

# A New Approach for Excessive-Precision Vehicle Navigation in City Environments Making Use of an Mem's IMU and Single-Frequency GPS Receiver

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## Abstract:

Traffic problems have mainly resulted from an increase in mobility over the last decades involving an increase in traffic congestion and degradation of environmental conditions. The employment of new systems – namely, Intelligent Transport Systems (ITS) is being considered for their mitigation. ITS offer a high number of applications providing different types of support to the user: usually the driver or the traveler. These may range from “simple” solutions dedicated to comfort (e.g. parking aid, e-toll) or information services (e.g. navigation, Variable Message Signs) to more complex ones such as Advanced Driver Assistance Systems (ADAS). One may distinguish pre-crash ADAS (e.g. collision warning, lane warning), post-crash ADAS (e-call) and fully automatic driving systems like Automated Highway Systems (AHS). The complexity is characterized through the maturity level and market distribution.

*Keywords* — **Mems Sensor, Gps, Gprs Modem.**

## I. INTRODUCTION

A key role in maximum ITS packages is the estimation of the placement of the automobile. The GNSS bureaucracy a global and free tool providing appropriate records beneath maximum situations. The following criteria need to be met: accuracy, integrity, continuity, Availability interoperability and timeliness. Data accuracy necessities fluctuate and rely upon the various ITS applications. Accuracy is not that crucial for navigation gadgets however it's far for AHS. For such systems, requirements have been recognized: zero.01-zero.5 m for the region, 0.01-zero.Five m/s for the rate and 10-one hundred Hz for the replace charge .

## II.LITERATURE SURVEY

The integration of GNSS and INS data is a exceptionally worrying computational manner that requires significant experience. Noisy accelerations and rotation costs from the INS are included to acquire the location, pace and orientation of the car. The Position-Velocity-Time answer from the satellite receiver suffers from errors too. These are manifold: biases within the satellite tv for pc clocks and orbits, delays within the sign transmission through the troposphere/ionosphere as well as multipath/reflections around the receiver. The majority of those mistakes may be decreased by way of the usage of a dual frequency receiver and corrections from a base station via the implementation of special processing techniques that employ the whole spectrum of the GNSS indicators (differentiation of provider phase and

pseudo-range code). Provided that the entire manner is undertaken carefully, a high positioning accuracy on the centimeter degree may be finished.

### III. BLOCK DIAGRAM:

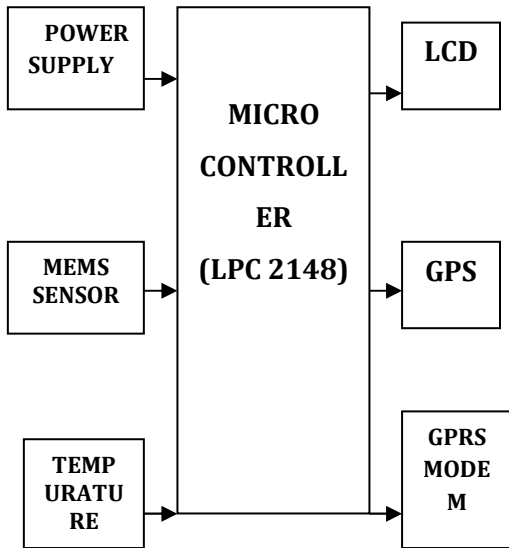


Figure 1: Functional Block Diagram

### IV. PROPOSED FRAME WORK

The manner of operating of this venture is explained as follows. The general task includes sections. They are car phase and monitor phase. In the automobile section, the system of this mission is placed inner a vehicle is not seen to others. The automobile is moving via the assist of MEMS sensor and right here. We have GPS (Global Positioning System) module by means of which we are able to get the graphical place of the vehicle and these area values are displayed on the LCD (Liquid Crystal Display). In this venture we've got temperature sensor it's far interfaced to the micro controller. Temperature sensor via which we are able to degree amount of Temperature exhausted from the automobile. These values also are displayed on LCD. Whenever those values exceed the

threshold restrict then intimation is given to the OWNER (or) to the screen section inclusive of automobile's genuine function and the alarm intimation is given.

### V. COMPONENTS USED

#### LCD (liquid crystal display):

A liquid-crystal display (LCD) is a flat-panel display or one among a kind electronically modulated optical tool that uses the slight-coloration or mono chrome. Modulating houses of liquid crystals. Liquid crystals do now not emit mild right away, as a substitute the use of a backlight or reflector to offer pix.



Figure 2: A liquid-crystal display

#### GPS

The Global Positioning System (GPS) is a satellite tv for pc-based navigation device. It is maintained via America government and became initially designed to assist infantrymen and military motors but now it is freely on hand to anyone with a GPS receiver.

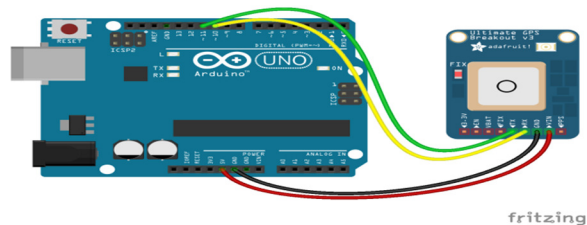


Figure 2: The Global Positioning System

## GPRS MODEM

General Packet Radio Service (GPRS) is a packet orientated cell data company on the 2G and 3G mobile communication machine's global gadget for cell communications (GSM).

GPRS have become at the start standardized by using European Telecommunications Standards Institute (ETSI) in response to the earlier CDPD and that i-mode packet-switched cell generation. It is now maintained with the aid of the 1/3 Generation Partnership Project (3GPP).

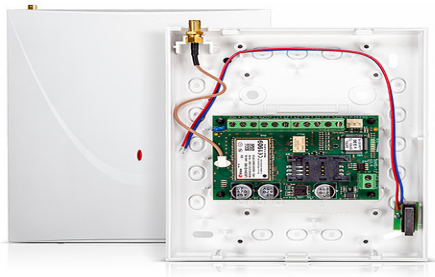


Figure 3: General Packet Radio Service

## MEMS SENSOR

Mems Sensor based totally gesture controlled robot moves in keeping with the movement of hand as we area the accelerometer in your hand. When we tilt hand with an accelerometer inside the front of the robot, then the robot starts off developed shifting ahead till the subsequent movement is given. When we tilt hand in backward path, then the robot adjustments its path and country. Then it starts off evolved off advanced shifting in backward course until the subsequent sign is given. When we tilt hand on left side, then the robot actions into left facet till the following signal is given .In the same way, even as we tilt hand in right facet, then the robotic movements right side.

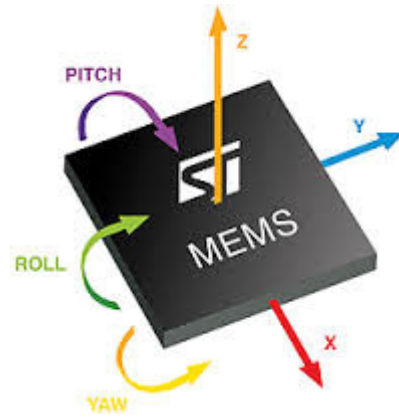


Figure 3 : Mems Sensor

## TEMPERATURE SENSOR

Temperature sensor The LM35 series are precision included-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. It is low price and small size sensor. Its temperature variety is -fifty five° to +a hundred and 50C.

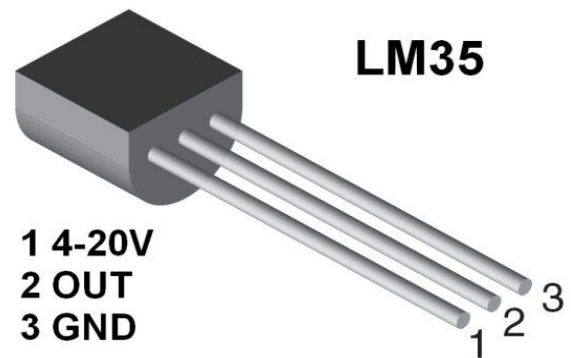


Figure 4 : Temperature sensor

## VI.WORKING PROCEDURE

## VII. PICTURES OF PROJECT

Figure 5: RESULT

## VIII. CONCLUSION

In this contribution a newly developed direct geo referencing device has been provided. The device is designed to be applicable on micro- and mini-sized UAVs and to offer specific positions and attitudes in real time. Due to the aggregate of GPS, an IMU and cameras it lets in for a multi sensor fusion with the gain that gaps of single sensors can be bridged.

Even though the hardware development is mostly completed there is still a lot of software extension possible. Like it was mentioned in section 3 and 4 the authors are currently working on the integration of a single frequency GPS baseline in the attitude determination. Furthermore, the IMU is also intended to be used to improve the ambiguity resolution in the RTK-GPS determination. Finally, the stereo camera systems will be integrated in the position and attitude determination in the future.

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