Homework 7 – Encoders

Submitted in partial fulfillment of the requirements for the course of

ENPM809T – Autonomous Robotics

By

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INTRODUCTION

The aim of this project is to integrate the use of encoders and control the robot based on the ticks of the encoders to measure distance and angle of rotation. A script is written to control the robot as per the ticks and implement movement of the robot in all directions measuring the distance traveled based on the encoder tick

APPROACH

We first assemble the encoders as instructed on the Pirate4WD. Then a python class is created to control the encoder and the motors. The robot is made to drive forward 1m, backward and pivot right and left. A motor encoder analysis is performed

CODE AND OUTPUT VIDEO

The entire repository containing the problem statement and the data can be viewed on https://github.com/adheeshc/raspi-encoders

The output video can also be viewed on YouTube -

- Moving 1m using a magnetic encoder https://youtu.be/RHw2bNqfzRo

- Moving 1m backwards, pivoting 90deg left, pivoting 180deg right, pivoting 90deg left, driving forward 1m - https://youtu.be/CgtWiR1eVsM

GRAPH

Motor Encoder Analysis
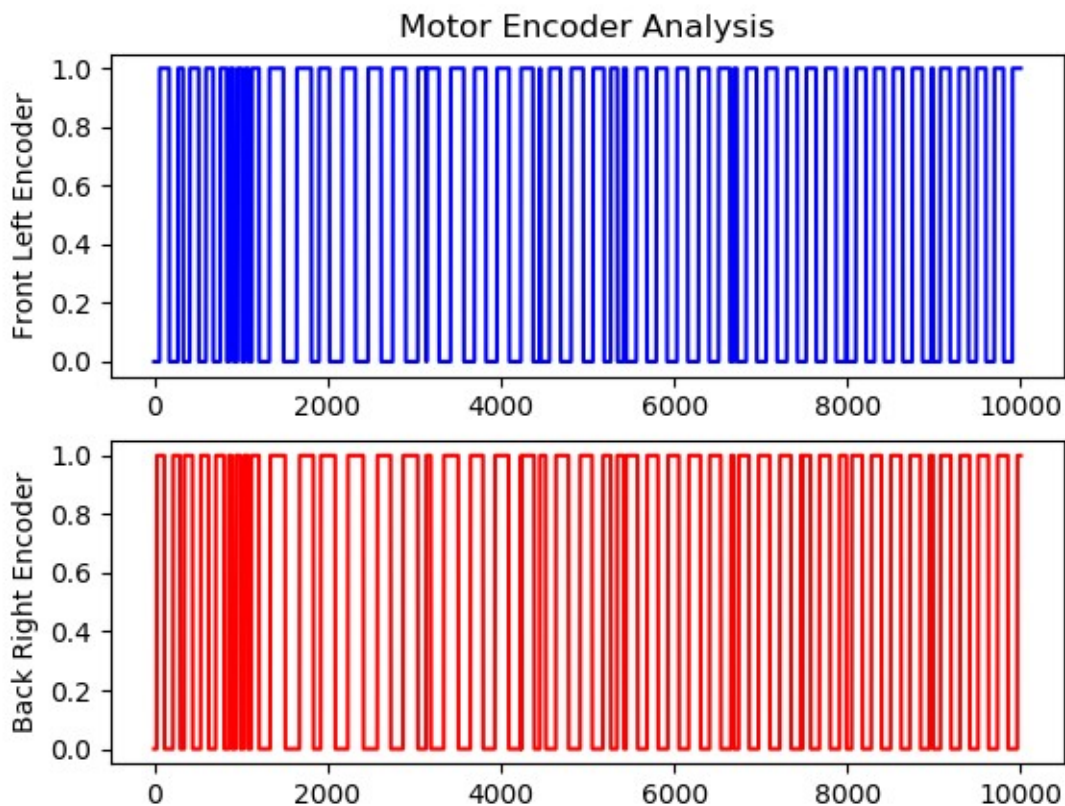
We observe that it isnt perfectly smooth. This could be due to a variety of reasons. We experienced wheel slip at many stages. Also one encoder sometimes records more ticks than

the other encoder in moving a particular distance, this is probably because the motors aren't perfect/fixing of the encoder to motors may not be equally tight (although this was double checked by us). This will be corrected by using the IMU sensor