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Collision Avoidance

Report

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Report for: Learn-in-depth Diploma (K.S)

1) Contents

2) Introduction

1. Case Study

A collision avoidance system is a system to check if there is enough distance needed to be able to move without avoidance.

The enough distance to move is at least 50cm.

The speed, if there is enough distance, is 30m/s.

2. Assumptions

There are drivers, IRQ, Hal to be defined later.

Min distance need to can move is 50cm.

Controller setup and shutdown procedures are not modeled.

The controller maintenance is not modeled.

Ultrasonic Sensors will never fail.

DC Motor will never fail.

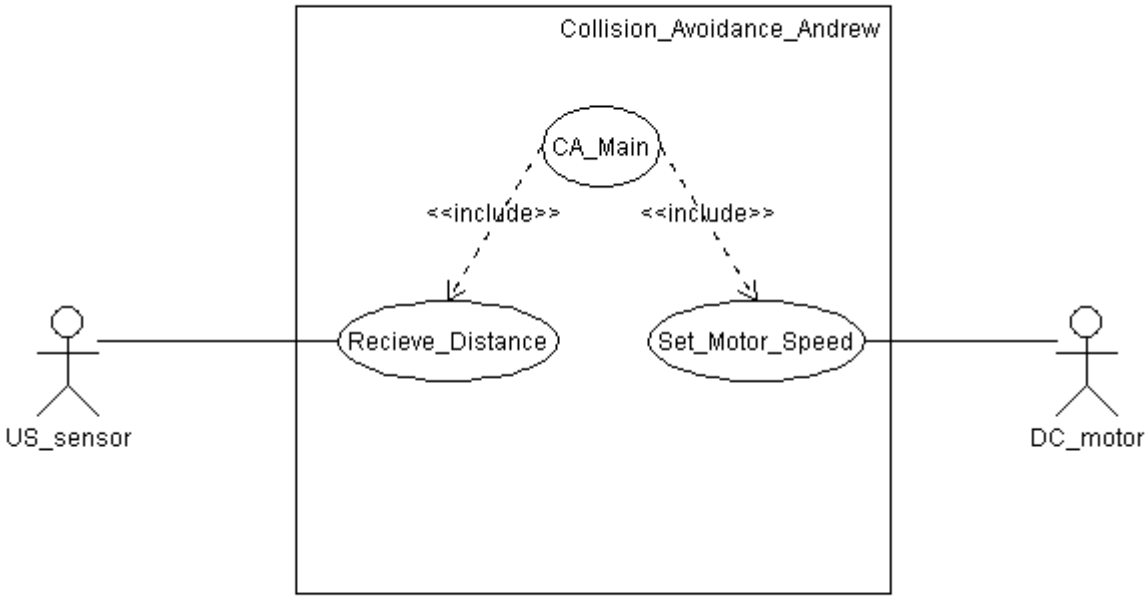
The controller never faces power cut.

3. Lifecycle method

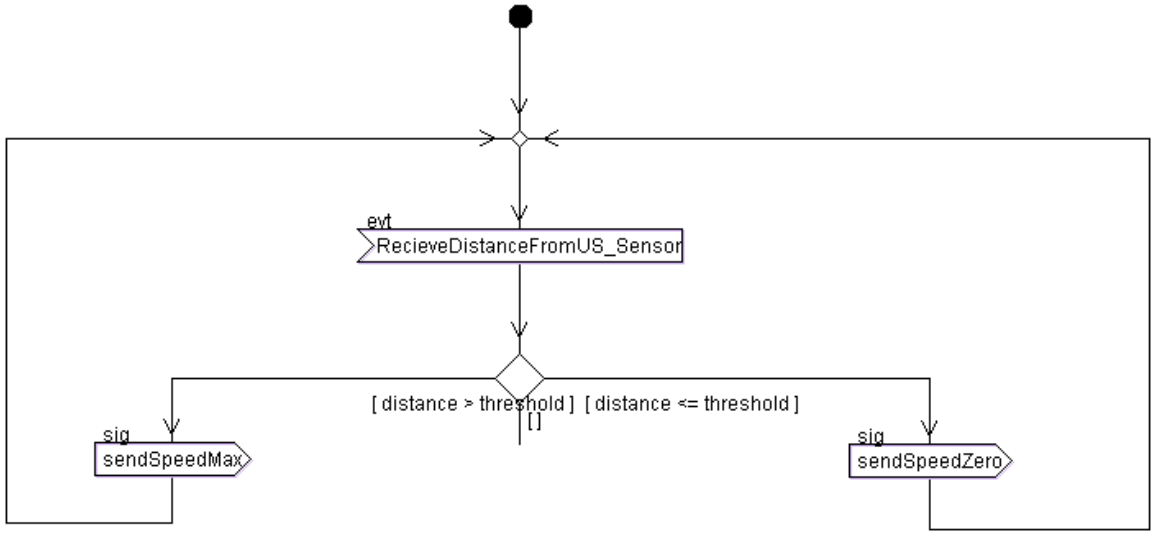
Waterfall model, so we develop each module separately until finishing it, without looping on code.

3) Diagram

4. Use Case Diagram

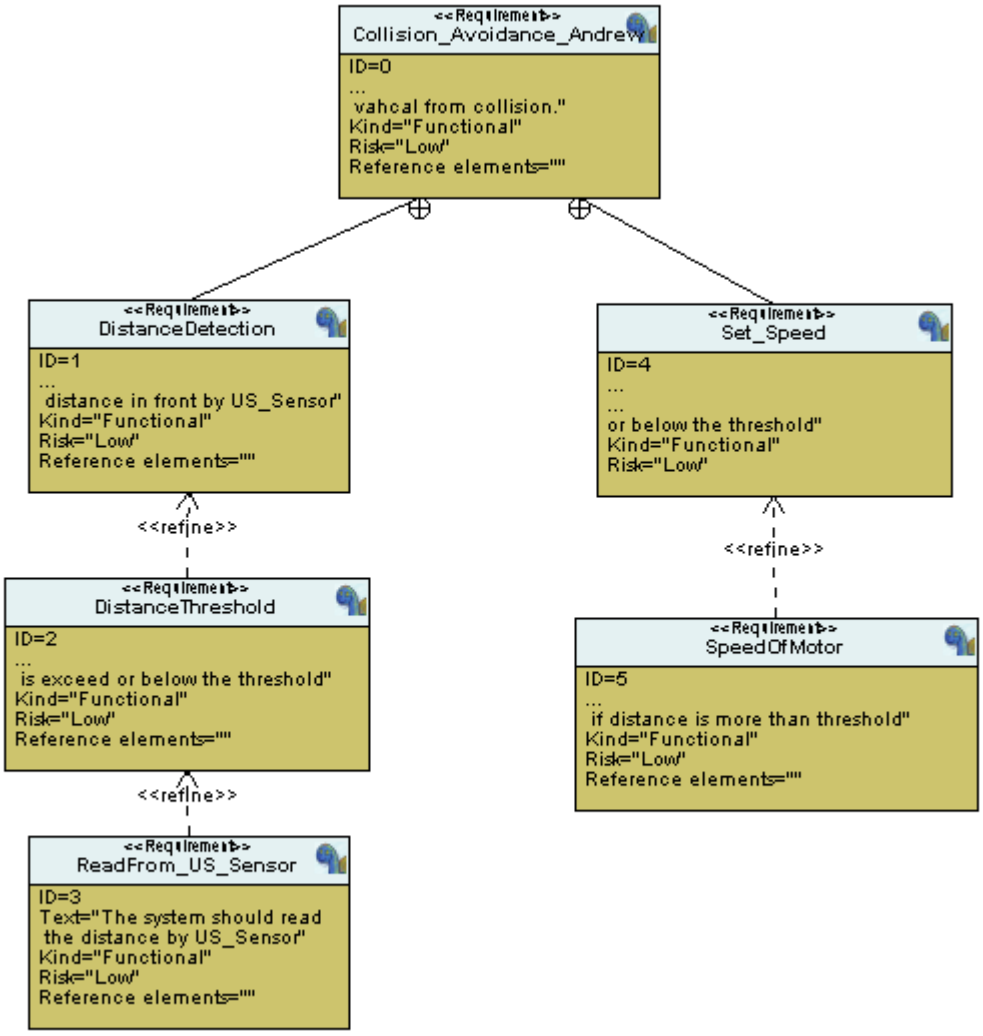


5. Activity Diagram

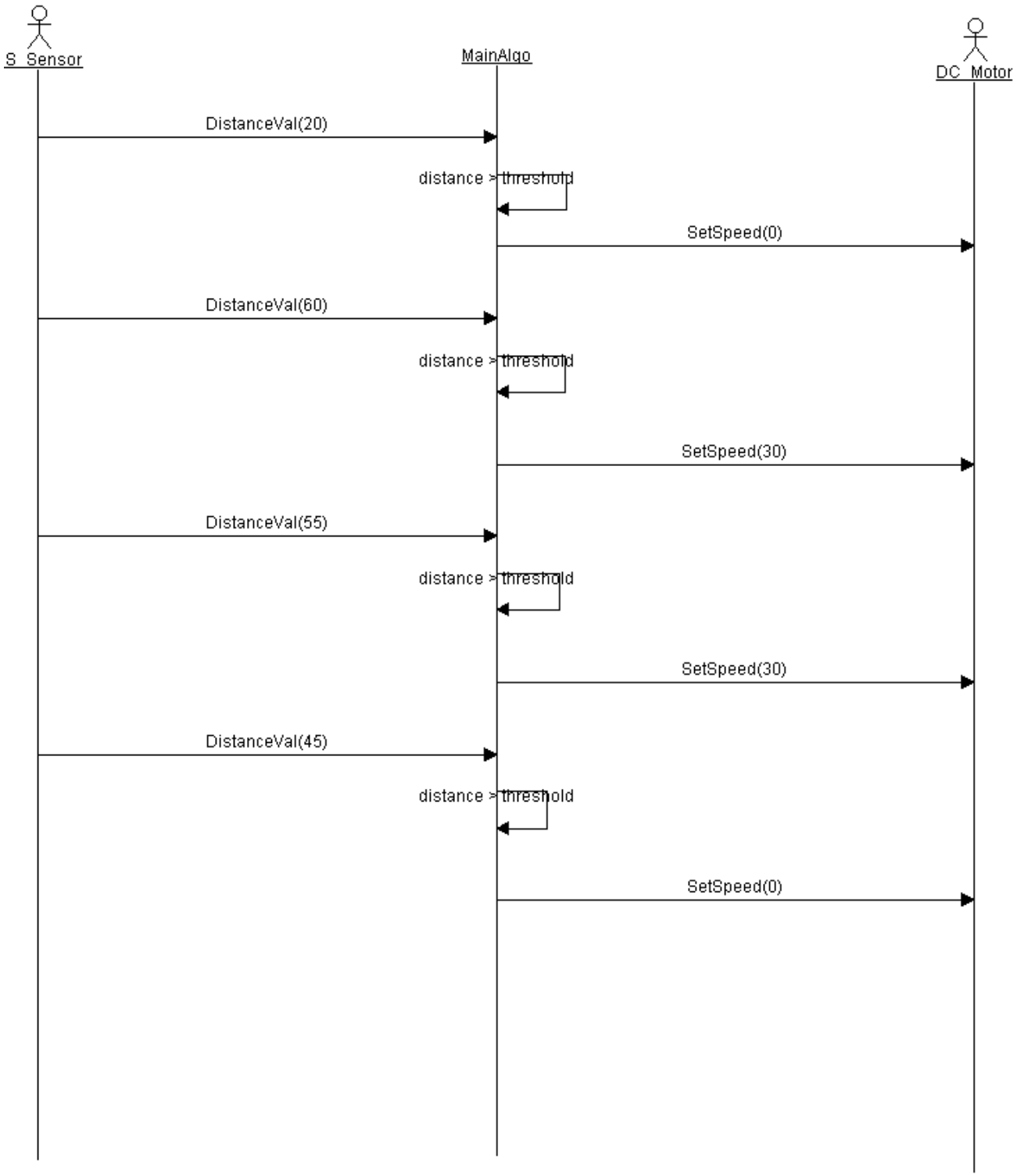


6.

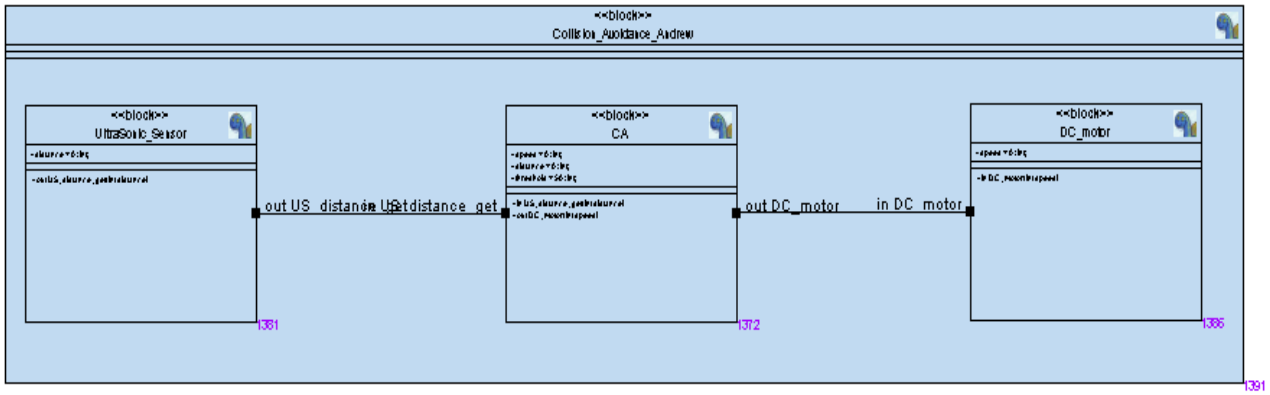
8. Requirements Diagram



9. Sequance Diagram

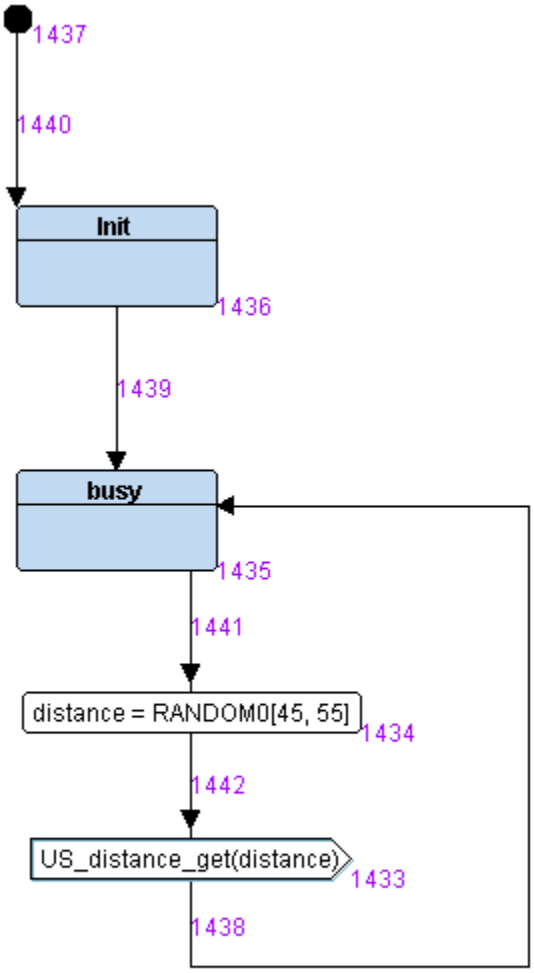


10. BlockDiagram

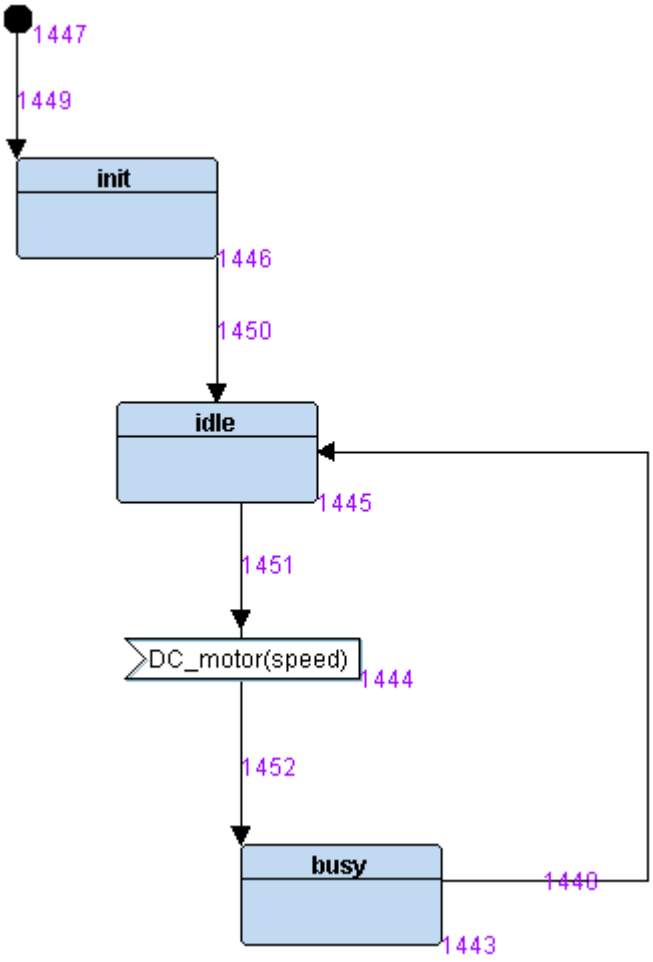


11. State Machine Diagram

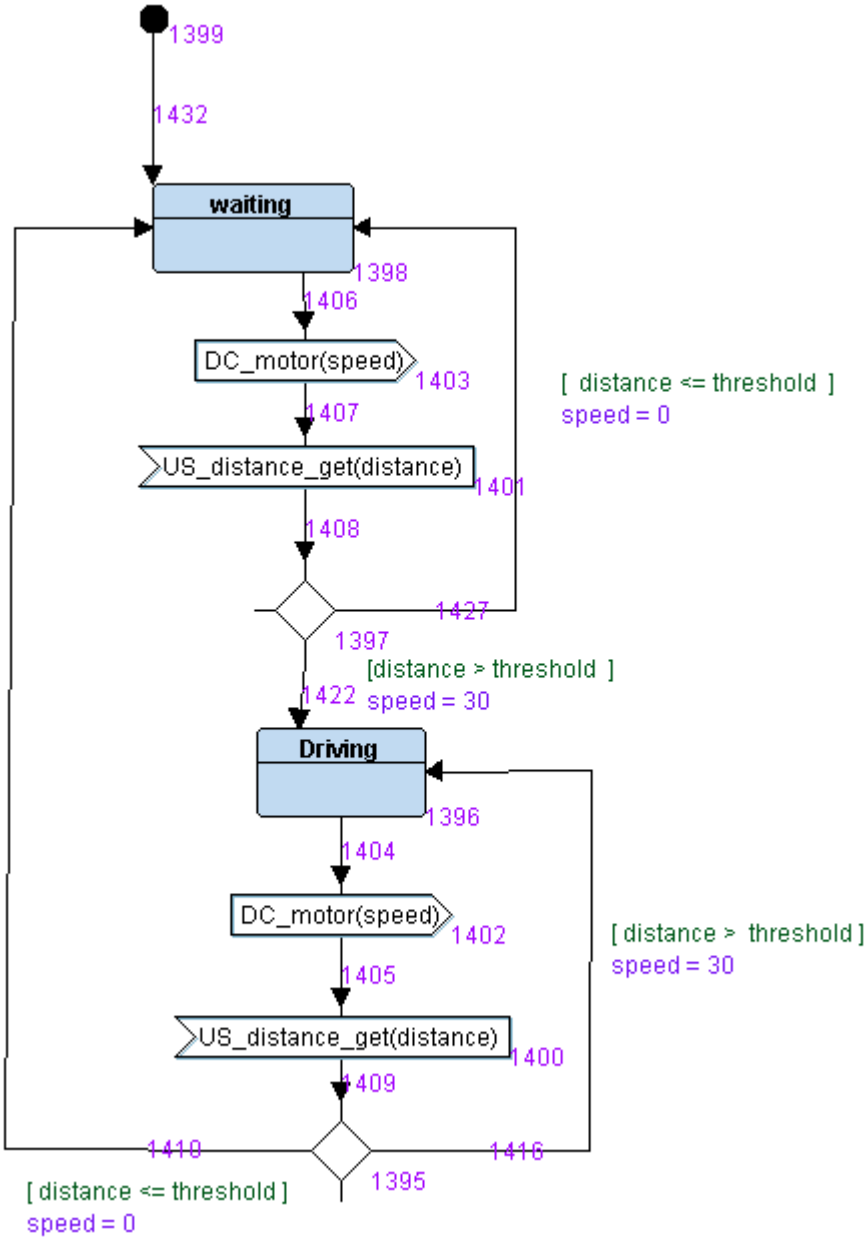
I. Ultrasonic Sensor



II. DC_Motor


1447
1449
init
1446
1450
idle
1445
1451
DC_motor(speed)
1444
1452
busy
1440
1443

III. CA_Main


1399
1432
waiting
1398
1406
DC_motor(speed)
1403
1407
US_distance_get(distance)
1401
1408
1427
1397
1422
Driving
1396
1404
DC_motor(speed)
1402
1405
US_distance_get(distance)
1400
1409
1410
1416
1395
[distance <= threshold]
speed = 0
[distance > threshold]
speed = 30
[distance > threshold]
speed = 30
[distance <= threshold]
speed = 0

IV. Simulation