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Project : Collison Avoidance

Learn In Depth

Case Study

Implementing a software module to detect the presence of an object within 50 cm distance so if the distance is less than or equal the threshold the speed of the robot will drop down to zero and if the distance is more than the threshold the speed of the robot is set to 30

System Design

The system consists of One Main block which is collision_avoidance and three sub blocks which are (US_Sensor , CA , DC_Motor)

US_Sensor

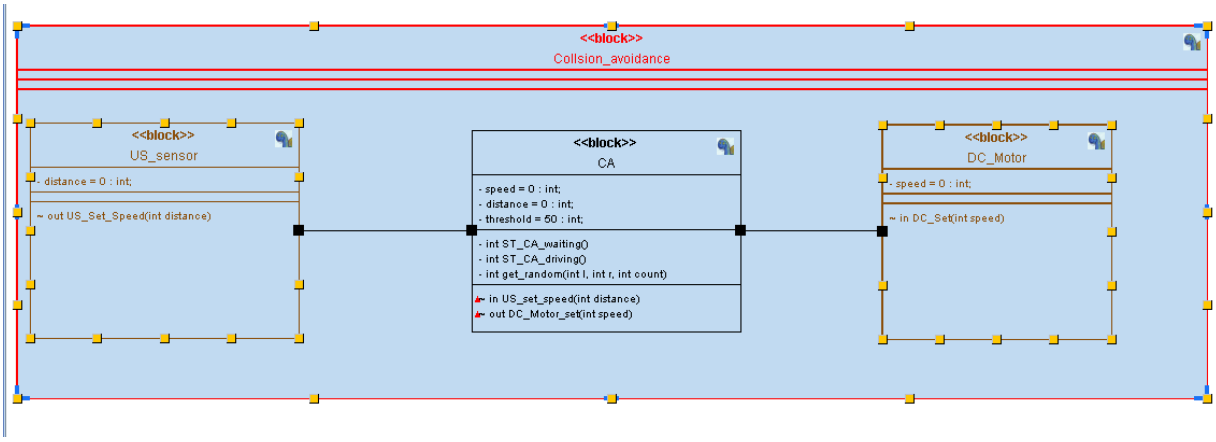
The US_sensor block have distance attribute as a global variable and a function Set_speed(int distance) which sends a signal to the CA block

CA

The CA block contains three attributes speed , distance ,threshold and three functions to wait , drive and to get a random number and contains set_speed which receives signal from the us_sensor , DC_motor_speed which sends signal to DC_motor

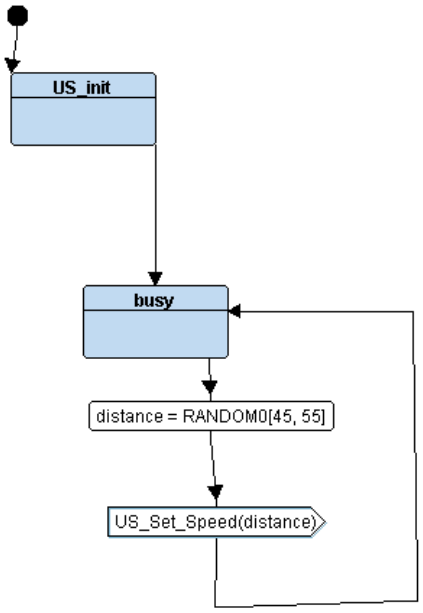
DC_MOTOR

The DC_Motor block contain the speed attribute and an input signal to the speed of the dc motor

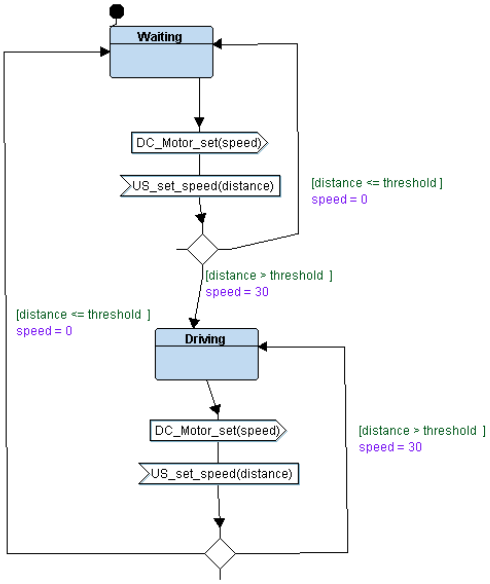


Logical Design

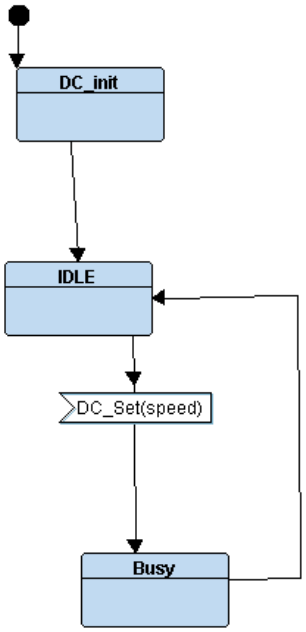
1. US_Sensor : contains one state busy which is used to send distance signal to the CA block from range of (45,55)



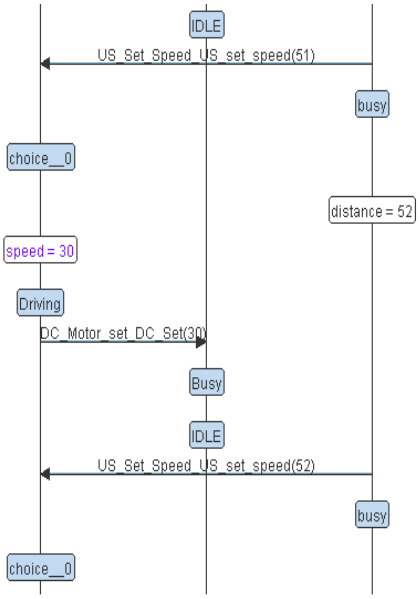
2. CA : contains two states waiting and driving in waiting the dc motor takes the input distance from the US_sensor and waits till it reaches more than the threshold to enter the driving state which sends signal to DC_Motor with speed 30

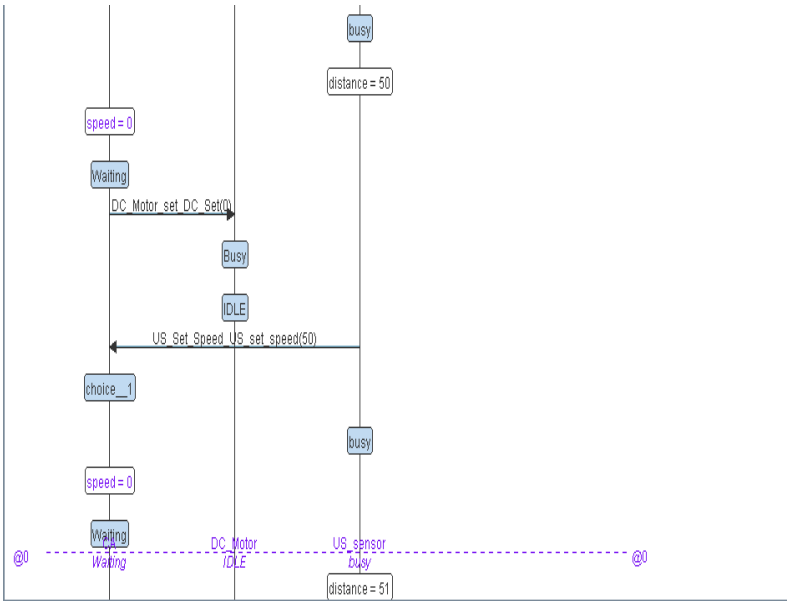


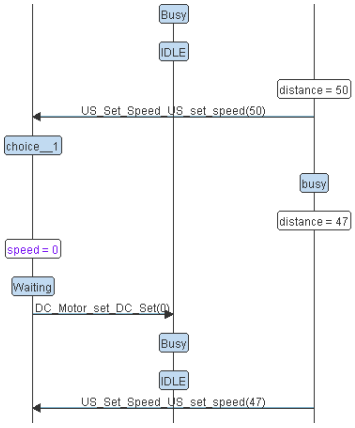
3. DC_Motor : contains two states IDLE and Busy



SW Verification




busy
distance = 50
speed = 0
Waiting
DC_Motor_set_DC_Set(0)
Busy
IDLE
US_Set_Speed_US_set_speed(50)
choice__1
busy
speed = 0
Waiting
@0
DC_Motor
IDLE
US_sensor
busy
@0
distance = 51


Busy
IDLE
distance = 50
US_Set_Speed_US_set_speed(50)
choice__1
busy
distance = 47
speed = 0
Waiting
DC_Motor_set_DC_Set(0)
Busy
IDLE
US_Set_Speed_US_set_speed(47)