International Journal of Advances in Engineering and Management (IJAEM)
Volume 5, Issue 5 May 2023, pp: 214-217 www.ijaem.net ISSN: 2395-5252

Identify the Coordinate System and Updating Data in the Cloud

Chandrachuda Hosahalli, Manasa S, Jayanth U, Swetha Rani L, Akshaya K R

Department Of Electronics And Communication Engineering, Amc Engineering College, Bengaluru, India
Assistant Proffesor, Department Of Electronics And Communication, Amc Engineering College, Bengaluru, India
Department Of Electronics And Communication, Amc Engineering College, Bengaluru, India
Associate Proffesor, Department Of Electronics And Communication Engineering, Amc Engineering College, Bengaluru, India
Department Of Electronics And Communication, Amc Engineering College, Bengaluru, India

Date of Submission: 01-05-2023 Date of Acceptance: 08-05-2023

ABSTRACT—The contribution describes the application of an Internet of Things device with an ESP32 micro controller with the dual-core implementation of data processing and wireless communication. The first leading idea of using low-end hardware and software optimization to create software architecture in order to make the most of this hardware and reduce the cost of more expensive hardware solutions was tested. The MPU6050 sensor module consists of an accelerometer and gyro on a single chip. It contains analog-16 bits in the digital converter for each channel. So it can capture the x, y, and z channels at the same time. The sensor uses I2C-bus to interact with Arduino or any other micro controller. The MPU-6050 sensor module used in many applications like drones, robots, motion sensors. This sensor is also called the Gyroscope or Triple axis accelerometer. We previously used this module to build many MPU6050 based projects.
Thing speak result viewed via a web app or delivered on a smartphone to a specialist who is in a remote location. In order to achieve high accuracy in readings. The results displayed by the proposed system proved the system to be well suited and reliable.

Keywords— PITCH, ROLL, YAW, GYROSENSOR, ESP32

I. INTRODUCTION

The sensor, which provides a required output in response to a specified measurement. It converts the physical quantity into a signal for processing (e.g.optical, electrical, mechanical). Nowadays common sensors convert measurement of physical experience into an electrical signal. Active element of a sensor is called a transducer. The sensor can be classified into two types, one based on properties sensed and another one is technologies used. The latter list comprises both physical phenomena and types of the materials. Mathematical models of processes are a useful tool in the monitoring and control of industrial processes. The models used in such a framework are generally known as soft sensors (SSs) and can be used as part of virtual instruments. SSs can be used, for example, to replace hardware measuring devices during maintenance, to back up measurement instruments to implement fault detection policies, or to reduce delays due to measuring times. SS design is generally based on data-driven identification procedures using recorded data concerning relevant plant input and output variables. Soft robots possess the inherent advantages of lightness and compliance, which allow them to perform a wide variety of tasks requiring safe interaction

One of the main challenges for soft sensors is routing the strain signal using soft wires. For example, soft wires can be composed of long channels filled with reward. Stress applied to one of these channels would cause a resistance change and therefore an erroneous sensor reading. Due to the unstructured nature of the environment in which a prosthetic hand will be used, its obvious that soft wires located on the back of the hand will be subject to occasional stresses such as contact with an object. Velocity estimation is attainable through integration of readouts from Inertial Measurement Units (IMUs).

IMU is a association of accelerometer and gyroscopes that scope acceleration and angular velocity. The model of the whole sensor design is

International Journal of Advances in Engineering and Management (IJAEM)
Volume 5, Issue 5 May 2023, pp: 214-217 www.ijaem.net ISSN: 2395-5252

implemented in MATLAB/Simulink, because this software allows the modeling of complex systems and a detailed verification of the model and its signals. Generally, three-axis gyros are used on board to contribute data (angular rate) for attitude estimation.

II. RELATED WORK

A literature survey is that section which shows the various analyses and research made in the field of your interest and the results already published.

Ilham Arun Faisal et.al. in “A Review of Accelerometer Sensor and Gyroscope Sensor in IMU Sensors on Motion Capture” 2019 [1] IMU is electronic devices that used on specific body, angular rate and sometimes magnetic fields surround the body, use combination of accelerometer sensor and gyroscopes sensor, sometimes magnetometer to but IMU usually just using accelerometer and gyroscope sensor. IMU Sensor usually used on aircraft maneuver include Unmanned Aerial Vehicles (UAV) and space aircraft include landers and its satellite.

Liangqian Chen et.al. in “A Temperature Drift Suppression Method of Mode-Matched MEMS Gyroscope Based on a Combination of Mode Reversal and Multiple Regression 2022 [2] In recent years, the application prospects of high-precision MEMS gyroscopes have been shown to be very broad, but the large temperature drift of MEMS gyroscopes limits their application in complex temperature environments. In response to this, we propose a method that combines mode reversal and real-time multiple regression compensation to compensate for the temperature drift of gyroscope bias. This method has strong adaptability to the environment, low computational cost, the algorithm is online in real time, and the compensation effect is good.

William A Clark and Roger T. Howe “Surface micro machined Z-axis vibratory rate gyroscope” 2021 [3] We have designed and tested the first poly silicon surface micro machined vibratory rate gyroscope that is sensitive to angular rotation about an axis normal to the plane of the silicon chip, the Z-axis. The Analog Devices, Inc. BiMEMS technology was used to fabricate the gyroscope, which has as a demonstrated minimum detectable signal of 1 deg/sec/Hz/2 with performance projected to improve to 0.1 deg/sec/Hz in a second-generation B. MEMS design

Wenyan Zhang et.al. in “Advancement and expectations for mode-locked laser gyroscopes” 2022 [4] Laser gyroscopes afford extremely precise measurement of ultra slow angular velocity and play an irrefutable role in engineering seismology, tidal detection, aviation, aerospace, satellite navigation, and other inertial systems. With recent progress of mode-locked fiber lasers, particularly the realization of effective bidirectional generation, their applications in the fields of gyroscopic sensing have attracted tremendous attention. Besides the merits of excellent structure compactness, maintenance-free operation, and rather low cost, remarkably, the mode-locked laser gyroscope presents a promising approach for eliminating the lock-in effect caused by the synchronization of counter propagating resonant frequencies, which is the most severe sensing limitation of traditional laser gyroscopes.

(i) collecting the reading of co-ordinate system using gyro sensor,
(ii) updating the obtained data to the thing speak cloud,
By interfacing ESP32 Wi-Fi module with gyro sensor and collecting the information of roll angle, pitch angle, yaw angle, acceleration in X, Y, Z co-ordinates, and temperature.
Updating the obtained data to cloud.

III . BLOCK DIAGRAM

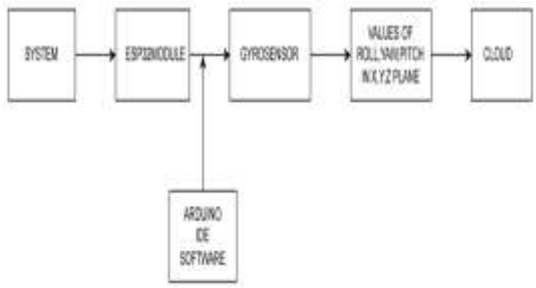

Fig.1:Block diagram of the Gyro sensor

SYSTEM: A system is connected to the esp32 module and it is used as the main component of the setup.
ESP32MODULE: ESP32 can perform as a complete standalone system or as a slave device to a host MCU,reducing communication stack overhead
Two main approaches: wired and wireless communication. Wireless communication is accomplished based on two principles: Wi-Fi and Bluetooth.
The ESP32 includes full 802.11 b/g/n/e/i WLAN MAC.Espressif's
official IoT Development Framework for the ESP32 and ESP32-S series of SoCs.
ARDUINO IDE SOFTWARE: All the coding part is done in the software that is connected in between the esp32 module and gyro sensor Port registers allow for lower-level and faster

manipulation of the pins of the micro controller on an Arduino board.
LED: There is a built-in LED driven by digital pin 13. When the pin is high value, the LED is on, when the pin is low, it is off.

VIN: The input voltage to the Arduino/Genuine board when it is using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.

GND: Ground pins.
IOREF: This pin on the Arduino/Genuine board provides the voltage reference with which the micro controller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source, or enable voltage translators on the outputs to work with the 5V or 3.3V.
Reset: Typically used to add a reset button to shields that block the one on the board.

GYRO SENSOR: Gyro sensor is a device that is used to find the values of pitch,yaw and roll in x,y,z axis. This gyro sensor is connected to the esp32 module.

VALUES OF PITCH,YAW,ROLL:Rotation around the front-to-back axis is called roll.
Rotation around the side-to-side axis is called pitch.
Rotation around the vertical axis is called yaw.

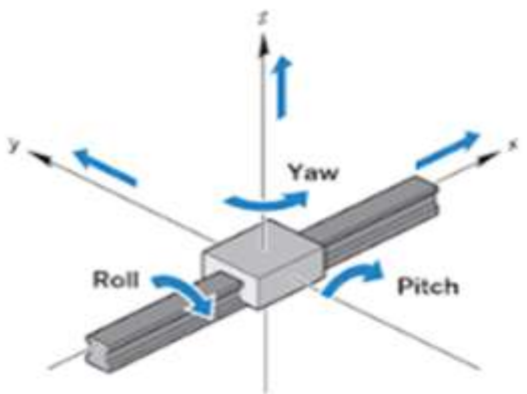

FIG 2: PITCH,YAW,ROLL

CLOUD: "The cloud" refers to servers that are accessed over the Internet, and the software and databases that run on those servers. Cloud servers are located in data .This cloud is connected to the gyro sensor and helps in detecting the values .

IV. PROPOSED WORK

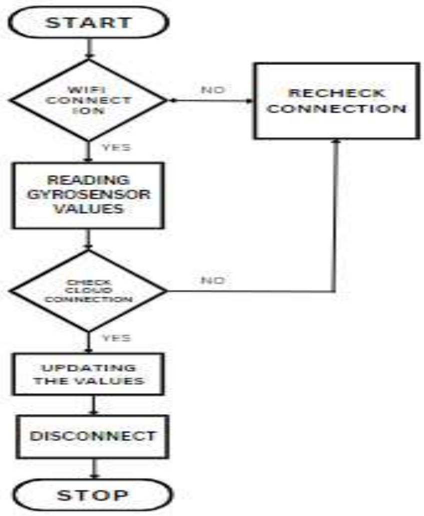

Fig .3. FLOW CHART OF THE PROPOSED WORK

Step 1: **Define the problem and gather data**
Collect the necessary data and ensure it is in a usable format.

Step 2: **Identify the coordinate system**
Determine the coordinate system used in the data you have collected.
If the coordinate system is unknown, use available tools to identify it.

Step 3: **Transform the data to the desired coordinate system**
If necessary, transform the data to the desired coordinate system for your application.
Use available tools or software to perform the transformation.

Step 4: **Update data to the cloud**
Once the data is transformed to the desired coordinate system, update it to the cloud.
Ensure that the data is properly formatted and that any metadata is included.

Step 5: **Validate the data**
Validate the data to ensure it has been properly updated to the cloud.
Use available tools or software to perform any necessary validation checks.

Updating data in the cloud:
Connect to cloud: Connect to the cloud service or platform where the data is stored.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 5, Issue 5 May 2023, pp: 214-217 www.ijaem.net ISSN: 2395-5252

Authenticate: Authenticate and authorize access to the cloud service using the appropriate credentials and security measures.

Retrieve data: Retrieve the data that needs to be updated from the cloud.

Update data: Apply the necessary changes or updates to the data.

Upload data: Upload the updated data back to the cloud, making sure to follow any relevant formatting, metadata, or versioning requirements.

Verify: Verify that the data has been successfully updated and that it is accessible and usable by other authorized users or services.

V. CONCLUSION

Identifying the coordinate system and updating data in the cloud are two critical tasks in various fields such as robotics, navigation, and data management. Identifying the coordinate system requires collecting data from the sensor or source, prepossessing it, extracting features, identifying the coordinate system, and possibly transforming the data into a desired coordinate system. Updating data in the cloud involves connecting to the cloud service, authenticating access, retrieving the data, applying changes, uploading the updated data, and verifying the changes. These tasks can be performed using a combination of traditional geometric methods, machine learning techniques, and cloud technologies, depending on the specific use case and requirements. By following appropriate methodologies, users can ensure that their data is correctly identified and updated in the cloud, making it accessible and usable by authorized users and services.

VI. FURTHER WORK

Improved accuracy and efficiency: Developing more accurate and efficient methods for identifying the coordinate system and updating data in the cloud. This could involve incorporating more advanced algorithms, machine learning techniques, or leveraging cloud-native services and technologies.

Multi-sensor fusion: Exploring methods for fusing data from multiple sensors or sources to improve the accuracy and robustness of coordinate system identification and data updating. This could include developing new techniques for sensor fusion, such as Bayesian approaches, Kalman filters, or deep learning models.

Security and privacy: Addressing security and privacy concerns related to identifying the coordinate system and updating data in the cloud. This could involve implementing stronger authentication and encryption mechanisms, ensuring data privacy and protection, and complying with regulatory requirements such as GDPR or HIPAA.

Integration with other technologies: Integrating coordinate system identification and data updating with other technologies such as augmented reality, virtual reality, or autonomous systems. This could involve developing new use cases or applications that leverage the power of cloud computing and advanced sensor technologies.

Scalability and performance: Ensuring that coordinate system identification and data updating methods are scalable and performance enough to handle large amounts of data and multiple users. This could involve optimizing algorithms, leveraging cloud-native services, or implementing distributed computing or edge computing approaches.

REFERENCES

[1]. "A Temperature Drift Suppression Method of Mode-Matched MEMS Gyroscope Based on a Combination of Mode Reversal and Multiple Regression" Liangqian Chen, Tongqiao Miao, Qingsong Li *, Peng Wang, Xuezhong Wu, Xiang Xi and Dingbang Xiao 20 September 2022
[2]. "A Review of Accelerometer Sensor and Gyroscope Sensor in IMU Sensors on Motion Capture "Ilham Arun Faisal, Tito Waluyo Purboyo and Anton Siswo Raharjo Ansori 16 December 2019.
[3]. "Surface micro machined Z-axis vibratory rate gyroscope” William A Clark and Roger T. Howe 03August2021
[4]. “Advancement and expectations for mode-locked laser gyroscopes” Wenyan Zhang,1,2 Tianhal Xian,2 Wenchao Wang,2 AND Li Zhan2 05 December 2022.
[5]. “Microcomputer-based Acceleration Sensor Device for Swimming Stroke Monitoring “ Yuji Ohgi Chikara Miyagi Hiroshi Lchikawa December2002