**Hardware selection**

**1. \*\*Main Controller: Raspberry Pi:\*\***

- Raspberry Pi will serve as the main controller for the car, responsible for processing user inputs, executing pathfinding algorithms, controlling motor movements, and interfacing with sensors.

**2. \*\*Motor Control:\*\***

- Use a motor driver board compatible with Raspberry Pi to control the movement of the car. The motor driver should support bidirectional control to enable forward, backward, and turning motions.

- Example: L298N Dual H-Bridge Motor Controller.

**3. \*\*Navigation Module:\*\***

- Implement a keypad or user interface for inputting destination codes (e.g., 1 for cheese, 2 for meat). This interface will allow users to select their desired destination within the supermarket.

- Connect the keypad to Raspberry Pi for receiving user inputs.

**4. \*\*Object Detection:\*\***

- Integrate ultrasonic sensors or infrared sensors for object detection and collision avoidance. These sensors will detect obstacles in the car's path and trigger corrective actions to avoid collisions.

- Mount the sensors strategically on the front, sides, and rear of the car to provide 360-degree coverage.

- Example: HC-SR04 Ultrasonic Sensor.

**5. \*\*Pathfinding Module:\*\***

- Develop software algorithms for pathfinding based on the user's input. Map out the supermarket layout and define routes to different destinations (e.g., cheese aisle, meat section).

- Implement pathfinding logic (software part) on Raspberry Pi. We can make use of algorithms such as Dijkstra's algorithm or A\* search algorithm to calculate the optimal path from the current location to the selected destination.

**6. \*\*Power Supply:\*\***

- Power the Raspberry Pi and motor driver board with a rechargeable battery pack or a set of AA batteries. Ensure the power supply is sufficient to support continuous operation during shopping trips.

- Example: Lithium-ion battery pack.

**7. \*\*Chassis and Wheels:\*\***

- Choose a chassis kit designed for small robots or remote-controlled cars. The chassis should be sturdy and lightweight, with provisions for mounting the Raspberry Pi, motor driver, sensors, and battery pack.

- Example: Smart Car Chassis Kit.

**8. \*\*Optional: Camera Module (for Future Expansion):\*\***

- Include a camera module compatible with Raspberry Pi for potential future expansion. While not essential for the current functionality, the camera can be used for additional features such as image recognition or barcode scanning.

- Example: Raspberry Pi Camera Module.