Mastering Embedded System Diploma

Collision Avoidance Car System Design Report



by:

Ehab Mohamed Abdelhamed

Under the supervision of:

Eng. Keroles Shenouda

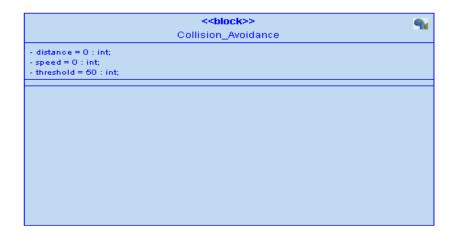
Collision Avoidance Car System

Description:

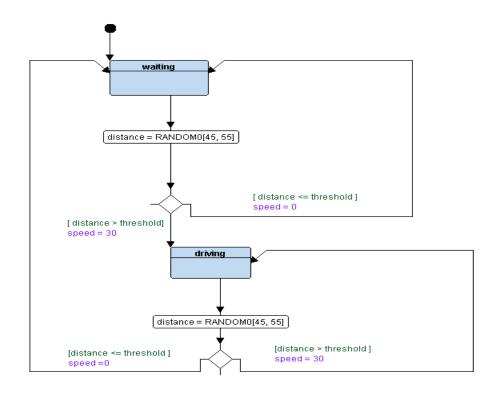
Implementation collision avoidance car system that detects objects, measures the distance between the car and object and decides which is go or stop according to the distance between the car and the object, if this distance is larger than 50 cm the car will keep forward if not the car will stop.

1) Singel Module Project (V1.0)

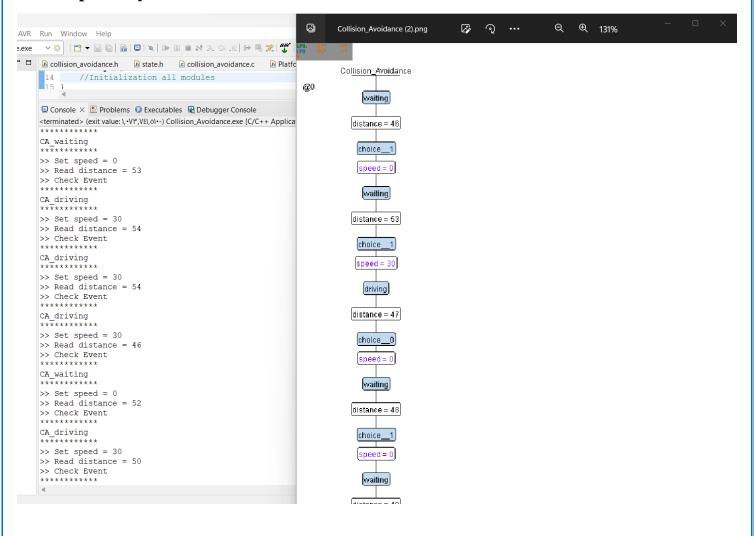
Block diagram of the system:



State Machine:

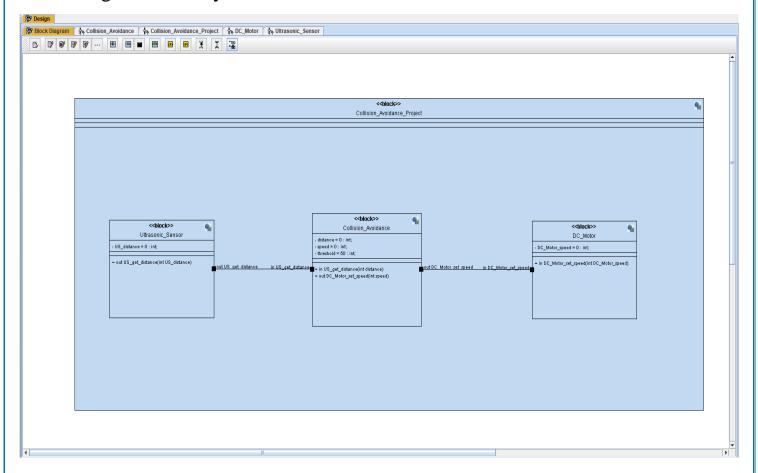


The output of system:



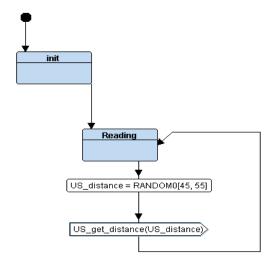
1) Multiple Modules Project (V2.0)

Block diagram of the system:

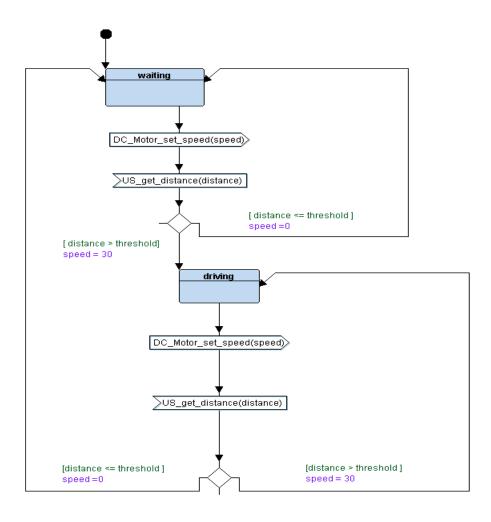


State Machine:

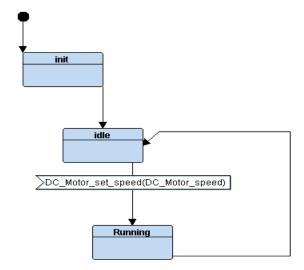
a) Ultrasonic Sensor



b) Collision avoidance



c) DC Motor



The output of system: Lesson 2 - Collision_Avoidance_MultipleModules/ultrasonic_sensor.c - Eclipse IDE CA_multipleModules.png **₽** 🤉 ··· **२** € 121% le Edit Source Refactor Navigate Search Project AVR Run Window Help Collision_Avoidance_Multip ∨ Collision_Avoidance Collision_Avoidan S Run init Project Explorer × → Collision Avoidance MultipleModules Collision Avoidance Multiple Collision Avoidanc Reading > 🐉 Binaries US distance = 53 > 🗁 Debug DC_Motor_set_speed(0) > a collision avoidance.c > la collision_avoidance.h return US_distance; > @ dc_motor.c > A dc motor.h idle > 🖻 main.c <terminated> (exit value: 1,*Vf",VE1,o1--) Collision_Avoidance_MultipleModules DC_init > 🖻 Platform_Types.h > 🖟 state.h US_init choice_1 > la ultrasonic_sensor.c US_Reading ultrasonic_sensor.h Collision_Avoidance_SingleModule Reading US Send signal to CA >> distance= 53 CA receive signal from US >> distance= 53 speed = 30 CA_driving driving DC_Motor_set_speed(30) Running DC_Motor_running idle Set DC motor speed = 30 US_distance = 54 US_Reading US_get_distance(54) US Send signal to CA >> distance= 54 CA receive signal from US >> distance= 54 ************ Reading choice 0 CA_driving CA Send signal to DC Motor >> speed= 30 DC Motor receive signal from CA >> Speed= 30 DC_Motor_running US_distance = 46 Set DC motor speed = 30 DC Motor set speed(30) nic sensor.c - Eclipse IDE CA_multipleModules.png Q € 121% ବ ct AVR Run Window Help lance_Multip ∨ ‡ | □ ▼ | □ | ⊗ ▼ ¶ ▼ | □ | ∞ | Щ" | @ ▼ 63 ▼ 63 ▼ 63 ▼ driving US_distance = 46 12 US_states_t US_state_id; 13 void (*US state)()=STATE(US reading); DC Motor set speed(30) Running <terminated> (exit value: \,.*\T",\V\(\),\O\--) Collision_Avoidance_MultipleModules. ***** US_get_distance(46) US Reading US Send signal to CA >> distance= 46 choice__0 CA receive signal from US >> distance= 46 Reading CA_waiting CA Send signal to DC Motor >> speed= 0 US_distance = 52 speed = 0 DC_Motor_running waiting Set DC motor speed = 0 DC_Motor_set_speed(0) ****** Running US_Reading US Send signal to CA >> distance= 52 idle CA receive signal from US >> distance= 52 US_get_distance(52) CA driving choice__1 CA Send signal to DC Motor >> speed= 30 DC Motor receive signal from CA >> Speed= 30 ********* Motor DC_Motor_running Set DC motor speed = 30 driving ***** US_distance = 50 US Reading DC_Motor_set_speed(30) US Send signal to CA >> distance= 50 CA receive signal from US >> distance= 50