3D printer
- Nano Long-Range Frame
- 3 Arduino Every
- 5 Gikfun Obstacle avoidance IR Infrared Sensor Module Reflective Photoelectric Light Intensity DIY Kit for Arduino UNO
- WYPH Mini Nano V3.0 Module ATmega328P 5V 16MHz CH340G Chip Microcontroller Development Board for Arduino Without USB Cable

Decision-making process

Determining the type of required materials:

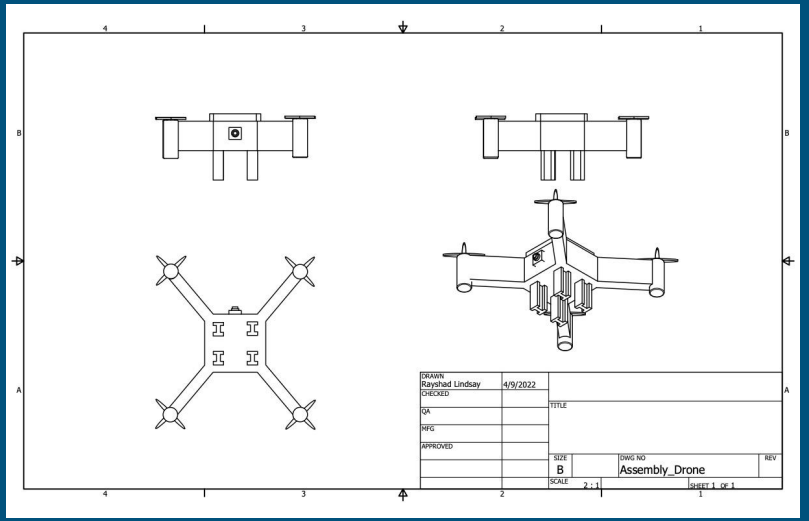
- Forming a matrix to determine the right part for our drone
- Parts capabilities and functions
- If first choice fail, second-highest choic battery, then re-evaluate the matrix

Supplier	Size	Design	Weight	Hardware	Extras	Score
NanoLong Range	135.0 x 128.5 mm	2 Parts	100 gram	M2 screws, glue, electrical tape	Camera, wire design, parts list	2
T4 QuadCopter	152.4 mm x 152.4 mm	4 parts	937 gram	8 M3 x 40mm+ bolts (arms to body) 8 M3 x ~5mm bolts (motors)	None	3
FPV quad	69.9 x 69.9 mm	3 parts	40 gram	None- Snap design	Camera and wiring design	1
PL1Q Vampire	104.9 x 104.9 mm	5 parts	231.6 gram	None- Snap design	Camera and wiring design	4

Process of the project

1. Forming a matrix to determine the right part for our drone (i.e., size, cost, and compatibility)
2. Creating the blades for the drone using light-thin plastic
3. Determining the flight control of the drone controller.
4. Constructing a code for our drone control
5. Searching for the correct sensor for our drone control
6. Attaching each blade to the 4 four different brushless motors
7. Connecting the battery to the frame should be a small turning-nano and weightless for the bottom frame to carry the components.
8. The resource for deciding the code for our drone is the GitHub, consists with varieties of codes to help operate the Arduino using a wireless communication phone.
9. We made special arrangements for a code to aid in adding the avoidance sensors to the sensors for better communication.

Detail drawing of the drone



Problems and issues

- **The problem is that when testing the drone mainframe control using the Bluetooth interface app and IR sensors connecting to the Arduino, the IR sensor did not respond using the code.**
- **We could not figure out the source of the problem, either the code itself or the incorrect type of USB sensor to operate the drone.**
- **The possibility of the battery capacity could cause the motor to overrun and malfunction.**

Conclusion

- **We can create a drone using cheap parts and materials**
- **Due to long time consumption and technical issues, we were unable to test it.**
- **Need more people majoring in computer science, electrical engineering, or computer engineering who experience in system installation**

Appendices

- Complete Evolution & History of Drones: From 1800s to 2022." *Propel RC*, 31 December 2021, https://www.propelrc.com/history-of-drones/. Accessed 16 February 2022.
- Vyas, Kashyap, et al. "A Brief History of Drones: The Remote Controlled Unmanned Aerial Vehicles (UAVs)." *Interesting Engineering*, 29 June 2020, https://interestingengineering.com/a-brief-history-of-drones-the-remote-controlled-unmanned-aerial-vehicles-uavs. Accessed 16 February 2022.
- Nye, Logan. "This famous inventor designed drones before World War I." *We Are The Mighty*, 4 May 2021, https://www.wearethemighty.com/mighty-history/tesla-designed-drones/. Accessed 16 February 2022.

All thanks to the rest of the team in the STEM 382 Industrial design course of Spring 2022.