A REVIEW ON NAVIGATION BASED AUTONOMOUS E-WAGON

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Abstract:

The project aims to build an autonomous vehicle using Node MCU and Arduino UNO. An Ultrasonic sensor is used to provide and detect the obstacle from the real world to the vehicle. The vehicle is capable of avoiding the obstacle occurring in its path using an obstacle detection algorithm and move in an obstacle free path. The IR sensor module will detect the stop in real time basis and using RF transmitter and receiver it will detect the stop and feedback to the relay module wherein it will change the path of the vehicle and divert it to obstacle free path.

I. Introduction:

A car, a motor vehicle or a car is a wheeled motor vehicle used for the transport of passengers, which often bears its own engine or engine. Most of the meanings of the term state that cars are designed primarily to drive on highways, have seats for one to eight persons, usually have four wheels, and are designed primarily for the transport of people rather than goods. [1]

The development of the automobile starts as early as 1769, with the invention of steam engines capable of transporting human beings. In 1806, the first automobiles powered by an internal combustion engine operating on natural gas appeared, which led to the introduction, in 1885, of a widespread modern gasoline or petrol-fueled internal combustion engine.

The year 1886 is considered to be the year of the birth of modern automotive – with the Benz Patent – by the German inventor Carl Benz. Cars, powered by electric power, appeared briefly at the turn of the 20th century, but largely vanished from use until the turn of the 21st century.

Google has also been checking its car on the streets of the US for a long time. [2] Companies like Tesla Motors have embarked on a new age of electric self-driving cars that prove to be quicker, more powerful and more environmentally friendly than any other car they have made. There are several challenges when constructing such vehicles, some of which include the identification of obstacles, track identification and position. We use a toy car as a template for simplicity and research. It's running on Node MCU and Arduino.

II. EXISTING SYSTEM:

The manual transmission allows the vehicle to be physically shifted to various gears, thus the term "manual," using the clutch pedal and the shifting knob. To drive your vehicle forward and hit higher speeds, you need to manually change gears to get to the desired speed. Various types of cars are available, such as electric cars, diesel cars, fully automatic and semi-automatic cars, etc., in these cars, fully hand-operated cars are commonly used. [2]

Manually driven vehicles include petrol-powered vehicles, diesel-powered cars, CNG-powered cars, hybrid cars, electric cars. All these types of cars are used as fully manual vehicles in all parts of the world. So these completely man-made cars need a driver. People who don't know how to drive need a driver, which makes the car owner pay the driver's sum.

Even when they know driving, elderly people can't drive a car long distance, so they still need an acting driver.

Gas vehicles such as petrol engine cars and diesel engine cars are used. Owing to fuel scarcity, the cost is increased. So they built the cars that operated on compressed gas. It consists of a gas cylinder that is filled with compressed natural gas. In the early stages, gas filling stations are less and during the rainy season, vehicles are difficult to start. Hence, compressed gas used along with fuel is either petrol or diesel to improve the performance known as hybrid vehicles. [6]

In hybrid vehicles, it begins with the aid of petrol, then works with the use of compressed natural gas. It's creating more productivity. It also decreases the fuel cost. It also makes the use of fuels more effective and induces global warming. They have therefore developed requirements to reduce fuel emissions. These requirements make it impossible for many companies to manufacture diesel vehicles, so they opted to use petrol cars on the basis of BS6 requirements.

EXISTING BLOCK DIAGRAM:

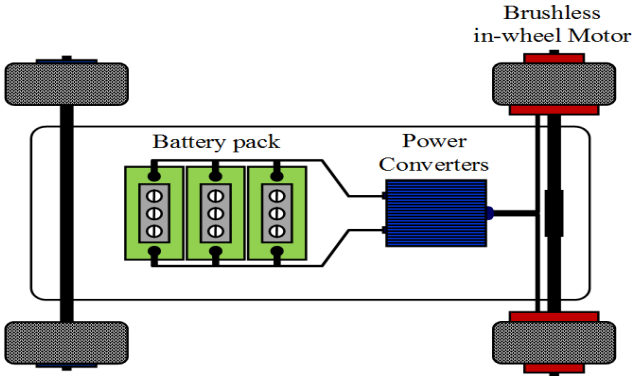

Figure 1: Block Diagram of Electric Car

Cars are then produced using semi-automation techniques. Some of the cars are equipped with a rear or rear camera to know the obstacles during parking, and some of the cars are equipped with a rain sensing wiper and some of the cars with a front camera to provide a clear view of the road and some with a speed sensing door lock. Cars like BMW, Benz, etc. can interact with the cars of the same company. [1]

If one car gets malfunctions, it interacts with another car of the same company that allows the service center to get help. These high-tech cars have a parking assistance system that can easily park cars without causing any harm. At the time, a lot of automobile companies launched electric vehicles. Top model with semi-automatic options such as cruise control, brake assistance and parking assistance. [6]

Tesla and google were searching for fully automatic cars and checked in the USA. These automatic cars with GPS that are used for navigation purposes. They've found some disadvantages to resolve the fact that they're beginning research again. Hyundai and Tata have introduced electric cars in India. Due to the unavailability of the charging station, low battery capacity, increased vehicle charging time, electric cars are not becoming common in India.

Even though India used electric cars for indoor locations such as zoo, railway station, temple, airport, etc. [2] Using electric cars indoors makes it convenient to charge cars. The battery is attached to the controller after charging. The power the engine and drive the car with the aid of the Controller. It's a basic electric vehicle, it includes just the accelerator and the brake. It didn't have a range of gears so it's easy to use. It did not include any safety systems, such as seatbelt and ABS. It's a fully manual vehicle, and it didn't have any automatic options. Drivers must be needed to drive a vehicle.

DRAWBACKS OF EXISTING SYSTEMS:

Electric cars powered indoor are relatively expensive. It has only a steering, brake and accelerator that makes driving easy. And when people come from different countries, it's easy to drive, we can't judge their driving skills, so we need a driver for safety purposes. Some people know about driving, and they even have a driving licence, but they're not the origin of the spot. But they need a driver to drive a car, too. The management has named a driver for the respective vehicles. The management needs to provide the drivers with salaries and they need to keep the car in order to raise more money from the people (tourists). These types of cars do not have any protection devices. This is one of the key drawbacks of the current scheme.

III. PROPOSED SYSTEM

As discussed above self-driving cars are not used indoors such as Airport, Mosque, Train Station, Zoo etc., so we introduce a new concept by creating a self-driving car to be used indoors. We use an electric car in our project and it is made of metal and wood. The device consists of sensors, controls and motors. [4]

We've created a separate lane for the car to drive, it's an obstacle free lane. Even though we have a free path for obstacles, the car will also check the path with the aid of a sensor to prevent accidents. Instead of having a monitor to select a destination point, cell phones are used to select a destination point. The cell phone is connected to the Node MCU to send the car input.

When the feedback is given to the car via a mobile device, the car begins to travel from the starting point to the destination point, until the car assumes a standing position as the starting point. The IR transmitter is mounted in the car and the light is transmitted every second. The IR receiver is positioned in each stop where the IR transmitter is connected to the RF transmitter module. The RF transmitter is used to relay the signal to the RF receiver. The RF receiver is mounted in the car and is attached to the MCU node when it receives the signal from the RF receiver that sends the order to the controller. The controller operated the relay module when the order was received from the receiver. The Relay Module is connected to the controller to provide the required commands and triggers. The car is powered by two 12V DC motors. The DC motor shall be attached to the relay module. [3]

The relay module consists of four relays, the positive terminal of the motor is connected to relay 1 and the negative terminal of the motor is connected to relay 2. The same protocol followed for motor 2 that the positive terminal of the motor was connected to relay 3 and the negative terminal connected to relay 4.

PROPOSED BLOCK DIAGRAM

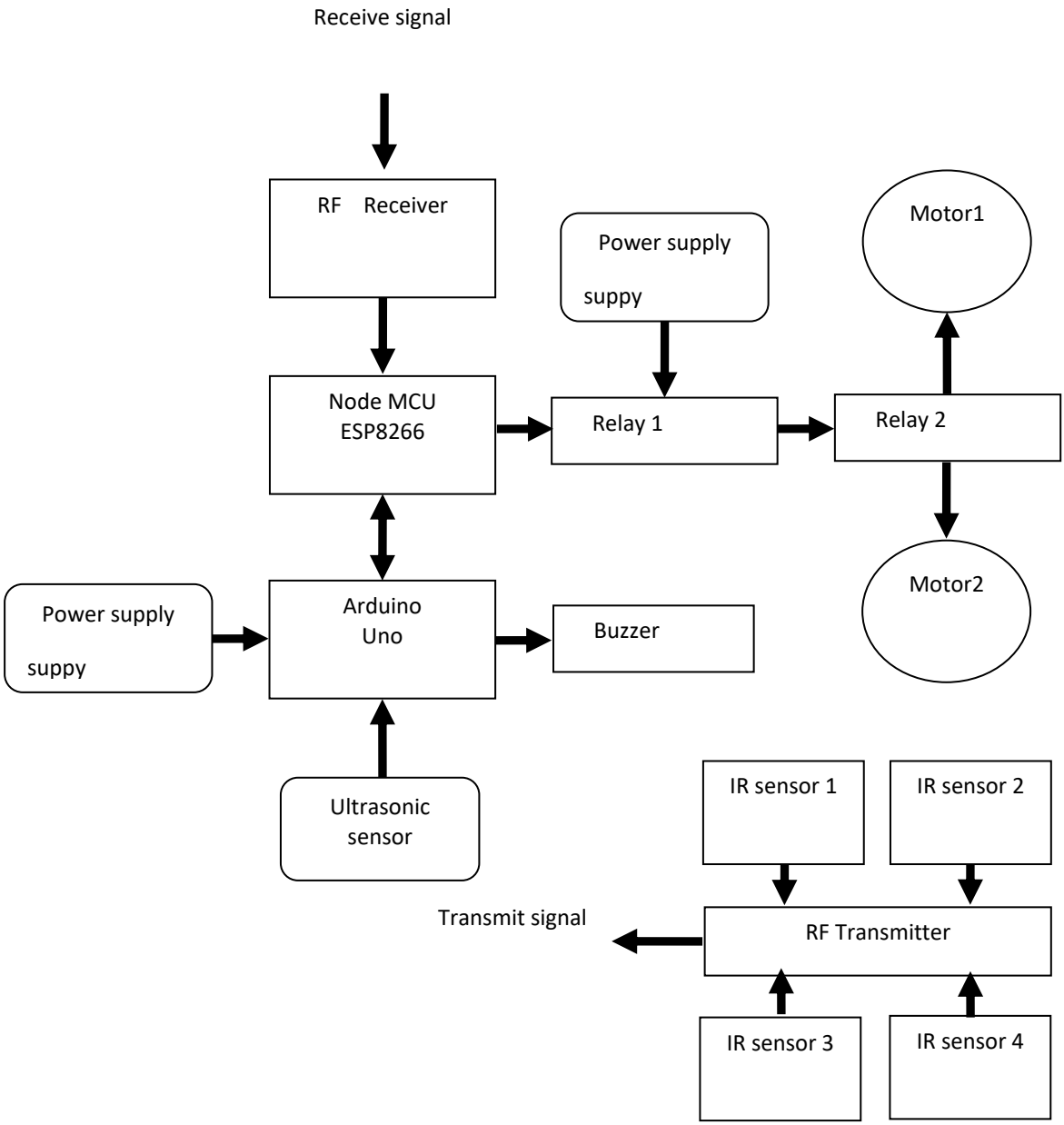

Figure 2: Block Diagram of Proposed Electric Car

By using a 12V lead acid battery, we have a separate power supply for the 1 and 2 motors. When the signal is received by the controller, it can be understood that the car reaches the destination. If the signal is not received by the controller, the car will start running before the

signal is received. There are four stops in our road, and we have fixed an IR receiver at each stop. [5]

The output of each IR receiver shall be fed to the RF transmitter to relay the signal to the RF receiver. We supply separate power for each stop, the IR sensor is connected to the RF receiver by wire. If the car detects some obstacle while driving, this obstacle is detected by an ultrasonic sensor, and the sensor output is fed to arduino UNO. By reading the value of the ultrasonic sensor, the buzzer beep sound is produced to induce the vehicle to approach the obstacle.

Consider our land that there are four stops, as we described above, called stop a, stop b, stop c and stop d. Initially the car placed in "stop a" the user enters the car in the cell phone by pressing the "stop a" indicates that the car does not move because both points are the same. The input signal must therefore be different from the starting point. Again, the car stopping at the same "stop a" but the user gives the "stop c" input. The car begins to move from "stop a" to "stop c," the "stop b" is located between "a & c" but the car does not stop at "b" because the input is provided as "stop c." So it's just stopping that point. If there is a pause before the input, the car does not consider the pause. [4]

ALGORITHM FLOW CHART:

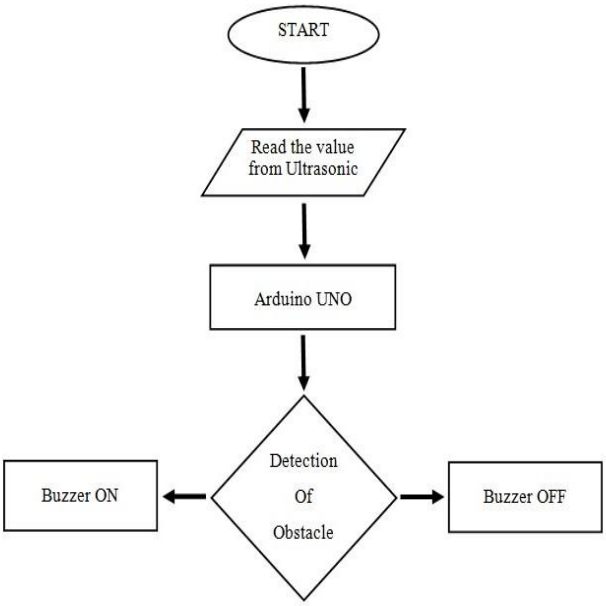

Figure 3:Flow Chart for obstacle System

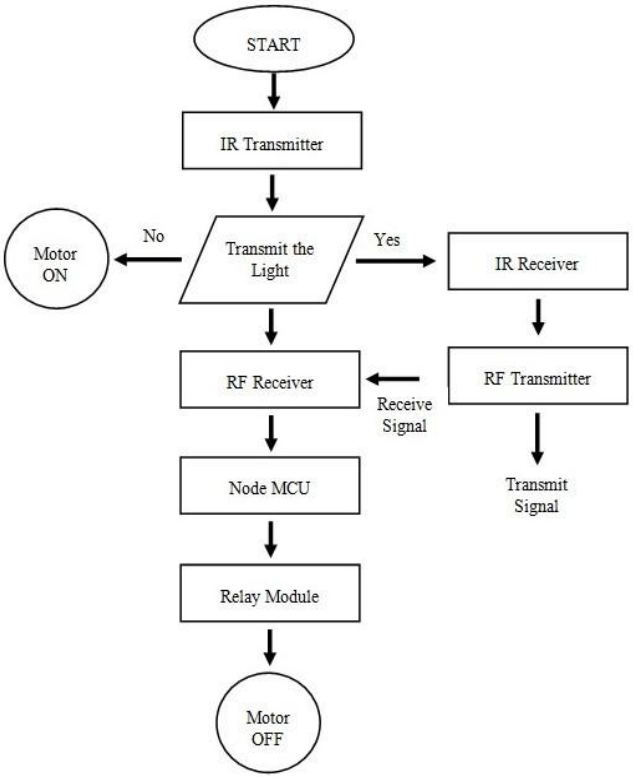

Figure 4: Flow Chart for motor driving System

ADVANTAGES OF PROPOSED SYSTEM

Like the current system, no drivers are required and the vehicle is fully autonomous. There are several safety measures, such as seat belts, ABS, etc., so we can easily spot obstacles. We can save the money given to the drivers as wages. With the aid of this new invention, people can be easily drawn. It will bring about a new revolution in our culture. We can also apply this technique outdoors. This is going to make a big change for our developing world.

IV. HARDWARE INTREPRETATION

Predefined locations are given to the controller for particular locations, by using the image processing technique in figure 5 & 6. we can use so many sample data's and trial and error algorithms are used for perfect driving and also reduces 99% accident chances. Practical design and implementations are given below in figure 9. [6]

Figure 5:Image processing technique applied for predefined values

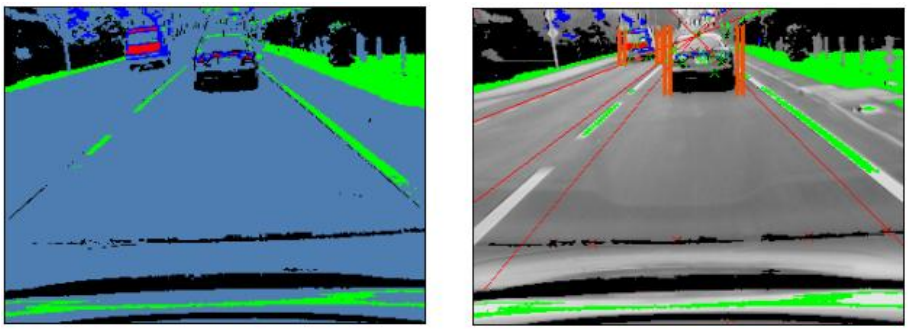

Figure 6:Image processing technique applied for varies samples

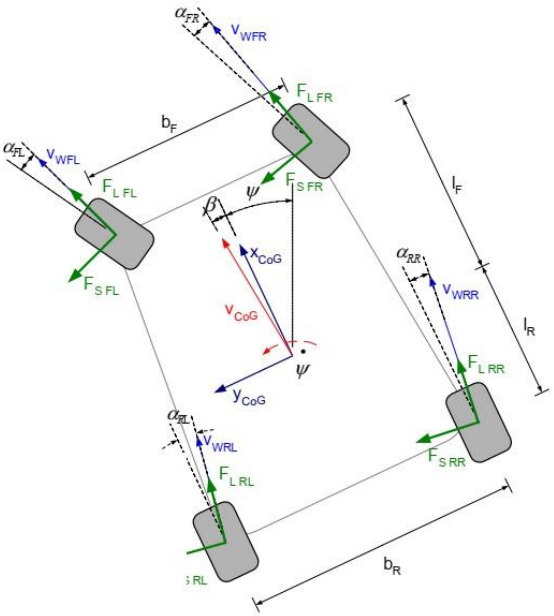

Figure 7:Design model of proposed E-Wagon

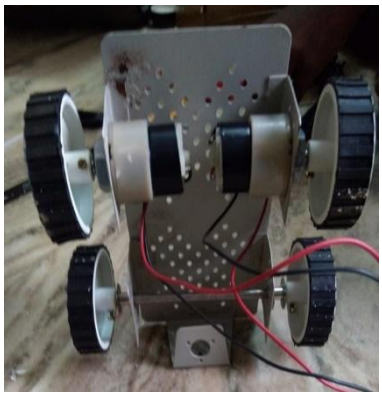

Figure 8:Implementation of proposed design

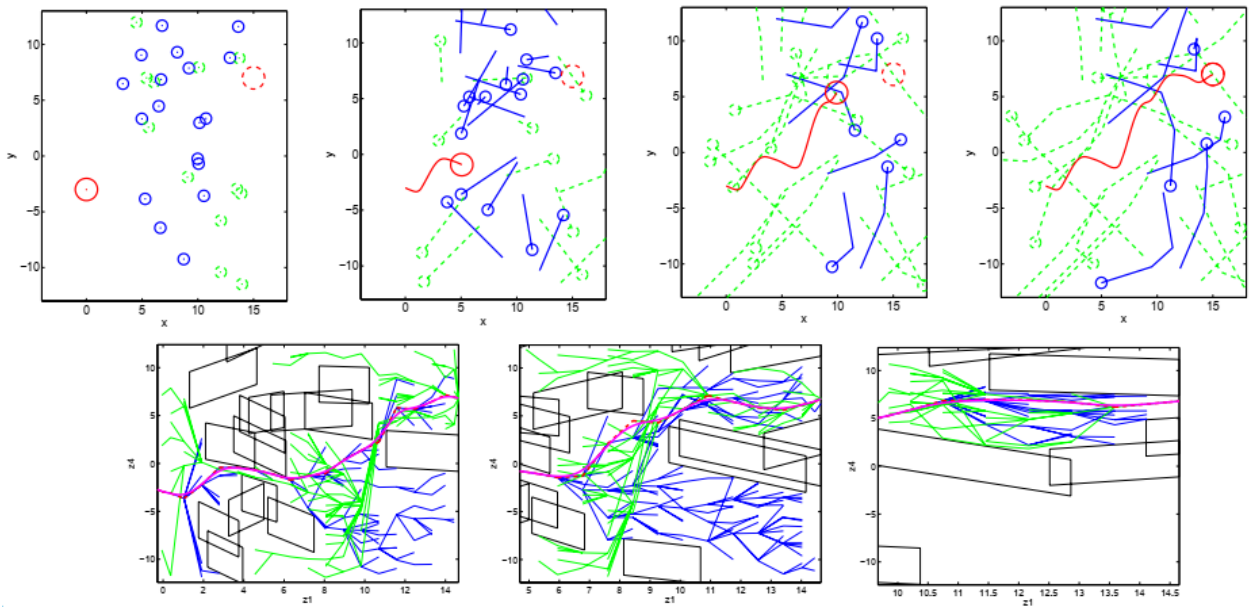

Figure 9:Various sample data's considered for algorithms

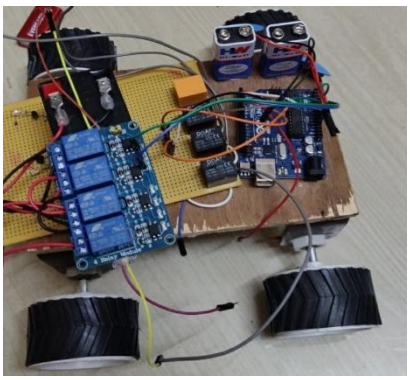

Figure 10:Final proposed design model

V. CONCLUSION AND FUTURE WORK:

This paper introduces the proposed model for self-driving car algorithms. This is an advanced step for autonomous vehicles. With the aid of this algorithm, vehicles can be set to navigate automatically to the destination location. Many people wonder how fast autonomous vehicles will help solve transport problems. Optimists expect that, by 2030, Autonomous Vehicles will be sufficiently efficient, affordable and widespread to displace most human driving, offering tremendous savings and benefits. From the above project discussion, assume that we are replacing a manual car with a self-driving car.

By removing this, we would reduce the cost of travel, for example, in a zoo where they raise more money to carry people in a manual vehicle, so they have to pay salaries to drivers, which is an extra cost to visitors. By using self-driving vehicles, we will proceed to the correct destination without the aid of the driver.

One may be able to fly without a guide. We used the concept car as a model in our project, and we used the lane to drive the car. If we go for a real-time model, we can extend this concept to private transport companies such as ola, uber, etc., by applying this concept, we can reduce transport costs.

REFERENCE:

1. F.V. Savrasov, R.V. Meyta, "Algorithm of Route Position's Detecting for Service Transport", Applied Mechanics and Materials, vol. 770, pp. 495, 2015.
2. Y. Ye, GPS Controlled Autonomous Vehicle: An Interesting Approach to GPS Guided Autonomous Vehicle Navigation LAP LAMBERT Acedemic Publishing, 2011
3. V Suresh Kumar, S. Arunraj, A. Nazar Ali, “Hybrid battery charging system for electric vehicles” 2017 International conference on Intelligent Sustainable Systems (ICISS) Year: 2017, Pages: 314-319, IEEE Conferences
4. T.Vishnu Kumar, V. Suresh Kumar, T. Sumeet, M.Srimaha “Hybrid Front end Interface DC-DC Converter with ANFIS Based Control of EMS System”. International Journal of Scientific Research in Science and Technology, Volume 3, Issue 8, Print ISSN: 2395-6011, 2017.
5. V.Suresh kumar, T. Vishnu kumar, A certain investigation for the battery charging system” International Journal of Multidisciplinary Research and Modern Education (IJMRME) ISSN(online): 2454-6119 Vol.1 Issue.1 2015.
6. B. Hofmann-Wellenhof, H. Lichtenegger and J. Collins, Global Positioning System, theory and practice, 5th ed., New York, Sprincer-Verlag, 2001.