Department of Electrical and Electronic Engineering, HKUST
Final Year Project (2003-2004)

Motion Detection System with Magnetic Sensors

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Overview

Applications using magnetic sensors have been developed for over 2,000 years. Magnetic field sensing has vastly expanded as industry adapting a variety of magnetic sensors to detect the presence, strength, or direction of magnetic fields not only from the earth, but also from permanent magnets, magnetized soft magnets and vehicles disturbance.

The aim of this project is to design an accurate approach to the detection system. This speed detection system is based on the local disturbance on earth’s magnetic field caused by the moving ferrous object (the car) within the sensing range of the magnetic sensors. The speed of the vehicle and the photo of the speeder are displayed on the LabVIEW as record. The performance of the system is evaluated by two experiments. It shows that the time counting error is < 1% which is comparable to the result of the laser gun.

In this project, a speed detection system using the AMR magnetic sensor has been implemented in LabVIEW. The speed of the vehicle and the photo taking of the speeder has been displayed in the system for record. Analysis and comparison of this system with the current speed laser gun technology has been examined. Results from the project show that this system outperformed in terms of accuracy and the anti-laser technology.

Block diagram of the speed detection system

- Two Magnetic Sensors
- CB-68LP I/O Collector Block
- DAQ Card - 6024E
- Notebook - LabVIEW
The magnetic sensor were linked to the inputs (channels) of the 68 pins I/O connector block by wiring in the breadboard. The connector block has already been connected to a DAQ card. This is the typical way for the implementation of the sensor by linking it to the computer.
Results

Distortion of magnetic flux and waveform of a car passing through the magnetic sensor and the corresponding voltage output in LabVIEW.

Component for testing speed using a DC motor and the result of testing speed using a DC motor.

Front panel of the LabVIEW program used for speed measurement of vehicle.