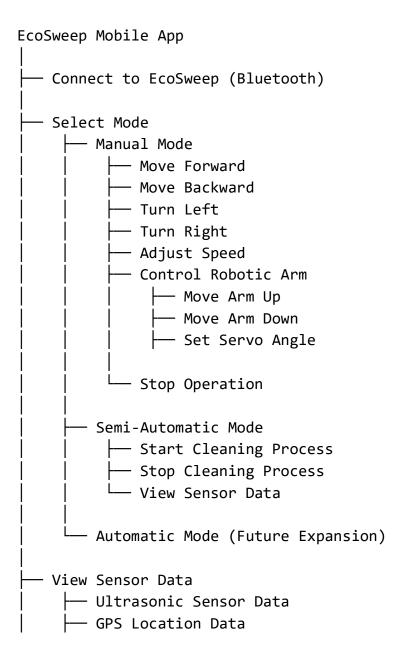
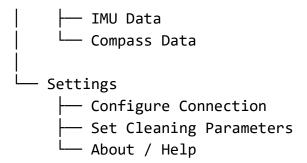
# ✓ 4.3.7 Menu Tree / Circuit Diagram

## ✓ ► 1 – Menu Tree

The **Menu Tree** shows the hierarchy of options and actions the user can perform in the Mobile App UI.

#### Suggested Menu Tree Structure





#### **Explanation to Add in Documentation**

- The **Menu Tree** shows the user navigation flow in the EcoSweep Mobile App.
- Users can connect to the EcoSweep robot, select operation modes, control movement and robotic arm manually, view sensor data, and configure settings.
- In **Manual Mode**, users have fine-grained control of movement and arm position.
- **Semi-Automatic Mode** allows the user to start predefined cleaning processes and view real-time sensor data.
- Future expansion includes fully **Automatic Mode** based on AI.

## **✓** ▶ 2 – Circuit Diagram

#### Overview of Circuit Design (Text Data)

The circuit diagram shows the electrical connections between EcoSweep's main hardware components.

### ▶ ✓ Main Components in Circuit:

Component	Connection	Description
LiPo Battery	Powers Motor Drivers & Arduino	Supplies high current for motors
	Mega	
LM2596	Steps down voltage for sensors,	Ensures stable voltage for low-
Buck	microcontrollers	power devices
Converter		

Arduino	Central microcontroller for sensor	Receives commands from
Mega 2560	reading and actuator control	Raspberry Pi
Raspberry Pi	Central processing hub; connected	Handles command parsing and
4	to Arduino Mega via USB	Bluetooth communication
BTS7960	Connected to Arduino Mega digital	Controls DC tire motors
Motor Driver	pins	
PCA9685	Connected to Arduino Mega via I2C	Controls up to 16 servo motors
Servo Driver	(SDA/SCL)	
Ultrasonic	Connected to Arduino Mega digital	Distance sensing for obstacle
Sensors	pins	detection
IR Sensors	Connected to Arduino Mega digital	Edge detection / Line tracking
	pins	
NEO-6M	Connected to Arduino Mega via	Provides GPS coordinates
GPS Module	Serial	
MPU6050	Connected to Arduino Mega via I2C	Provides accelerometer and
IMU		gyroscope data
HMC5883L	Connected to Arduino Mega via I2C	Provides orientation data
Compass		

#### ► ✓ Example Textual Circuit Flow

```
[LiPo Battery (11.1V)]

↓

[BTS7960 Motor Driver] ↔ [DC Tire Motors]

↓

[Arduino Mega 2560]

↓

[PCA9685 Servo Driver] → [Servo Motors (Arm)]

↓

[Ultrasonic Sensors, IR Sensors, GPS, IMU, Compass] → [Arduino Mega]

↓

[LM2596 Buck Converter] → Supplies 5V to Arduino Mega, Sensors,

PCA9685

↑

[Raspberry Pi 4] ↔ USB Serial ↔ Arduino Mega

[Mobile App (Bluetooth SPP)] ↔ [Bluetooth Module] ↔ [Raspberry Pi 4]
```

### **☑** Explanation to Add in Documentation

- Power is supplied primarily by a **LiPo battery**, powering high-consumption components like motors and motor drivers.
- The **LM2596 buck converter** regulates voltage for stable operation of sensors and microcontrollers.
- The **Arduino Mega 2560** acts as the hardware controller, reading sensors and controlling motors and servos via drivers (BTS7960 and PCA9685).
- **Raspberry Pi 4** acts as the higher-level communication controller, receiving Bluetooth commands and forwarding them to Arduino Mega.
- The full system works together to enable user control, autonomous movement, and environment sensing.

# **☑** Summary of Data to Add in Documentation

- ▶ Menu Tree (as shown in the structured tree above).
- ► Circuit Flow Text (shown above).
- Explanation about power flow, data flow, and component interaction.