

# **Autonomous simplified long-range web-based system for tracking of movement using findXTech**

## **ABSTRACT**

Generally, long-range movement tracking system requires either complex integration of multiple short-range communication networks such as Zig Bee, Bluetooth, Wi-Fi, Wi-MAX and RFIDs, or through commercial satellite communication system such as Global System for Mobile Communications and General Packet Radio Service. It could be for many purposes such as smart city management, tracking asset, smart agriculture management or reducing traffic accidents. Using multiple short-range communication networks require wide range of electronics components and communication protocol to enabling the function. On the other hand, using Global System for Mobile or General Packet Radio Service could incur additional cost for subscription and depending on the coverage area. This paper discusses a simplified long-range tracking system with unlimited access over the internet. A prototype called FindXTech was built in the paper that uses point-to-point transceivers using Long Range communication device or LoRa in short, without any intermediate third-party communication medium. For location identification, a global positioning satellite module was coupled with a primary LoRa module and integrated using Arduino Nano microcontroller that also channeled the required power to LoRa and global positioning satellite modules, as well as to handle the sending global positioning satellite data via LoRa at the transmitter's end. At the receiver's end, the GPS data received by the secondary LoRa which is also powered by using Arduino Nano microcontroller where at the same time the microcontroller read and process the data. The receiver's Arduino Nano microcontroller is connected to a local server personal computer with local area network connection where the microcontroller fed related information such as latitude and longitude (Lat-Long) data and sending time of the transmitter. The Lat-Long data are integrated into a map to display the transmitter's location. A series of test were conducted to show the workability of the system for tracking a moving car on a road at different conditions where the transmitter is fitted. It was found that FindXTech system is capable of displaying the moving car location on a straight road at different speed. The system also capable of smoothly showing a U-turn movement on a U-turn road, movement in a shopping lots area, residential area, hilly and winding road as well as under flyover road and dense housing area within 5 km radius.

KEYWORD