

# 3-D Navigation

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**Abstract-** Core unit of the device is Raspberry pi 3b which works along with its Broadcom BCM2387 chipset processor .This raspberry pi controls over both the modules GPS and altimeter, which is interfaced with touch and display .The GPS module tracks the location and heads to destination, where as altimeter module determines the height of module above specified anchor point .Collectively this will show exact location with height and specified destination.

**Keywords-** Altimeter ,GPS ,Raspberry pi ,touch and display.

## I. INTRODUCTION

In general, navigation involves three distinct aspects: **Global** navigation, which is the ability to determine one's position in absolute or map-referenced terms, and to move to a desired destination point.

**Local** navigation, the ability to determine one's position relative to objects (stationary or moving) in the environment, and not collide with them as one moves. **Personal** navigation, which involves being aware of the positioning of the various parts that make up oneself, in relation to each other and handling objects. Navigation of Mobile Robots is a broad topic, covering a large spectrum of different technologies and applications.

Whenever you go to some unknown space you have to ask local people for any query or information about that space specifically in tourist places or colleges. Google maps helps us to find routes so that we can reach that place ,but question arises n What next? Our project will be the next step towards navigating people .

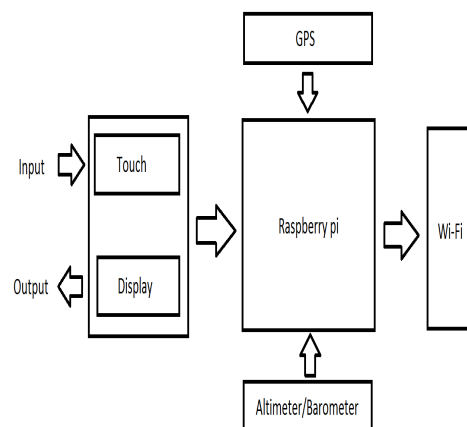
Device will take touch commands from you and route you towards your destination with you. Smartphone navigation is very much effective in navigating from one place to another place ,but when you want to travel inside a campus its quite inappropriate.We will tackle this limitation of smartphone navigation by routing and guiding with private maps along with information of every location through database information. Our device will help you to enroute through building/monument specific areas.

## II. LITERATURE SURVEY

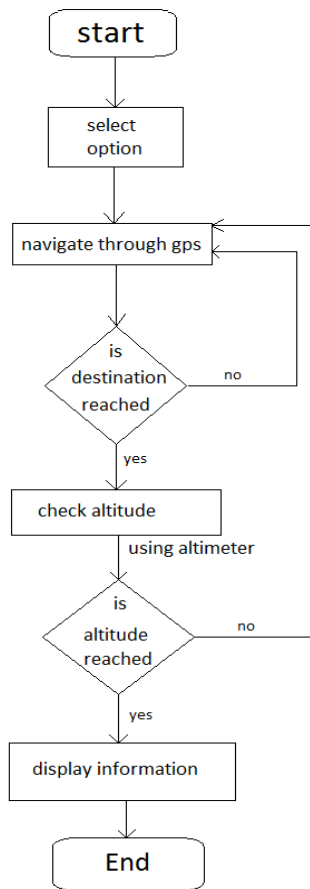
Standard navigation system which uses gps as their main object for its operation, works on principle of 2-axis or the navigation which is carried out by conventional gps can only show us the location of subject, but the navigation doesn't shows us at what height we are currently. This is limitation of today's gps navigation systems. The gps can work till exact location but if we are heading to words corporate or educational buildings or site then height can be a major factor in navigation .This is where idea of making an 3d navigation system came in our minds .This project will help to guide the visitor through given perimeter of area regardless of limitation of height which will be determined by using altimeter (/barometer—an sensor which sense air pressure to give altitude and can also sense temperature using the same)

## III. METHODOLOGY

This device works when user give input through the touch and display unit, the input destination is saved and the device starts navigating the user .At first the user location is traced and then navigations is carried out through the GPS .The GPS works only till specified location of point .After which the altitude of user is checked, and then height of destination is compared and accordingly altimeter works to for user to reach destination oriented height .While carrying this out display unit shows the rout of destination in detailed mode . The raspberry pi controls over the actions of all sub-ordinate units. Raspberry pi has program of GPS and altimeter, that what content should be displayed while intermediate stages.



**IV. ALGORITHM OF PROPOSED METHOD**



**V. IMPLEMENTATION**

The system is implemented with the help of different modules which are explained in this section along with code snippets.

**a) RASPBERRY PI :**

The Raspberry Pi 3+ uses a Broadcom BCM2837B0 SoC with a 1.4 GHz 64-bit quad-core ARM Cortex-A53 processor, with 512 KB shared L2 cache.

The rpi works as main brain of our device, which controls over wide range operations which includes taking input through touch screen, processing it and anticipating according to it as programmed.



**b) ALTIMETER MODULE :**

The Altimeter Module is a high resolution (20 cm) altimeter sensor. It will give extremely accurate, altitude, pressure, and temperature readings .The module includes a high-linearity barometric pressure sensor and a high-resolution temperature output, allowing implementation of an altimeter/thermometer without any additional sensors.



- Pressure range of 10 –1200 mbar
- Thermometer of -40 to +85 °C with <.01 °C resolution
- Power Requirements: 3.3 to 6.5 VDC
- Current Consumption: ~1.74 mA @ 3.3 VDC
- Communication Interface: I2C (up to 400 kHz) or SPI (20 MHz)
- Dimensions: 0.85 X 0.80 in (2.16 X 2.03 cm)
- Operating temperature: -40 to +185 °F (-40 to +85 °C)

**c) GPS MODULE :**

- Pressure range of 10 –1200 mbar
- Thermometer of -40 to +85 °C with <.01 °C resolution
- Power Requirements: 3.3 to 6.5 VDC
- Current Consumption: ~1.74 mA @ 3.3 VDC

- Communication Interface: I2C (up to 400 kHz) or SPI (20 MHz)
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## REFERENCES

- [1] <https://www.arduino.cc>
- [2] <https://www.raspberrypi.org>
- [3] <https://www.robotisc.org>
- [4] <https://www.python.org>



### d) TOUCH SCREEN:

It is the cutest, little display for the Raspberry Pi. It features a 3.5" display with 480x320 16-bit colour pixels and a resistive touch overlay. It supports any revision of Raspberry Pi (directly-pluggable).



The Arduino board is the link

## VI. CONCLUSION

This project is about building a device which can guide user through GPS and even for height in given specified areas. It consumes less power and work with high accuracy due to precise controlling of raspberry pi. It is designed for private manufacturing and small scale applications in educational institutes. The rpi can be replaced with a ASIC or any microprocessor for different purpose of use.