Hardware Components for AutoMate

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| ESP32 Board  Espressif Developmentboard ESP32-DevKitC-VIE  Figure 1: ESP32 Board | |
| Hardware type: | Microcontroller |
| Function: | To control a singular function in a device, by interpreting data it receives from its I/O peripherals using its central processor |
| Consideration: | For this project, wireless communication between the automated plant modules is needed, ESP32 makes an excellent choice because it has an integrated Wi-Fi chip, which makes it ideal for prototyping IoT or other devices which require wireless and internet connectivity. The ESP32 is also faster and more powerful than Arduino |

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| BME280  Amazon.in: Buy NYLSA GY-BME280 5V Precision Altimeter Atmospheric Pressure  BME280 Sensor Module Online at Low Prices in India | NYLSA Reviews & Ratings  Figure 2: BME280 Sensor | |
| Hardware type: | Sensor |
| Function: | To measure Temperature and Humidity |
| Consideration: | To make sure the temperature and humidity of a plant’s environment is being measured accurately, the BME280 sensor was chosen because it’s an impressive low-cost sensing solution for measuring humidity with ±3% accuracy and temperature with ±1.0°C accuracy, which makes it perfect choice for this project |

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| Grove Moisture Sensor    Figure 3: Grove Moisture Sensor | |
| Hardware type: | Sensor |
| Function: | To measure moisture in soil |
| Consideration: | To detect soil moisture accurately for plants. The usage for this moisture sensor is simplified. It can be simply inserted into soil and connected to a microcontroller with its Grove cable. It is compatible with 3.3 V and 5 V input voltage which make it more adaptive. You can use this moisture sensor to build loads of smart plant-attending applications. |

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| Adafruit UV Light Sensor  ADAFRUIT INDUSTRIES Breakout Module - RS Components Indonesia  Figure 4: Adafruit UV Light Sensor | |
| Hardware type: | Sensor |
| Function: | To measure Ultraviolet light |
| Consideration: | Ultraviolet (UV) light is important for plant growth, this UV light sensor was chosen because it uses a UV photodiode, which can detect the 240-370nm range of light (which covers UVB and most of UVA spectrum). This sensor is simple to use, it only does one thing and gives an analog voltage output instead of requiring a complicated I2C setup procedure. This makes it better for simple projects. It also has a 'true' UV sensor instead of a calibrated light-sensor. |

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| Water Level Sensor  Rain Water Level Sensor - Makerlab Electronics  Figure 5: Water level Sensor | |
| Hardware type: | Sensor |
| Function: | To measure water level in a tank |
| Consideration: | The working of the water level sensor is simple and easy to understand. The PCB is made from long conductive plates. When the water reaches a certain level the conductivity between the two plates changes, and by measuring the changes we can measure the water level. This sensor was chosen because it makes it easy and simple to simulate water tank level. |

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| SG90 180 degree Servo Motor  SG90 9G Micro Servo Motor | ThinkRobotics.in  Figure 6: SG90 180 degree Servo Motor | |
| Hardware type: | Actuator |
| Function: | To simulate water tank valve |
| Consideration: | This servo was chosen to act as a water tank valve, because it is an 180 degree servo, and it can easily be programmed to rotate at any angle between 0-180 degrees, and specific angles can be chosen for open drain and closed drain states. |

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| LEDs  Light Emitting Diode Basics | LED Types, Colors and Applications  Figure 7: LEDs | |  |
| Hardware type: | Actuator | |
| Function: | Blue LED | Simulate Humidifier |
| Red LED | Simulate Dehumidifier |
| Yellow LED | Simulate Ultraviolet light |
| Consideration: | LEDs were used to simulate these actuators because, LEDs are simple and easy to demonstrate during a demo. | |

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| Fan  DC Fan 12V Size 5x5 cm - DC Fan 5V| UGE Electronics Store Egypt  Figure 8: Fan | |
| Hardware type: | Actuator |
| Function: | To simulate cooling fan |
| Consideration: | This miniature fan was chosen to simulate a larger cooling fan that would be used to potentially cool off the indoor climate of a greenhouse when the temperature gets too hot. |

# References

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