

## **Preparing a magnetic map of the room**

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### **Abstract**

A magnetic field monitoring robot was designed to capture the Earth magnetic field by using the magnetometer that is already embedded with the Wi-Fi controlled robot cart. Experiments were designed using the magnetometer, where the robot constructed maps of the magnetic fields environment. There are lots of methods that can be used for detecting the position of the robot cart when it is placed to take reading in the room. The paper outlines an easy but effective method to determine the position of the robot cart and recording the magnetometer values through a Wi-Fi connection.

**Keywords:** Earth magnetic field, Indoor mapping, Magnetometer

### **Introduction**

Technology has advanced to a level that an Unmanned Aerial Vehicle (UAV) can be controlled from a distance ranging from 2km to 20,000km. There are many robot systems that are controlled either by radio frequency transmission or by creating intelligence. Such robots are called Non-Autonomous robots. These robots shave the programming logic to do the desired task but, the decision power lies in the hand of controller (human) handling the robot. Here, the interface can be made using two methods: wired or wireless. The underlying technology is transmission of signals wirelessly through air by a transmitter, that is captured by the receiver and sent to the microcontroller mounted on the robot to carry out the task. Looking at the present demand for robots in the developing world, the development of cost effective robots to carry out work effectively and accurately, is necessary.

An Earth Magnetic field monitoring robot is a mechanism designed to capture the magnetic field in several places using a magnetometer which is attached with the Wi-Fi controlled robot cart. The magnetic field was measured using a magnetometer and sent it to the computer through Wi-Fi in constant time period (every 3seconds).

### **Methodology**

In this study, the main objective was to control the robot cart through Wi-Fi and generated the Earth magnetic map at required places. Arduino Nano board was used as the main controller as it is a small, complete, and breadboard-friendly board based on the ATmega328, which offers the same connectivity and specifications of the Arduino UNO board in a smaller form factor. It has 22 digital pins, which can be used as an inputs or outputs. There are 8 analog inputs or output pins as well. Functioning frequency is 16MHz, operating voltage is 5V and USBasp programmer is used to program the microcontroller using C programming language (Farnel Elements, 2017a).

This Earth Magnetic field monitoring robot can be operated remotely through Wi-Fi and NodeMCU Wi-Fi communication module - ESP 8266 was used for that. Some of its features are; 32-bit RISC CPU running at 80 MHz, 64 KB of instruction RAM, 96 KB of data RAM and 4 MB flash memory. NodeMCU is an open-source firmware