LIDAR BASED MOTOR CONTROL

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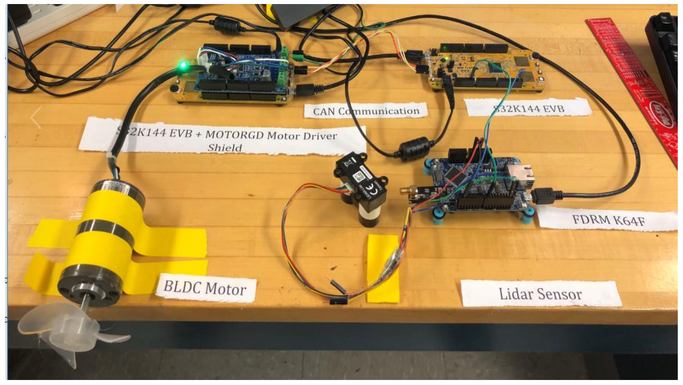
Introduction

Our system aims to assist the driver prevent any casualty which might occur by driver's or others ignorance

- Measure the distance from obstacle in front of vehicle and control the speed of vehicle.
- Uses Lidar to measure the distance of obstacle from the vehicle and control the speed of it.
- The Lidar data is sent through UART and it is transferred from S32K144 to the other using CAN protocol.

Working setup

- Garmin Lidar-Lite V3
- S32K144 Evaluation Board
- LINIX 45WN24-90-B
- FRDMK64 Evaluation Board
- DC Power Supply

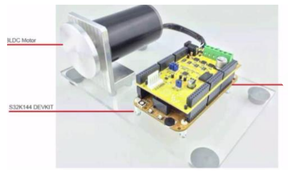


Implementation

- For implementing we do the following steps:
- Get the Lidar data from FRDMK64 using UART to S32K144.
- Process the lidar data in the S32K144 which act as master.
- Send the processed data using CAN to the slave S32K144 EVB.
- Control the rpm of BLDC motor connected to the slave using the lidar data.

Components of System

S32K144 EVB



MotorGD + BLDC Motor

GARMIN LidarliteV3

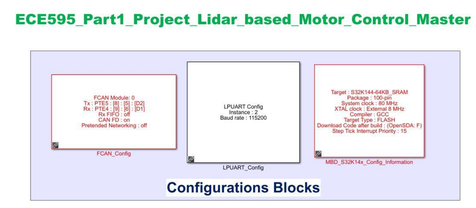
FreeMASTER

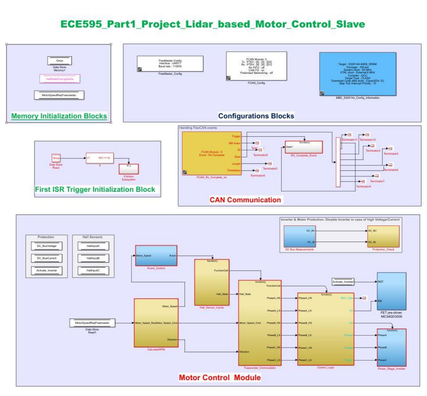
Motor Control Development Toolbox *with Simulink ™*

Model-based design
Driver configuration
Assignment to pins
Initialization setup

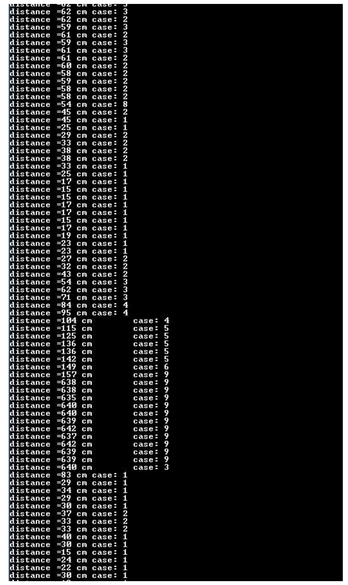
MATLAB SIMULINK

Model Based Design

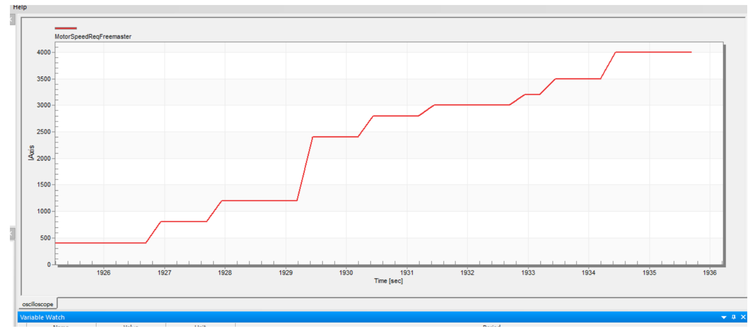




Results



Distance(in cm)	RPM
0-30	0
30-60	400
60-90	800
90-180	1200
180-240	2400
240-270	2800
270-300	3200
above 300	4000



Conclusion & Discussion

We are able to build a system which control the rpm of the BLDC according to the distance of obstacle present. The S32K144 EVB was used to collect data from Garmin LidarliteV3 sensor and the data is sent to the other board which has BLDC motor using CAN protocol and we controlled the rpm of BLDC motor using Closed Loop motor control.