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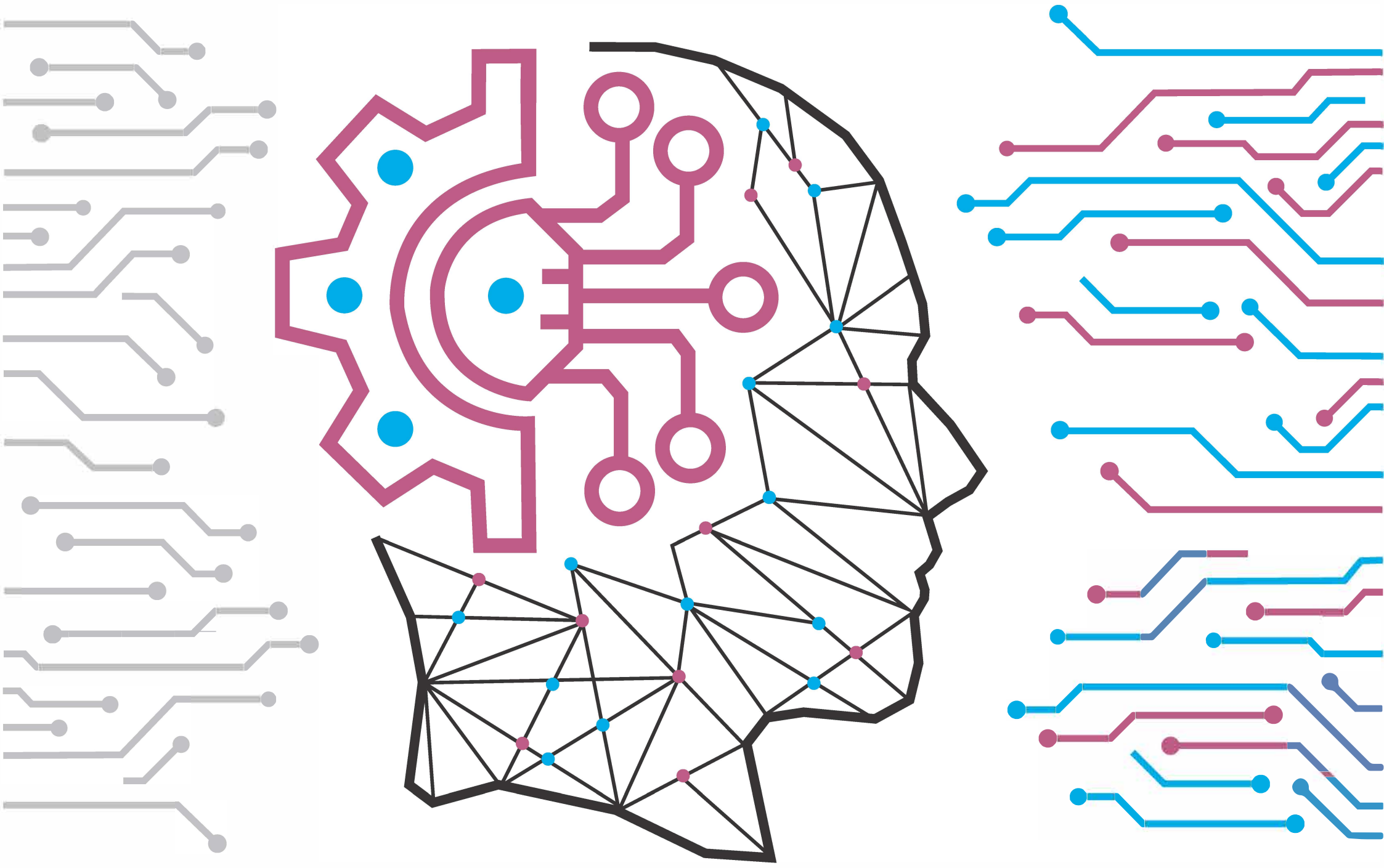

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EXTENDED ABSTRACTS

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TRACKING GPS LOCATION THROUGH NETWORK CONNECTION

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ABSTRACT

GPS (Global Positioning System) technology is ubiquitous in modern life. It provides location data for navigation, mapping, and various applications to the users. While GPS itself relies on satellite signals, its usefulness often hinges on network connectivity. Hence, this paper explores how network connections are used to track GPS data and the implications of this practice.

Keyword: Network-based GPS Tracking

1. INTRODUCTION

Basic principles of GPS include the use of satellites and signal triangulation to determine users location. However, GPS has some limitations, such as its inability to function indoors or in areas with poor satellite reception. Network connections, typically cellular or Wi-Fi on the other hand become crucial for transmitting GPS real-time tracking data. GPS data is continuously transmitted through the network to a server or application, allowing for live location updates. For instance, it helps riders such ride-hailing services and delivery tracking. GPS data is periodically recorded or logged on the device. Later on, it is also uploaded to a server via the network for historical analysis or sharing such as fitness trackers and personal location sharing.

According to Ratasvouri (2013), she claimed that one of the benefits of network-based GPS Tracking amongst others is to enhance functionality. Chen (2019) mentioned that real time give location updates and enable features like route optimization, location-based services, and emergency assistance, low battery consumption (Khan, 2013). This benefit is tested in this project and the result is recorded in Section 3: Findings 2) Data analysis: Historical location data allows for insights into travel patterns, activity monitoring, and geospatial analysis. Meanwhile Zhang (2019) claimed that it could improve logistics. It can track vehicles and assets facilitates fleet management, delivery optimization, and resource allocation.

2. METHODOLOGY

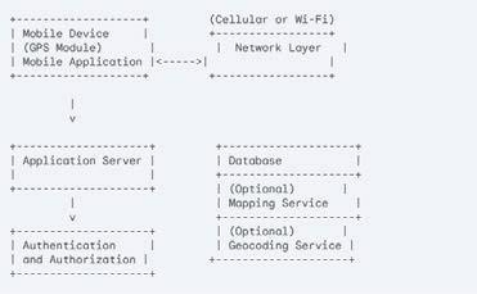

Figure 1 Project Methodology

Mobile Device represents the phone or device with the GPS module and the mobile application. Mobile Application is the software on the phone that interacts with the GPS module and sends location data to the server. Network Layer represents the cellular network or Wi-Fi connection that allows the phone to communicate with the server. Application Server is the server that receives location data from the phone, stores it in a database, and can send back information to the phone (like maps or navigation instructions). Database stores the location data collected from the mobile devices. (Optional components are shown below the dotted line). Mapping Service is an optional component that provides map data and functionalities to be displayed within the mobile application (Bishop, 2017). Geocoding Service is another optional component that converts addresses or landmarks into geographic coordinates. Authentication and Authorization manages user accounts, logins, and access controls (optional depending on the application). The arrows represent the flow of data between the components.

3. FINDINGS

Figure 2 showed that the battery consumption with location (GPS function) is turned on. It will be noticed when the GPS is turned on for navigation and active navigation, the battery drained per hour range from more than **6% to 15%**.

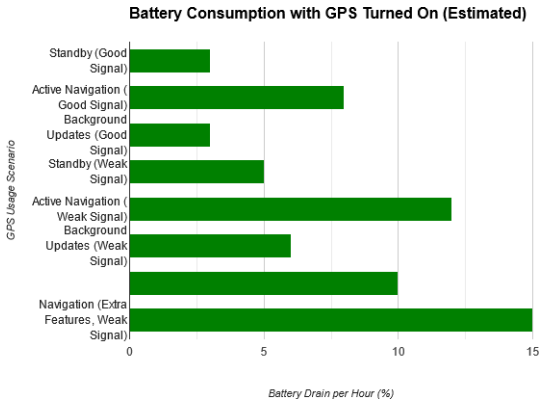

Figure 2 Battery Consumption Savoring the aroma, one bean at a time. (Font size 10)

Meanwhile, Figure 3 showed that the battery consumption with location (GPS function) is turned off. When GPS is turned off and the Background App is turned on, the Network-based GPS Tracking App showed that the battery consumption had a significant reduction at only 1% or 2%.

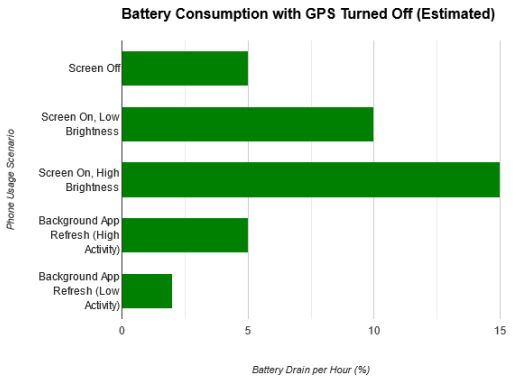

Figure 3 Battery Consumption with GPS Turned off

4. CONCLUSION

Network connections play a vital role in unlocking the full potential of GPS technology. Jiang (2015) mentioned that while offering numerous benefits, it's crucial to address privacy that concerns and ensure responsible data practices. As technology evolves, understanding the interplay between GPS and network connectivity will be vital for navigating the future of location-based services.

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