COLLISION AVOIDANCE REPORT

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Introduction:

Designing an embedded system passes by few steps to make the correct sequence from meeting with your client till you hand him prototype then the final product.

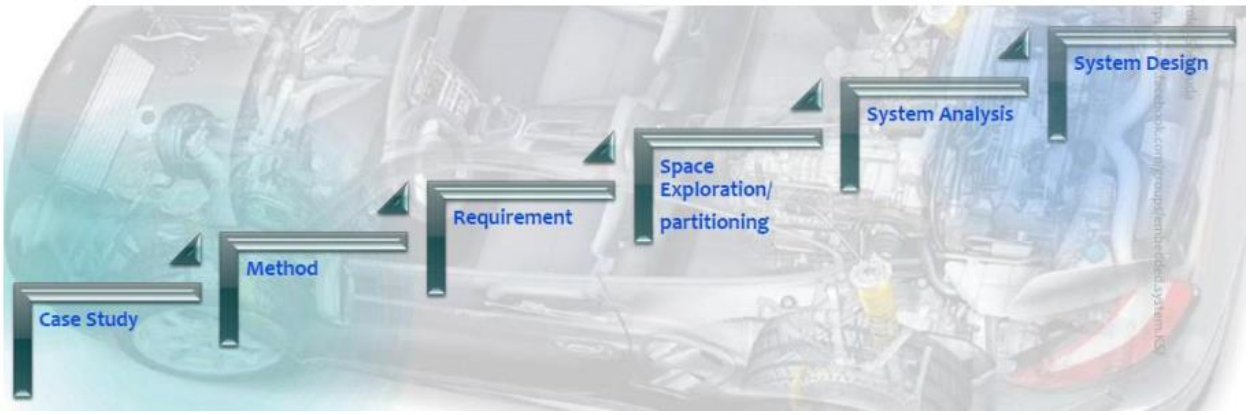

Figure 1: Design sequence

The steps of the correct sequence help reach a systematic solution for any job as explained in .

Case study:

- Specification: the robot stops if there is an obstacle 50cm away or less using the help of an ultrasonic sensor.

- Assumptions:
    1. The robot can only stop and not navigate around objects
    2. The power source of system is always constant hence the speed is constant.
    3. Ultrasonic sensor never fails or face noises
    4. Both motors have same speed
    5. The maintenance of the system is not molded

Method:

Will be depending on the waterfall SDLC model for designing.

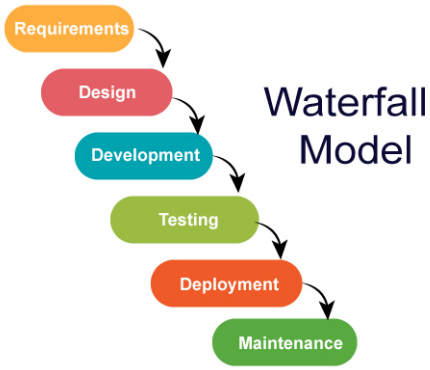

Figure 2: waterfall model

Requirements:

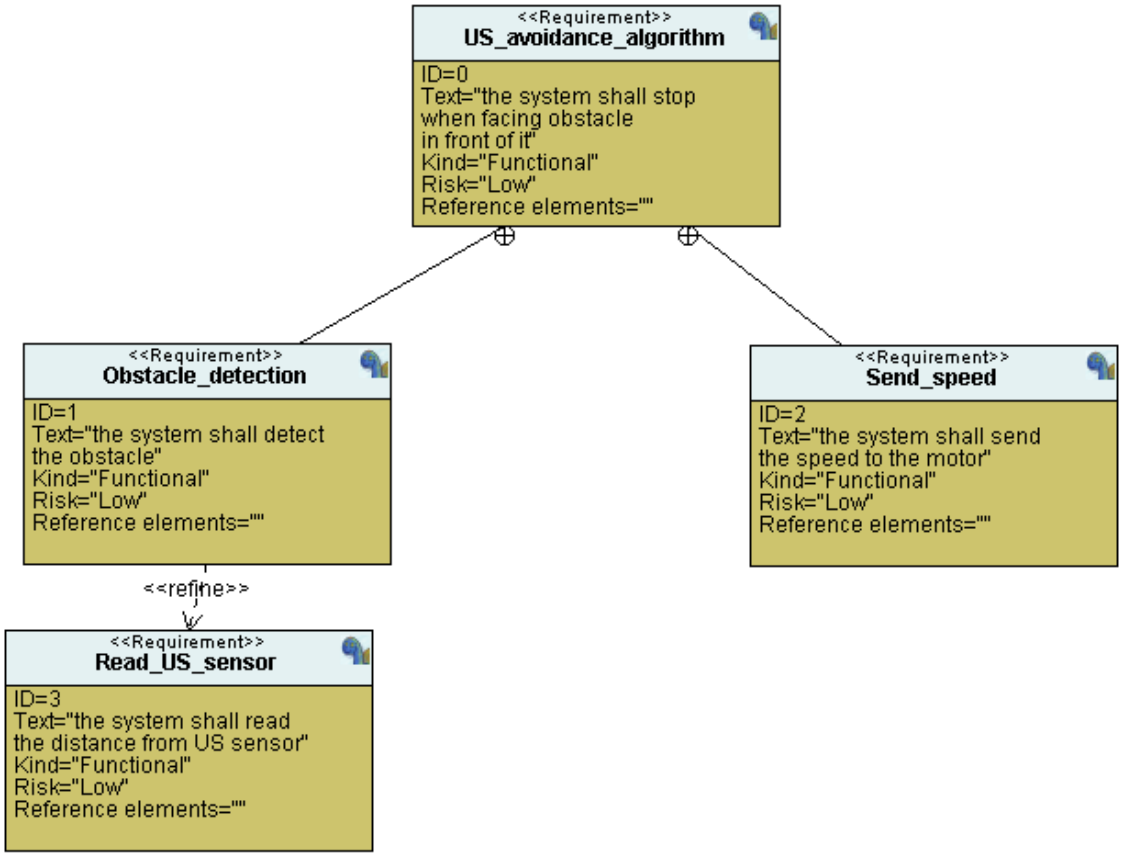

Figure 3:the requirements diagram

Space exploration:

The system depends only on 1 sensor and send same signal to 2 motors.

an STM32_F103x board is sufficient to handle the system.

System analysis:

1. Case Diagram

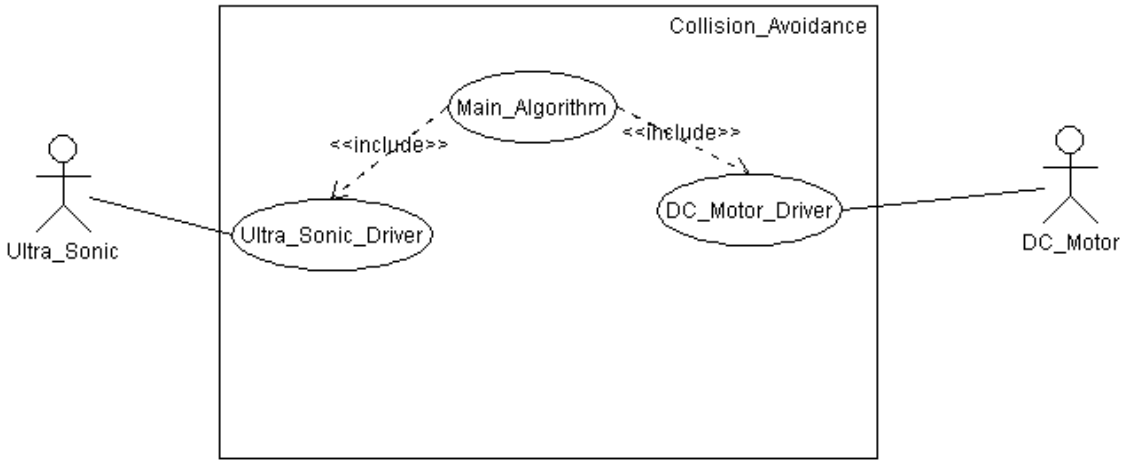

Figure 4: case diagram for the system

2. Activity diagram:

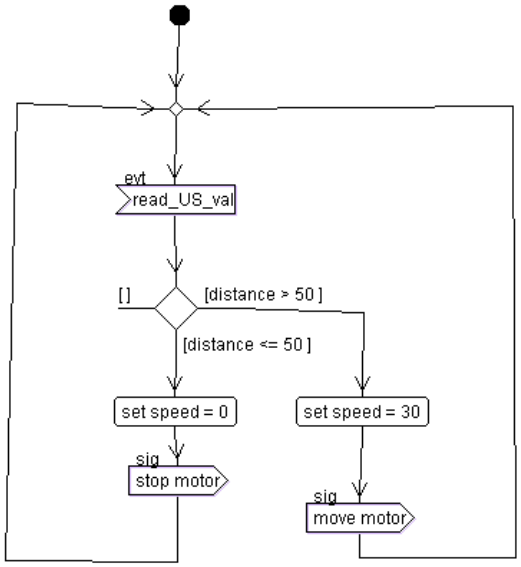

Figure 5:activity diagram

3. Sequence diagram:

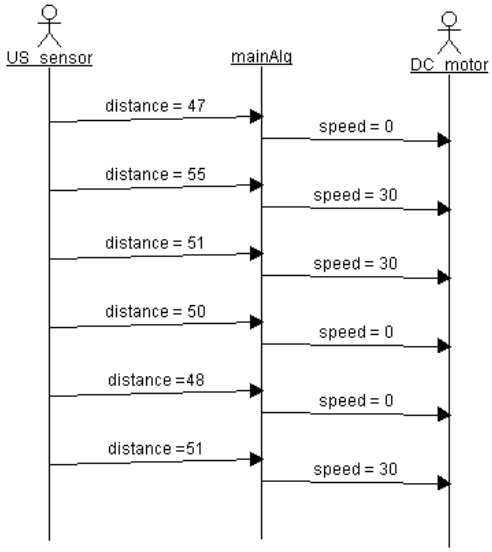

Figure 6:sequence diagram

System Design

1. Block diagram:

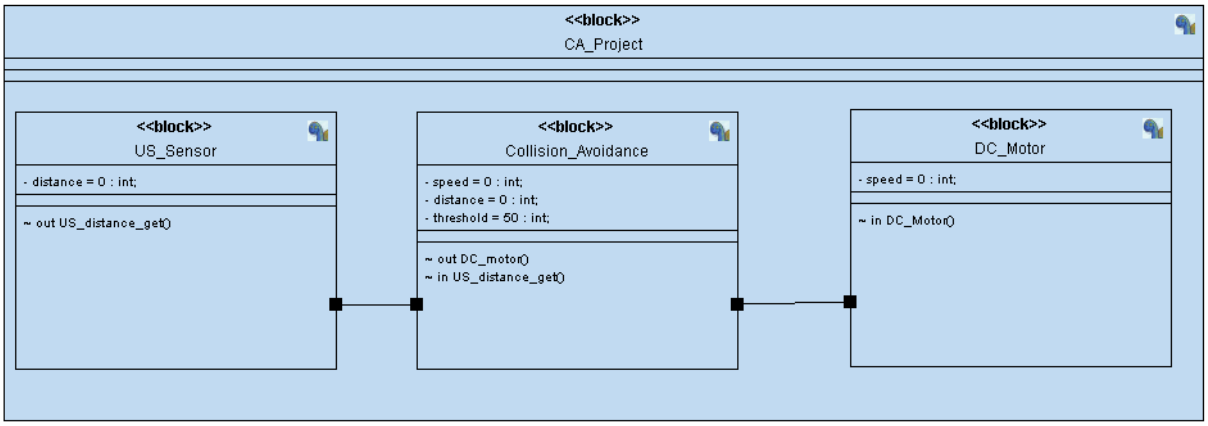

Figure 7: block diagram

2. State diagrams:

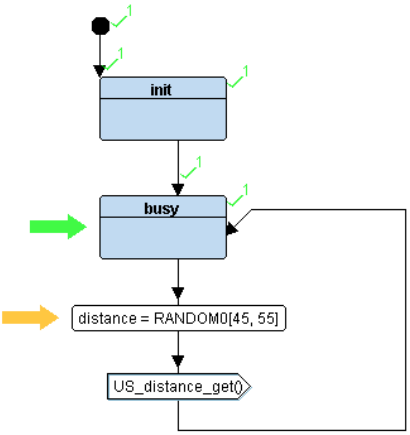

Figure 9:US sensor state diagram

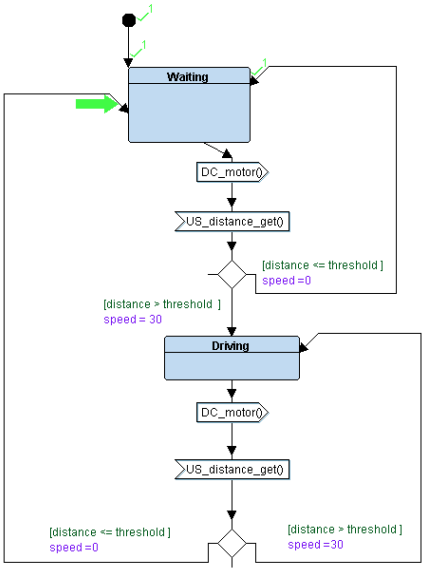

Figure 8: main program state diagram

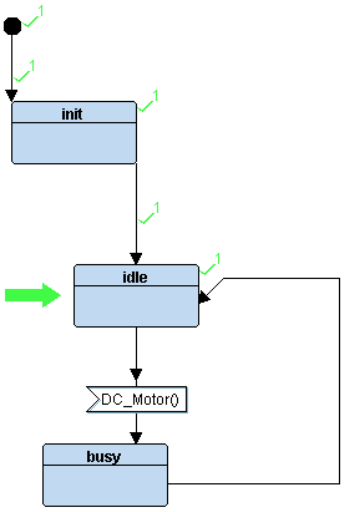

Figure 10: DC motor state diagram

Working simulation

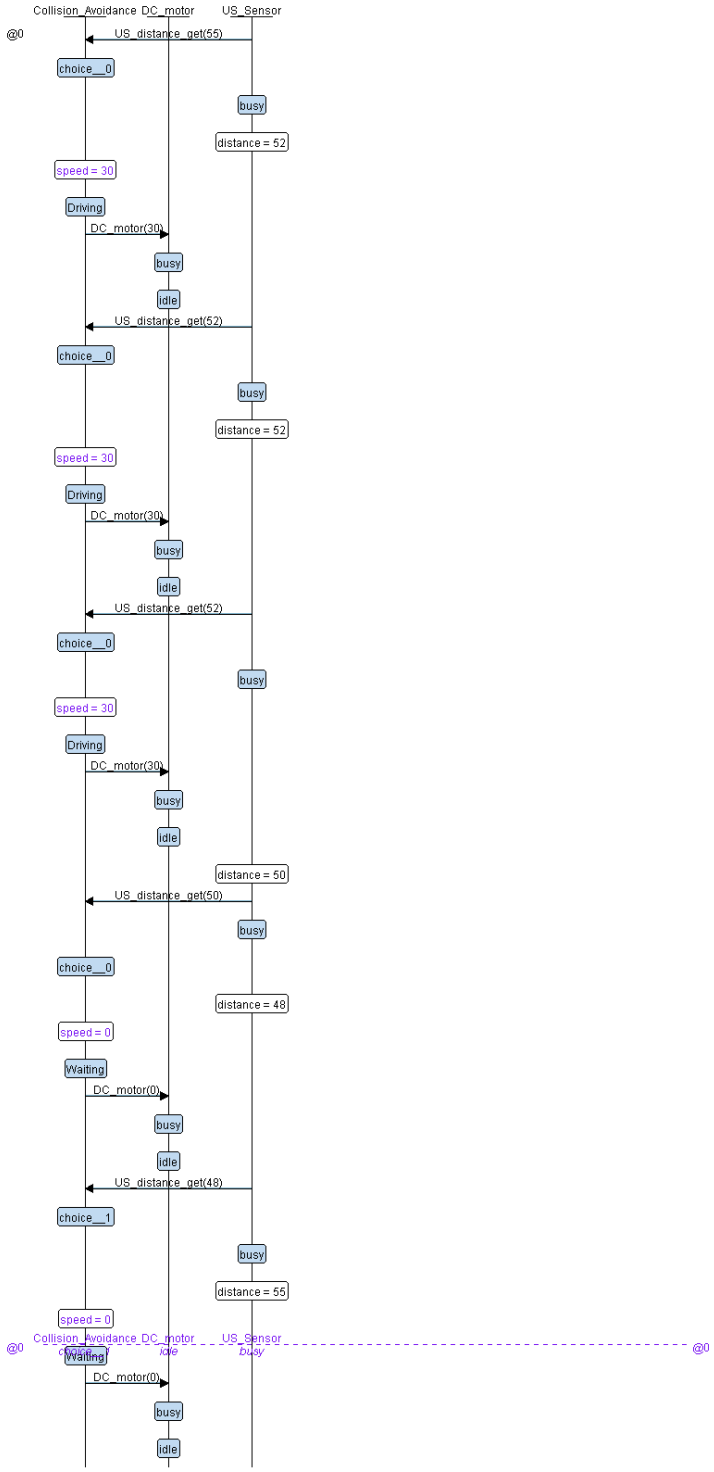

Figure 11: simulation trace of the 3 state with time