



## Using IoT to Track and Analyze Newborn Birth Rates by Gender

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### ABSTRACT

This study explores how internet of things iot can be used to gather and visualize details on human birth rates by integrating internet of things such as detector data loggers and smart systems we can gather real-time statistics on births across different regions these devices can track various factors related to birth rates such as hospital admissions birth records and demographic data providing an other accurate and up-to-date picture of birth trends revised through iot tool is then analyzed and visualized using user-friendly dashboards and graphs this makes it easier for researchers policymakers and health organizations to detect birth direction patterns and make it informed settlement about healthcare planning and resource allocation with the benefit of iot birth rate data becomes more accessible and can be used to improve public health strategies manage population growth and support family planning initiatives

**Key Words:** - IoT, birth rate, demographic trends, real-time data, predictive analytics, healthcare, data visualization

### Why This Project is Needed for Humans?

Knowledge and monitoring living birthrate is critical for many features of society from wellness protection planning to social protection economic development however collecting accurate and timely data on birth rates has always been a challenge traditional methods of tracking births such as censuses or surveys often suffer from delays incomplete data or lack of real-time insights this is where the internet of things iot can make a significant difference.

### 1. Introduction :-

- Live data material for fast decision making for iot devices track births in actual time enabling administration and health organizations to respond swiftly to fluctuations in birth rates and adjust healthcare resources and planning accordingly .
- Enhanced Health protection real-time birth date helps hospitals improved resorces like beds staff and equipment to better maternal health results and improved healthcare planning
- demographic insights targeted interventions Iot data reveals birth rate trends by region and demographic factors helping address overpopulation or underpopulation challenges and enabling targeted health education and social services
- Tracking gender factors iot data helps analyze how socio-economic and gender factors affect birth rates guiding efforts to improve gender equity family planning and healthcare access
- Optimized resource issuing real-time birth rate data helps government and organizations allocate medical management assets more effectively addressing issues like overpopulation poverty and inadequate healthcare services

### 2. Literature Review :-

- IoT in medical management :
- IoT apparatus (wearables, sharp sensors, connected medical equipment) provide real-time strength info.
- These equipments authorize constant observation, enhancing clients protection, ill-health prevention, and medical system management.
- In birth rate tracking, IoT gives non-stop info on births, maternal health, and demographic component, assuming a authentic and exhaustive in comparison to classical approch .

### 1. Data Visualization for Birth Rate Monitoring :

- Data visualization tools like interactive dashboards and geographic maps help analyze birth rate data.
- These tools allow tracking of birth rates by gender, age, location, and time, revealing trends and regional disparities.
- They make it easier to identify areas needing interventions, such as regions with low birth rates or gender imbalances.

### 2. Challenges and Opportunities :

- Key challenges include data privacy concerns and ensuring interoperability across diverse IoT devices.
- Protecting sensitive health data and ensuring its secure and anonymous\*\* storage is essential.
- Standardizing data formats is necessary for accurate analysis. Despite these challenges, IoT helps improve decision-making in healthcare, family planning, and maternal health .

### 3. Future Directions :

- The integration of machine learning and AI will enhance predictive capabilities in birth rate and population growth forecasting.
- IoT can address data gaps in developing regions, where traditional methods are slower or unreliable.
- IoT's expansion will provide real-time insights into birth rates and gender ratios, improving maternal care and addressing population challenges globally .

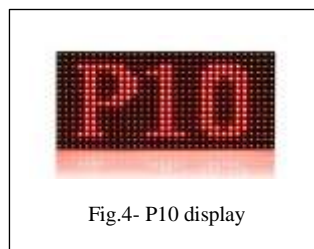
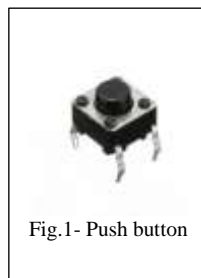
### 4. Weaknesses and Limitations :

- Data Privacy and Security - Sensitive birth data could be at risk of unauthorized access or breaches.
- Data Accuracy and Reliability - Human errors in data entry can lead to incorrect birth information. IoT system malfunctions (e.g., SD card issues, connectivity problems) may cause data loss or corruption.
- Limited Scope - Data may only represent certain hospitals or regions, limiting generalization to broader populations.

## 3. Methodology :-

### 1. Component Used :

- Push Buttons (fig.1)
- SD Card Module(fig.2)
- ESP32(fig.3)
- P 10 Display(fig.4)
- Power Supply



### 2. The Setup : We have several components in the system

- Two Push Buttons :These are for the father or mother to press, depending on whether they want to announce the birth of a baby boy or a baby girl.
- P10 Display : This is an LED display that shows messages, such as “Congratulations on the Baby Boy” or “Congratulation on the Baby Girl.”
- ESP32 : This is a small but powerful microcontroller (like a brain for the system) that connects all the components. It processes the information from the buttons and controls the display.
- SD Card Module : This stores data on an SD card, essentially saving records like which button was pressed (boy or girl) and when the announcement was made.

### 3. How It Works :

#### A. *Step 1: Button Press*

- When the father or mother presses one of the push buttons (one for baby boy, one for baby girl), the ESP32 detects this action.
- Let's say if the "Baby Boy" button is pressed, the ESP32 will trigger the display to show the message "Congratulations on your Baby Boy."
- Similarly, if the "Baby Girl" button is pressed, the message on the P10 display will say "Congratulations on your Baby Girl."

#### B. *Step 2: Display the Message*

- The P10 display, which is an LED screen, will show the congratulatory message based on the button press. This display acts like a visual announcement for everyone nearby to see.

#### C. *Step 3: Save Information to SD Card*

- At the same time, the ESP32 will save this information (like whether it's a boy or girl and the timestamp) on the SD card. This is like recording the event for future reference or any other purpose.
- For example, the data saved could look like: "Baby Boy - 2024-11-14 10:00 AM."

#### D. *Step 4: Web Update (Optional)*

- The ESP32 can also connect to the internet (via Wi-Fi), so it can update a web page with the information.
- For example, once the information is stored on the SD card, the ESP32 can send it to a web server where the information will appear online. This can be a personal web page or a database, where you can track and update the status of each birth.
- So, the ESP32 allows the information to be updated or changed remotely via a web interface. For example, the message could be updated later if the parents decide to change the wording or add additional details.

### 4. Assembly Setup :

- ESP 32 to P10 display
- ESP 32 to Push buttons
- ESP 32 to SD card module
- 5V output power supply to P10 display & 3V to 5V power supply for ESP 32 & SD card module

### 5. Circuit Layout :(fig.5 )

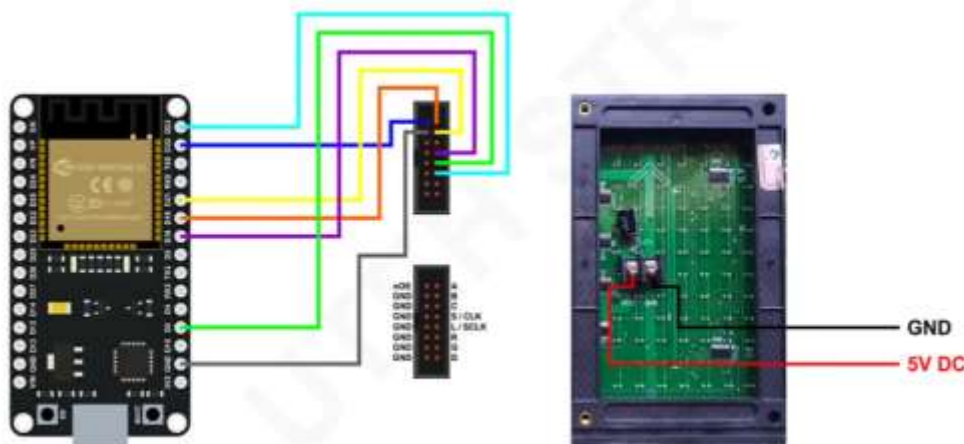


Fig.5- Circuit diagram of esp32 to p10 display

## IV. Result :-

The primary findings from the investigation the Using IoT to Track and Analyze Newborn Birth Rates by Gender are outlined in this portion. This shows the Visual representation including tables & charts (table.1) . Immediate visibility into where and when births are occurring globally or locally.

Table.1- shows fields to input data of birth , Gender (boy & girl), hospital name, and location. A simple “ Submit” button for recording data.

**Using IoT to Track and Analyze Newborn Birth Rates by Gender**

Real time data on birth rate

**Submit Birth information**

Date of birth :

Gender :

Hospital Name :

Location :

## V. Conclusion :-

This research demonstrates the potential of using Internet of Things (IoT) technology to track and analyze newborn birth rates by gender in real time. By leveraging IoT devices such as sensors, push buttons, and displays, combined with data storage and web connectivity, the system enables accurate, immediate collection and visualization of birth data. This approach offers significant advantages over traditional methods, providing valuable insights into demographic trends, gender ratios, and regional disparities. It helps governments, healthcare organizations, and policymakers make informed decisions related to healthcare planning, resource allocation, and social services.

While the system presents some challenges, such as data privacy concerns and reliability issues, it holds the promise of improving birth rate monitoring, promoting gender equity, and addressing public health needs. Future developments could further enhance predictive capabilities, ensuring better management of population growth and maternal health outcomes globally.

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