

IDP: Software Documentation

Code Structure and Algorithms

- **Initialisation:** Configures hardware components (motors, sensors, LEDs, servo) and sets initial states.
 - void setup();
- **Main Control Loop:** Manages button input to toggle AGV operation and coordinates the overall workflow.
 - void loop();
 - void run();
- **Line Following:** Reads inputs from four line sensors to adjust motor speeds and maintain alignment with the path.
 - void line_follow(int extreme_right, int right, int left, int extreme_left);
 - void turn_direction(int input);
 - void shift_direction(int input);
- **Object Detection:** Utilises a time-of-flight sensor to detect objects and magnetic sensors to classify them as recyclable or landfill.
 - void detect_object();
 - void check_magnetism();
- **Path Planning:** Implements pre-defined paths based on junction counts (splits, lefts, rights) to navigate efficiently, returning to common nodes for simplified routing.
 - void path_object_N();
- **Servo Control:** Operates the servo motor to pick up or deposit objects based on object detection and classification.
 - void moveServo(int targetPosition());
 - void servo_open();
 - void servo_close();
- **LED Handling:** Flashes a blue LED during motion ($2\text{Hz} \pm 10\%$) and uses red/green LEDs to indicate object type (magnetic or non-magnetic).
 - void handleLEDs();
- **Return-to-Start Routine:** Ensures the AGV navigates back to the start/finish box after completing its tasks.

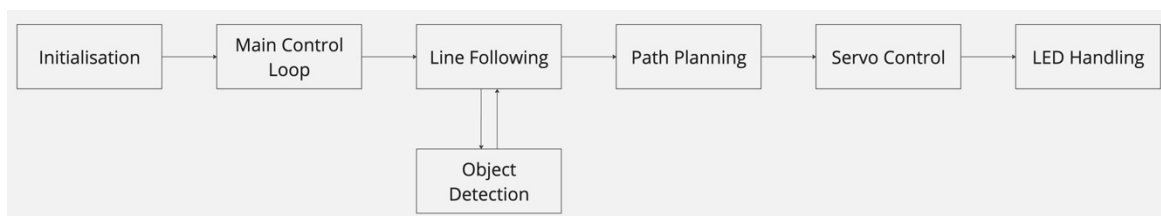


Figure 1: Simplified Flowchart