**PUV's Tracker: Enabling Commuters with Real-time GPS Monitoring & Routes of Active PUVs in Butuan City**

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6. **Related Works**

According to Berg et.al (2019), Most of the people’s mode of transportation is the use of public transportation. The public transit system is a crucial component of the city's transportation system because working professionals have a long daily commute (Ladha et.al, 2020). Also, to Muhammad et.al (2019) the attention paid to public transportation in cities has increased recently as a result of the world's population growth. People shouldn't have to wait for the bus for an extended period without knowing when it will arrive (Dharti et.al, 2018). The real-time update is very important to advance the Public Transportation System (Saad et.al, 2018). The global positioning system (GPS) is widely used in many different devices, such as GPS trackers and cellphones, and it offers essential information about the location of the vehicle at any time (Kazemeini et.al, 2022). The creation of a smartphone GPS tracking app offers various benefits over conventional survey methods and solves two of the major issues with earlier tracking technology by putting very little strain on the battery of the smartphone and needing almost no user effort (Marra et.al, 2019). To track the vehicle users wherein every vehicle will be observed and identified by an installed Internet Protocol (IP) address (Putra et.al, 2019). The use of this smartphone application benefits travelers because it enhances their experience when using public transportation (Fong et.al, 2019). One of the essential functions of high-quality services is to pay attention to public transportation to satisfy passengers (Anngraeni F., 2021).

**Gaps**

Many studies have explored global positioning system (GPS) tracker application on public transportation but only focuses on the time and arrival of the units.

1. **Problem of the Study**

The lack of visibility and real-time information about the location and availability of DATSCO’s PUVs in the community hinders efficient and informed transportation decisions. Community members are often unaware of the current whereabouts of DATSCO’s PUVs and whether they are still in operation. This leads to inconvenience, longer waiting times, and potential disruptions in travel plans.

Specific Problem

There is a need to develop a solution that enables community members to easily access up-to-date information about the location and operational status of DATSCO PUVs buses in real-time, improving overall transportation efficiency and passenger experience.

1. **Objective of the Study**

To develop the "DATSCO PUVs Tracker" application that enables commuters in Caraga Region to easily track the real-time location, availability, and routes of DATSCO’s PUVs, providing them with accurate and up-to-date information for efficient and informed commuters. The DATSCO’s real-time GPS tracker mobile application will provide convenience and assurance to the public for accessing the information on available public transportation options during late-night hours. The researchers intended to achieve the following specific objectives:

Specific Objective:

1. To create a real-time GPS tracker mobile application of DATSCO for public use.
2. Implement a reliable tracking system that provides accurate and up-to-date information on the number of active DATSOC’s PUVs in specific areas.
3. Incorporate a route tracking feature in the "DATSCO PUVs Tracker" application, enabling commuters to track the specific routes taken by DATSOC’s PUVs, ensuring they can choose the most convenient and efficient unit for their destination.
4. Develop a user-friendly mobile application, the "DATSCO PUVs Tracker," that allows commuters in Caraga Region to track the real-time location and availability of DATSCO PUVs on their daily routes.
5. **Scope**

The scope of this study only covers the development of the real-time GPS tracker mobile application of DATSO’s PUVs in the Caraga Region. This application will be used by the DATSCO PUVs and the public residing in Caraga Region.

**Limitation**

The DATSO’s PUVs tracking system's reliability and accuracy may be impacted by external factors including network connectivity and the availability of GPS signals. Not all community members may have access to cellphones or other gadgets required to access the DATSOC’s PUVs tracking system.

1. **Tech Stack**

* Unity Engine: Unity is used for developing the "DATSCO PUVs Tracker" application due to its robust features and cross-platform support.
* C#: C# is the scripting language used within Unity to implement the application's logic and functionality.
* GPS and Location Services: Integration with GPS and location services allows real-time tracking of DATSCO PUVs positions.
* Map Integration: Integration with a mapping service like Google Maps enables visual display of DATSOC’s PUVs locations and routes.
* Networking: Communication with a backend server facilitates real-time data retrieval, such as DATSOC’s PUVs availability and location.
* User Interface Design: Unity's visual editor enables the creation of an intuitive and user-friendly interface.
* Cross-platform Deployment: The application can be deployed on various platforms, ensuring wider accessibility.
* Database Integration: Database integration allows efficient storage and retrieval of relevant DATSOC’s PUVs data.
* Testing and Debugging: Unity provides tools for testing and resolving issues to ensure a stable application.

**References**

Berg, J., & Ihlström, J. (2019). The importance of public transport for mobility and everyday activities among rural residents. *Social Sciences*, *8*(2), 58.

Ladha, A., Bhattacharya, P., Chaubey, N., & Bodkhe, U. (2020, April). IIGPTS: IoT-based framework for intelligent green public transportation system. *In Proceedings of first international conference on computing, communications, and cyber-security* (IC4S 2019) (pp. 183-195). Singapore: Springer Singapore.

Saif, M. A., Zefreh, M. M., & Torok, A. (2019). Public transport accessibility: A literature review. *Periodica Polytechnica Transportation Engineering*, 47(1), 36-43.

Patel, D., Narmawala, Z., Tanwar, S., & Singh, P. K. (2019). A systematic review on scheduling public transport using IoT as tool. *Smart Innovations in Communication and Computational Sciences: Proceedings of ICSICCS 2017*, Volume 2, 39-48.

Saad, S. A., Ishak, M. H. I., Fauzi, M. H. M., Baharudin, M. A., & Idris, N. H. (2018, March). Real-time on-campus public transportation monitoring system. *In 2018 IEEE 14th International Colloquium on Signal Processing & Its Applications (CSPA)* (pp. 215-220). IEEE.

Kazemeini, A., Taheri, I., & Samimi, A. (2022). A GPS-based algorithm for brake and turn detection. *International Journal of Intelligent Transportation Systems Research*, 20(2), 433-445.

Marra, A. D., Becker, H., Axhausen, K. W., & Corman, F. (2019). Developing a passive GPS tracking system to study long-term travel behavior. *Transportation research part C: emerging technologies*, 104, 348-368.

Putra, A. S., Warnars, H. L. H. S., Gaol, F. L., Soewito, B., & Abdurachman, E. (2018, September). A Proposed surveillance model in an Intelligent Transportation System (ITS). *In 2018 Indonesian association for pattern recognition international conference (INAPR)* (pp. 156-160). IEEE.

Fong, S. L., Chin, D. W. Y., Abbas, R. A., Jamal, A., & Ahmed, F. Y. (2019, June). Smart city bus application with QR code: a review. *In 2019 IEEE International Conference on Automatic Control and Intelligent Systems (I2CACIS)* (pp. 34-39). IEEE.

Anggraeni, F. N. (2021). ANALYSIS OF USER SATISFACTION OF PUBLIC TRANSPORTATION OJEK ONLINE (GOJEK) THROUGH SERVICE INSTRUMENTS. *AKADEMIK: Jurnal Mahasiswa Ekonomi & Bisnis*, *1*(2), 77-86.