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3 Axial Positioning System For Large Work Spaces

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***Abstract*— Global Positioning System that we are using today is 2-dimentional while mapping. In this developing world, most of the buildings and offices are huge with a lot of stories. Positioning system today helps us while we travel larger distances, but the problem arises when we get closer and closer, we get confused. Consider a huge work space which is more than 500,000sft and the building is 48 floors long and if a new person has to meet an executive and the location could be quite confusing. With 3 Axial Positioning System we can transfer 3-dimensional data (latitude, longitude, floor number) meeting a person get easier.**

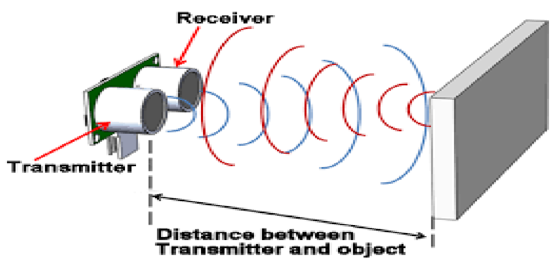
***Keywords*— Extended GPS, Super Sonic Positioning, CHIRP, Ultra Sonic Measurements, Hybrid Positioning**

I. Introduction

The paper adds to the study and implementation of the local positioning system based on the ultrasonic hardware components. Sounds are omnipresent in daily lives. We can quickly and often control the volume of Televisions and audio players; we can also utilize sound's additional characteristics to determine the health and gender of growing organisms or to discover sunken ships on the ocean floor. Sonograms, sonar devices take advantage of physics and math relationships that enable sound waves to be used as a tool to estimate distances using a simple formulaic relation of velocity distance and time. Using the same theory, we can predict the height of the object and the input can be exported to the local Wi-Fi module which helps in distribution of 3rd-dimensional data.

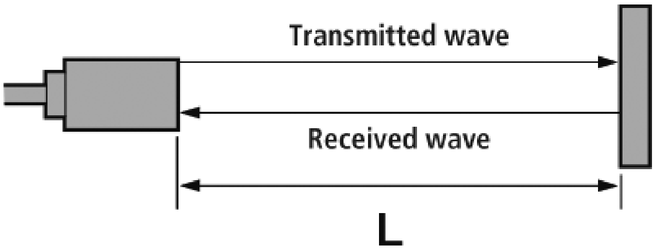
Sound waves are omnipresent around us, yet we cannot hear them — Human hearing counters to the frequencies in the spectrum around 20 Hz and 20,000 Hz. A diagram shows the ultrasound frequency range, from infrasound (20 Hz or lower; elephants can hear) to audible frequencies (20 Hz to 20 KHz, people can listen to) to ultrasound (20 KHz to 2 MHz to 200 MHz +, bats can hear). The frequency ranges for infrasound, ultrasound and audible waves and the similar animals that can listen to them. It is essential to make sure we first understand how to describe sound waves. The frequency of a wave is determined as the amount of cycles the wave develops in unit time. More particularly, the frequency of 1Hz, about one hertz, means that the wave swings one cycle in 1 second — view at what results to a sine wave while its frequency is built from 1Hz to 5Hz. The sine wave on the left performs one full cycle within 1 second; in other words, it has a frequency of 1 Hertz. The wave on the right oscillates five times in 1 second or has a frequency of 5 Hertz. For human beings, the influence of the wavelength limits means, ears cannot concoct sounds that form less than 20 or more than 20,000osc per second. Sound frequencies that are below and above human vestibule ought been used for engineering and pharmaceutical designs extensive for more than 60 years.

Example, while producing a sonogram of organisms, therapists use ultrasound pulses (about 2–18 MHz, where one megahertz is equal to 1,000,000 Hertz). This area is known as ultrasound because the frequency is above the sounds where humans hear. The ultrasound waves are utilized to determine the shape of the baby's body by estimating the lengths from the sensor to the blastulae inside the parent. Furthermore, ships examining the ocean floor for immersed submarines, aircraft or crashes send ultrasonic things, or waves, that mirrors off the facades and revert to the sensor. A moving recipient co-ordinate measurement is represented analytically including a matrix equation regarding unknown co-ordinates including coefficients, and distances are derived. Stages of information packet processing are expressed, and the pseudo pyramid of measuring distances are built. The information for the location of moving and stationary objects is of particular importance in many scientific and industrial areas of human activities, robotics, storage, and stock management, customer services, remote control, medicine, etc. It spurs ongoing analysis and study of local positioning systems with various applications. Several technologies based on distribution components of radio, acoustic and optical waves are applied [1-4].



The importance in contemporary work is on acoustic waves, acknowledging their characteristics such as dull propagation velocity, negligible diffusion in walls and mean cost of the transducers. Based on their analysis capacities as high accuracy (few millimeters) and little distance, ultrasound practices are suitable for the indoor utilization. The lengths within ultrasonic devices will be determined by multiplication of a signal's Time of Flight within devices by the speed of sound. A brief review of various tracking systems, principles, structures, methods and tracking algorithms were recommended in [5]. Lately, algorithms for recipient positioning based distance areas have been formed, for instance, Least Squares (LS) algorithm executed in MATLAB [5], the indoor localizing algorithm based on biphase measures wireless sensor networks [6]. Estimate of heterogeneous localization schemes using RSSI, TODA, and TOA was discussed in [7].

In [8-11] there did an effective tracking system utilizing an ultrasonic IEEE 802.15.4 compatible radio in wireless sensor networks and sensing device, an indoor positioning arrangement using TOF of the ultrasonic beacon to determine the gap between a collector node and a conductor node.



Indoor positioning systems utilizing ultrasound-localizing oscillations exhibit high heterogeneity in their applications. Plan and evaluation of a healthy indoor ultrasound location system and broadband ultrasonic position systems for enhanced indoor positioning are explained in [12]. Multi-position tracking system with ultrasonic sensor modules implementing the positioning system based on transmissions from independent ultrasound beacons, also a person tracking motorized robot using an ultrasonic positioning method are reviewed in [13, 14]. A submissive mobile positioning system can determine itself using the signatures of the acquired ultrasound signals and changes in the periodicities of the signals using the Doppler effect, to determine its location and speed [15].

Hybrid ultrasound and wireless system utilization are of great concern for researchers. New cellular phones ought characteristics of broadcasting and receiving ultrasonic sounds between 20-22 kHz with least distortion. It indicates that mobile devices pass ultrasonic positioning abilities. An indoor ultrasonic position tracking method that can appropriate mobile devices is presented in [16-17]. In [18] capacities of a tracking method based on ultrasonic beams and Android utilization aimed at personal privacy are discussed. A study on localization for motorized broadcast sensor networks is suggested in [19]. Collaborative-aware indoor positioning methods and indoor localization outdoors foundation doing the acoustic experience spectrum is presented in [20].

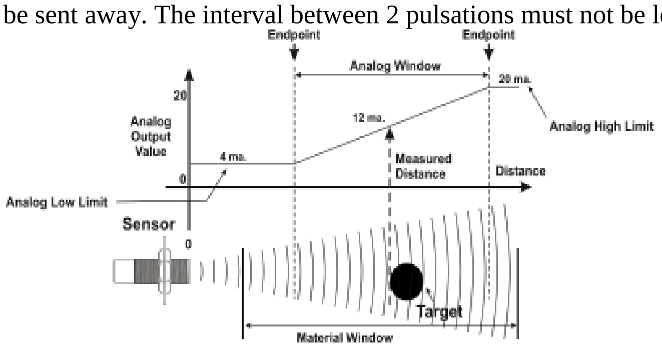
Examine a positioning method that has n +1 ultrasonic receivers placed within a 3rd-dimensional co-ordinate system. It is believed that one of the factors is with anonymous coordinates and probably moving, others n receivers are with preliminarily determined coordinates and apparently motionless. Determination of the current coordinates of a traveling target is based on n length measures between n stable receivers and a moving object. The length measured from ith transceiver with known coordinates to the moving object with private coordinates, i.e., i-th determination.

In simpler terms, the method is designed in two sections: The First division is for detecting the obstruction. The second division is of determining the position of the person and at the very same time transferring data to the Wi-Fi module about the location of the module.

The module contains an ultrasonic sensor, microcontroller. The microcontroller checks the working of the sensor, and it is also effective for the functionality of devices.

Ultrasonic sensors produce high-frequency waves and estimate the reverberation which is taken back by the sensor. Sensors determine the time taken between transferring the signal and getting the reverberation back to determine the distance to an object.

This module which we will be doing becomes three pins that are GND, VIN, and signal. VIN and GND are correlated to power. Beacon pin works as an I/O to start the beacon for broadcasting the pulse and output the electrical equivalent of the collected signal. An ultrasonic pulse will be sent at '0' time. The sensor mirrors the pulse. The sensor acquires the signal backward. It transforms it into an electrical beacon and output to signal pin. When the echo beacon is dissolved away, the next oscillation can be sent away. The interval between 2 pulsations must not be less than 50ms.



We oblige to program the sensors to calculate the distance of the obstacle in front of the blind person. This sensor sends a ping at a given moment and receives the ping bouncing back on a barrier at different given note. A ping is nothing but a noise that is imperceptible for the human ear. The sensor sends a ping at a time given and receives the ping at the time 't2'. Knowing the velocity of sound, the time interval Δt = 't2 -t1' can provide us with an idea of the length of the obstacle.

With these two modules, we calculate and transfer the height data from the module, and when the user is connected to the Wi-Fi modem, while sending the geo-location, along with latitude and longitude, the height or the story number can also be sent to the user. When a new person tries to navigate through the given data, until the user reaches the location and connect to the area, he will be given the 2 dimensional data (i.e.) latitude and longitude and whenever he gets attached to the internet by local internet connection from the in-house Wi-Fi modules, He can instantly get the 3 dimensional location of the person who sent his position

II. CONCLUSION

The thesis has addressed the problem of local and nearby positional system for users. Until now we have really good and assistive global positioning system which is connected using GPS and satellites. With the use of ultra-sonic waves and Wi-Fi routers, in really big work spaces and building, we provide 3 dimensional data so that along with latitude and longitude, we can also provide users with the floor data which actually helps people at huge spaces.

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