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Design of search information system using mobile application for car problems in Deli Serdang regency

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ABSTRACT

We successfully developed the mobile program that can solve the car problems that may be difficult to find the location of garage service. We developed MyBengkel as the solution of the problems between car owners and garage location. We delve into the common types of car problems encountered by drivers and explore the methods used to diagnose and resolve them. From routine maintenance to complex repairs, we will discuss the underlying causes of these issues and examine the technologies and tools employed in modern automotive diagnostics. The location interest in Deli Serdang regency and ist surrounding. The data compilation shows the total casualties in 2021 and 2022 is ranging at 80 – 120 cases in Deli Serdang with various roads type. This application makes it easy to get information on car problems facilities, appropriate prices and boarding car and garage service locations for local peoples and increases promotional opportunities for the garage owners in Deli Serdang locations.

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1. INTRODUCTION

The development of information technology makes it very easy to exchange information to solve various kinds of problems. Currently, improvements in technology play a role in conveying various information to users regarding many problems such as in the fields of education, scientific research tourism, business and almost all human needs; The rapid development of technology also makes it easier for people to get various information easily and quickly, such as the boarding car search system (Nurana et al., 2021)**.** In modern society, cars play an indispensable role in daily life, providing convenience, mobility, and independence. However, like any complex machinery, cars are susceptible to various issues and problems that can range from minor nuisances to serious safety concerns. These problems can arise from mechanical components, electrical systems, or even from external factors such as road conditions or environmental influences (Pasari, Simanjuntak, Neha, et al., 2021)**.** Several mobile apps have been successfully addressed car diagnostic such as RPM (revolutions per minute) and TPS (throttle position sensor) via OBDII, a mathematical model is created to forecast the fuel consumption of automobiles. The engine RPM and TPS model factors have a significant impact on the fuel consumption. It can be observed that the model with instantaneous engine RPM, TPS, and (RPM, TPS) can fairly accurately estimate fuel consumption (Setiyanto et al., 2019; Pompili et al., 2012; Sihotang et al., 2024).

Understanding and diagnosing car problems require a blend of technical knowledge, diagnostic skills, and sometimes, a bit of intuition. Whether it's a mysterious engine noise, a malfunctioning electrical system, or a persistent performance issue, each problem presents a

unique challenge to both car owners and professional mechanics alike (Setiyanto et al., 2019). In this paper, we delve into the common types of car problems encountered by drivers and explore the methods used to diagnose and resolve them. From routine maintenance to complex repairs, we will discuss the underlying causes of these issues and examine the technologies and tools employed in modern automotive diagnostics Furthermore, we will highlight preventive measures that can help mitigate the occurrence of these problems, thereby promoting safer and more reliable vehicle operation (Simanjuntak & Muksin, 2022). By exploring the intricacies of car problems and their solutions, this paper aims to equip readers with a deeper understanding of automotive troubleshooting and maintenance. Ultimately, enhancing our knowledge of car problems not only improves our ability to maintain vehicles but also contributes to safer roads and more efficient transportation systems. In today's automotive landscape, the complexities of vehicle maintenance and troubleshooting demand efficient and accessible solutions (Simanjuntak et al., 2023). As car owners and enthusiasts strive to maintain their vehicles in optimal condition, the integration of technology through applications has revolutionized how we diagnose, monitor, and resolve car problems (Hududillah et al., 2017).

This paper explores the development and functionality of a dedicated application designed to streamline the process of identifying and addressing human common problems in different cases). Such applications leverage the power of mobile devices and connectivity to provide real-time diagnostics, maintenance schedules, and personalized recommendations tailored to individual vehicles (Asnawi, Simanjuntak, Muksin, Okubo, et al., 2022). The proliferation of smart sensors, onboard diagnostics, and data analytics has empowered these applications to offer insights into a vehicle's health that were once reserved for professional mechanics (Idha, Sari, Humaidi, et al., 2023). By harnessing the capabilities of these technologies, car problem applications not only enhance convenience for users but also contribute to safer and more reliable vehicle operation. (Irwandi et al., 2021). Throughout this paper, we will examine the key features and benefits of car problem applications, discuss their impact on automotive maintenance practices, and explore case studies where such technologies have made a tangible difference in vehicle reliability and performance. Additionally, we will address considerations such as data security, usability, and the evolving landscape of automotive software (Angela & Gani, 2016). By delving into the realm of car problem applications, this paper aims to provide a comprehensive understanding of how technology continues to reshape the automotive industry, empowering users to take proactive measures in maintaining their vehicles and ensuring a driving experience (Irwandi et al., 2021).

2. RESEARCH METHOD

Developing a mobile application involves a systematic approach to ensure usability, functionality, and user satisfaction. This section outlines the research methods utilized to guide the development and refinement of the application, focusing on understanding user needs, evaluating competitors, and validating design (Pompili et al., 2012). A mobile application, commonly referred to as an "app," is software designed to run on mobile devices such as smartphones and tablets. These applications are tailored to utilize the unique capabilities of mobile platforms, offering functionalities that range from games and social networking to productivity tools and e-commerce. Mobile apps are typically downloaded and installed from app stores like Google Play for Android and the App Store for iOS (Pasari, Simanjuntak, Mehta, et al., 2021).

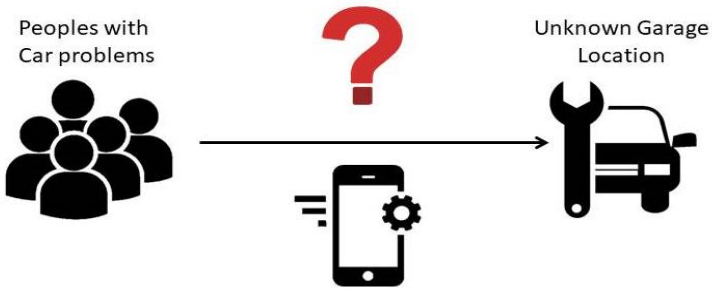

Figure 1. The problem in nowadays when peoples have car problems and difficult to find the location of car garage and this study aims to provide the solution

They enhance user experiences by providing access to content, services, and tools directly from handheld devices, such as GPS, camera, and touch interfaces for intuitive (Binarso Yusi Ardi, Sarwoko Eka Adi, 2012). Furthermore, the features of the mobile application have 7 common benefits such as: User Research conducted to gather insights into user preferences, pain points, and expectations regarding similar applications (Simanjuntak & Olymphia, 2017)**.** Also, persona development can create representative profiles of target users, guiding design and feature prioritization. Furthermore, market analysis to examine existing applications to identify strengths, weaknesses, and gaps in the market. (Pompili et al., 2012)**.** Researched current trends in mobile app design, functionality, and user expectations relevant to the application's domain. Iteratively designed and tested wireframes and prototypes to visualize user interfaces and gather early feedback. Usability testing conduct usability tests with prototypes to evaluate navigation, user flow, and overall user experience (Idha, Sari, Humaidi, et al., 2023)**.**

Development and Iteration: Agile Development: Adopted an agile methodology to facilitate continuous improvement and responsiveness to changing requirements. Feedback Loops: Incorporated user feedback from testing phases into subsequent iterations to refine features and address usability issues. Evaluation and Validation: Released beta versions to a limited group of users to gather feedback on performance, stability, and feature satisfaction. Metrics Analysis: Utilized analytics tools to track user engagement, retention rates, and feature usage to inform further development priorities (Pompili et al., 2012)**.**

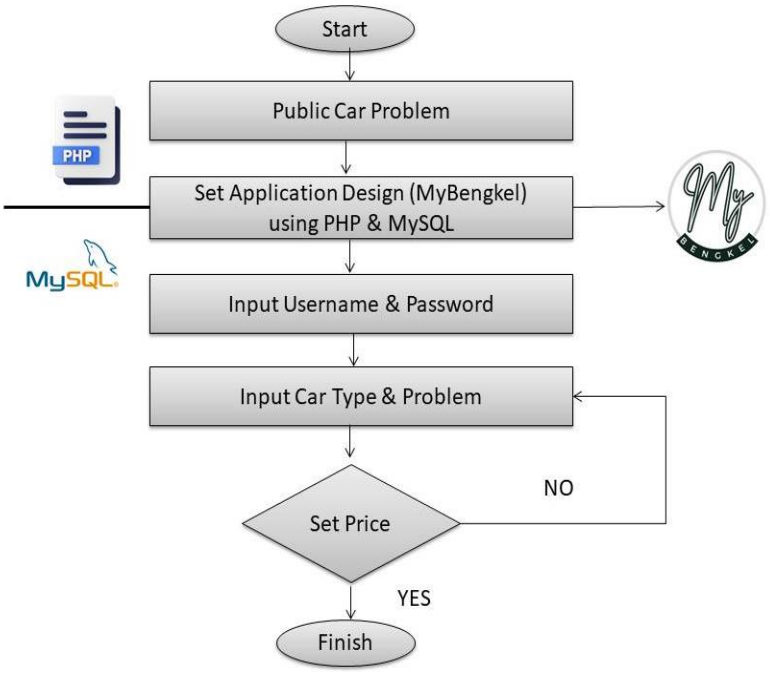

Figure 2. The flowchart of this study

Ensured compliance with data protection regulations and implemented measures to safeguard user data and privacy. Informed Consent: Obtained informed consent from participants involved in user research and testing phases. (Yusmaida et al., 2020)**.** Tools and Technologies: Development Tools: Utilized IDEs (Integrated Development Environments), version control systems, and collaboration platforms to streamline development and communication. Testing Tools: Employed automated testing frameworks and device emulators/simulators to ensure compatibility across different platforms (Pasari, Simanjuntak, Mehta, et al., 2021)**.**

PHP (Hypertext Preprocessor)

PHP is a programming language that runs on Server-Side Scripting, meaning that this language certainly cannot be displayed on browser website pages and can also be used to create website-based games, which is different from the Javascript programming language that runs on

Client-Side Scripting. Furthermore, PHP (Hypertext Preprocessor) is a widely-used server-side scripting language primarily designed for web development. It powers dynamic websites by embedding its code within HTML, enabling the creation of interactive and dynamic content (Pasari, Simanjuntak, Mehta, et al., 2021)**.** PHP is versatile, supporting various databases, web servers, and operating systems. It simplifies tasks like form handling (Arief & Mujiastuti, 2022), file processing, and database integration, making it a popular choice for developing web applications ranging from simple blogs to complex enterprise solutions (Binarso Yusi Ardi, Sarwoko Eka Adi, 2012)**.**

For example, create a calculating program on a website and want to multiply three numbers using the PHP programming language. First, create a form to calculate multiplication with these three numbers. After that, create a PHP programming script to manage these three numbers. And now the final result of the form that we created using Client-Side Scripting and the PHP programming language that we created will be uploaded to the server (Sihotang et al., 2024)**.** Next, if the user uses the website, the user will go to the server page and the user's position is the client. Next, the user will enter numbers in the form that we created and the function of the PHP language is to manage or calculate these number and shows the final result of the number calculation to the client or user (Simanjuntak & Olymphia, 2017)**.**

MySQL

MySQL is a database management system that is open source. MySQL is a relational database management system. MySQL is a widely-used open-source relational database management system (RDBMS) known for its reliability, flexibility, and performance. It allows users to store, manage, and retrieve data organized in tables using Structured Query Language (SQL) (Nurana et al., 2021). MySQL supports various data types, transactions for ensuring data integrity, and features like indexing for efficient data retrieval. It is favored for web applications, data-driven websites, and business applications due to its scalability, robustness, and ease of integration with other technologies (Sari et al., 2023)**.** This means that the data managed in the database will be placed in several separate tables so that data manipulation will be much faster. SQL can also be interpreted as a standard interface for relational management systems, including systems operating on personal computers. SQL allows a user to know where something is located, or how the information is organized (Idha, Sari, Humaidi, et al., 2023) SQL is easier to use than programming languages, but complicated compared to spreadsheet and data processing software. A simple SQL statement can generate a set of requests for information stored on different computers, requiring a lot of time and computing resources (Idha, Sari, Asnawi, et al., 2023).

3. RESULTS AND DISCUSSIONS

This application was built to help peoples that have several car problems, starting from prices, facilities and location of the garage car in the Deli Serdang district. This application also makes it easier for car owners to promote their boarding car problems. The system was tested with thirty-five (35) car engine sounds according to the test categories of the system. Initial recordings were done in different environment conditions and in different places. These recorded sounds were processed and used for system tests (Setyadi & Qohar, 2017)**.** The succeeding section shows the performance results of the developed application. The reference audio sounds were taken from Honda Civic cars with year model ranging from 1996 to 2000. The results show that the system is capable of total recognition at a rate of 56%. Fuel, timing and battery problems are 100% recognized. The fuzzy logic implementation in the Android platform is complete at a rate of 100%. The crisp output of the system is the same as with the Matlab output.

Figure 3. Design logo of MyBengkel for the program application

This study also explored in using the designed Android application with other car models though the variability in the mechanical design of the engines (H Simanjuntak dan Muksin Umar, 2018)**.** The ESA seems to be of no good when it comes to other car models considered in this study. Though the reference is taken from a Civic, results show that a Sentra could possibly have the same response with the reference. Jazz and Getz got 33.33% a piece while City has 25% (Asnawi, Simanjuntak, Muksin, Rizal, et al., 2022)**.**

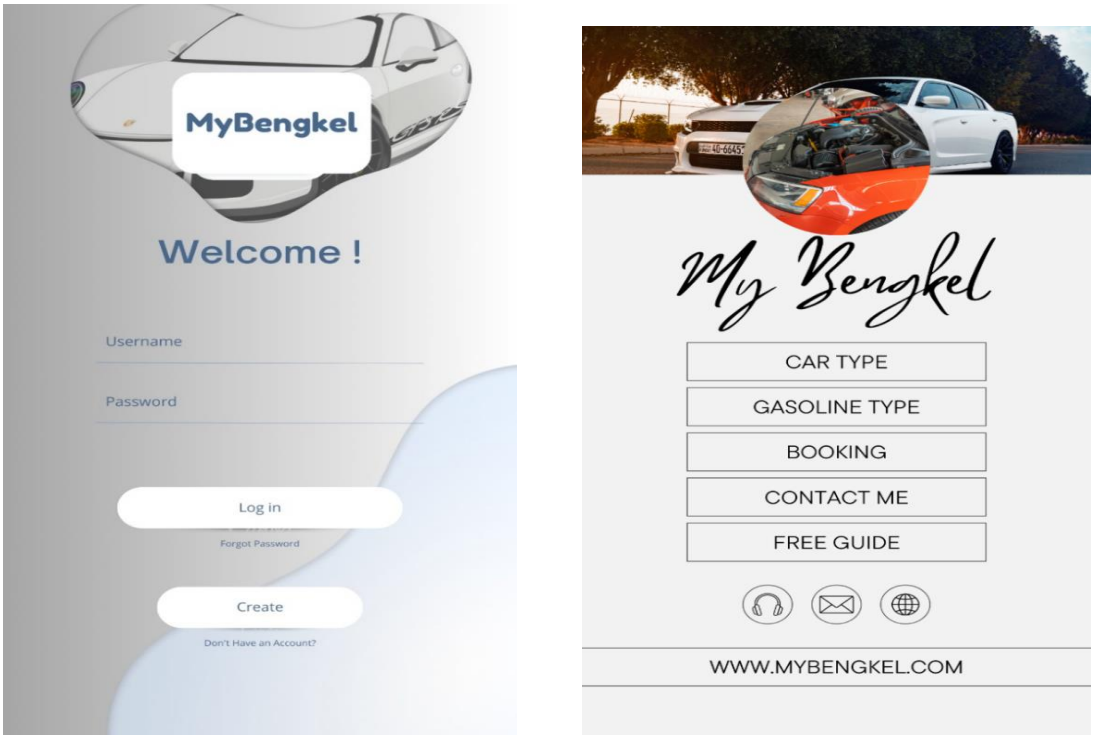

Figure 4. The application program of MyBengkel as the android program

The design of start menu with login menu (left) and the menu for the application that contains of several problems chosen. This study was able to design and implement an acoustic based car engine fault diagnostic system running using the Android platform (Sari et al., 2023). An algorithm was made to work in order to analyze the sound coming from the car's engine using the correlation coefficients obtained from two distinct clustering methods of the power density of the spectrum (Pasaribu et al., 2019)**.**

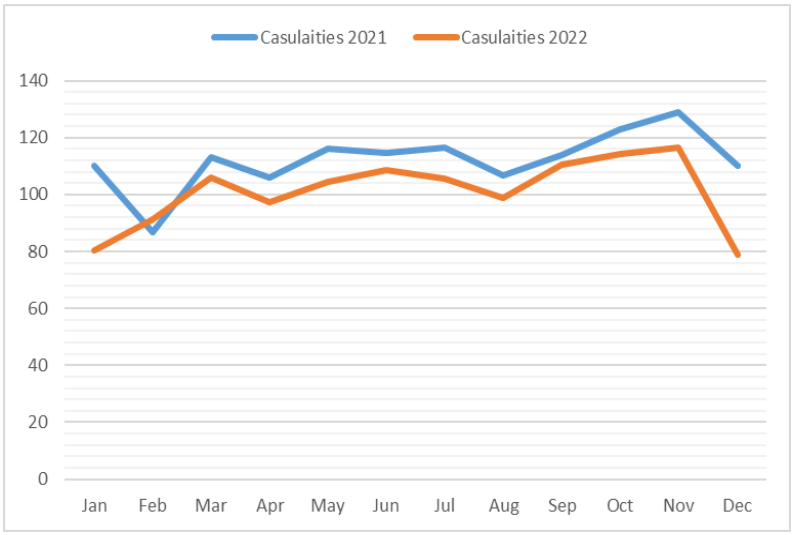

Figure 5. Graph shows the total causalities from input in the mobile application in 2021 and 2022

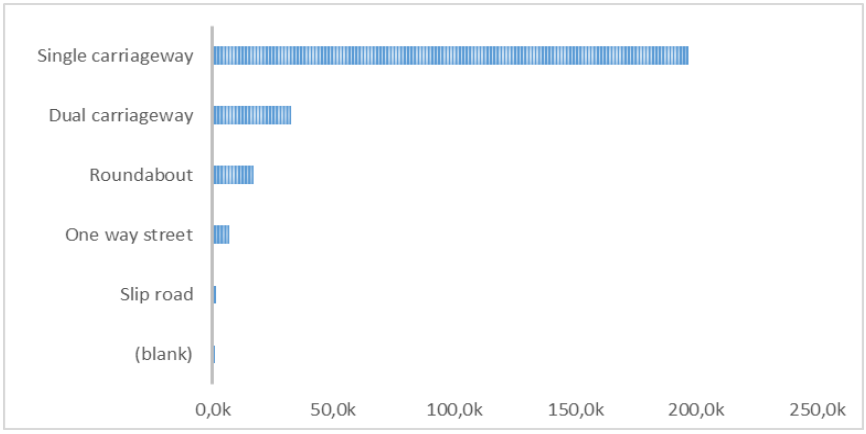

Figure 6. Graph shows the total car accident by roads type from global compilation and input data

The implementation of fuzzy logic in the Android platform performed well as the results show a complete match between the crisp values from the Android platform and the crisp values obtained from the fuzzy logic toolbox in Matlab (Darwis et al., 2019)**.** A graphical user interface was designed in order to control the functionality of the system. The GUI is equipped with button controls and display menus for result visualization. The car engine diagnosis was performed at varying level of recognition rate. Thus, in most of the car models used in this study, the recognition rate is acceptably high. The system was tested first using the reference cars then, to other car models, to see the applicability of the system's usage (Ansari et al., 2024)**.** Processing car problems such as machine, gasoline, interior and exterior, is carried out by the car owner and also the admin. Meanwhile, seekers can see the location and the problem of their car with reasonable price. (Simanjuntak & Olymphia, 2017)**.** This application was built using the PHP programming language and MySQL as the database. The following displays the home page and registration page on the web-based boarding search application. The home page is the main page used by boarding car seekers to get the required boarding car information, and is also used by boarding car seekers which can be accessed recently (Binarso Yusi Ardi, Sarwoko Eka Adi, 2012).

4. CONCLUSION

This research designs and builds a web-based and mobile application boarding car problem search application which aims to help peoples that have car accidents**.** The location interest in Deli Serdang regency and its surrounding. The mobile applications is designed to be expanded outside Deli Serdang in the near future to solve several car accidents. The data compilation shows the total

casualties in 2021 and 2022 is ranging at 80 – 120 cases in Deli Serdang with various roads type. This application makes it easy to get information on car problems facilities, appropriate prices and boarding car and garage service locations for local peoples and increases promotional opportunities for garage owners**.** Because auto accidents happen frequently and require flow economics to locate auto services and expedite problem-solving, the app will offer major advancements in both social and economic aspects in the Deli Serdang region.

REFERENCES

Angela, W., & Gani, A. (2016). Rancang Bangun Game Edukasi Berbasis Web Dan Android Menggunakan Adobe Flash Cs5 Dan Action Script 3.0. *IJIS - Indonesian Journal On Information System*, *1*(2), 78. https://doi.org/10.36549/ijis.v1i2.19

Ansari, K., Walo, J., Simanjuntak, A. V. H., & Wezka, K. (2024). Crustal deformation from GNSS measurement and earthquake mechanism along Pieniny Klippen Belt, Southern Poland. *Arabian Journal of Geosciences*, *17*(6). https://doi.org/10.1007/s12517-024-11983-8

Arief, D. N., & Mujiastuti, R. (2022). Perancangan Game Gunting-Batu-Kertas Berbasis Web. *Jurnal Sistem Informasi, Teknologi Informasi Dan Komputer*, *12*(3), 17–26.

Asnawi, Y., Simanjuntak, A., Muksin, U., Rizal, S., Syukri, M., Maisura, M., & Rahmati, R. (2022). Analysis of Microtremor H/V Spectral Ratio and Public Perception for Disaster Mitigation. *International Journal of GEOMATE*, *23*(97), 123–130. https://doi.org/10.21660/2022.97.3311

Asnawi, Y., Simanjuntak, A. V. H., Muksin, U., Okubo, M., Putri, S. I., Rizal, S., & Syukri, M. (2022). Soil classification in a seismically active environment based on join analysis of seismic parameters. *Global Journal of Environmental Science and Management*, *8*(3), 297–314. https://doi.org/10.22034/gjesm.2022.03.01

Binarso Yusi Ardi, Sarwoko Eka Adi, B. N. (2012). Pembangunan Sistem Informasi Alumni Berbasis Web Pada Program Studi Teknik Informatika Universitas Diponogoro. *Journal of Informatics and Technology*, *1*(1), 72–84. https://ejournal3.undip.ac.id/index.php/joint/article/view/434

Darwis, D., Pasaribu, A. F., & Surahman, A. (2019). Sistem Pencarian Lokasi Bengkel Mobil Resmi Menggunakan Teknik Pengolahan Suara Dan Pemrosesan Bahasa Alami. *Jurnal Teknoinfo*, *13*(2), 71. https://doi.org/10.33365/jti.v13i2.291

H Simanjuntak dan Muksin Umar, A. V. (2018). Analisis Mekanisme Fokal Menggunakan Inversi Waveform; Studi Kasus Gempa Bumi Pidie Jaya 7 Desember 2016. *J. Aceh Phys. Soc*, *7*(3), 127–132. http://www.jurnal.unsyiah.ac.id/JAcPS

Hududillah, T. H., Simanjuntak, A. V. H., & Husni, M. (2017). Identification of active fault using analysis of derivatives with vertical second based on gravity anomaly data (case study: Seulimeum fault in Sumatera fault system). *AIP Conference Proceedings*, *1857*, 0–7. https://doi.org/10.1063/1.4987063

Idha, R., Sari, E. P., Asnawi, Y., Simanjuntak, A. V. ., Humaidi, S., & Muksin, U. (2023). 1-Dimensional Model of Seismic Velocity after Tarutung Earthquake 1 October 2022 Mw 5.8. *Journal of Applied Geospatial Information*, *7*(1), 825–831. https://doi.org/10.30871/jagi.v7i1.5662

Idha, R., Sari, E. P., Humaidi, S., Simanjuntak, A. V. H., & Muksin, U. (2023). Response of Geologic Units to The Ground Parameters of Tarutung Earthquake 2022 Mw 5.8: A Preliminary Study. *IOP Conference Series: Earth and Environmental Science*, *1288*(1). https://doi.org/10.1088/1755-1315/1288/1/012032

Irwandi, I., Muksin, U., Asrillah, Simanjuntak, A. V. H., & Asrurifak. (2021). Probabilistic seismic hazard map analysis for Aceh Tenggara district and microzonation for Kutacane city. *IOP Conference Series: Earth and Environmental Science*, *630*(1). https://doi.org/10.1088/1755-1315/630/1/012001

Nurana, I., Simanjuntak, A. V. H., Umar, M., Kuncoro, D. C., Syamsidik, S., & Asnawi, Y. (2021). Spatial Temporal Condition of Recent Seismicity In The Northern Part of Sumatra. *Elkawnie*, *7*(1), 131. https://doi.org/10.22373/ekw.v7i1.8797

Pasari, S., Simanjuntak, A. V. H., Mehta, A., Neha, & Sharma, Y. (2021). A synoptic view of the natural time distribution and contemporary earthquake hazards in Sumatra, Indonesia. *Natural Hazards*, *108*(1), 309–321. https://doi.org/10.1007/s11069-021-04682-0

Pasari, S., Simanjuntak, A. V. H., Neha, & Sharma, Y. (2021). Nowcasting earthquakes in Sulawesi Island, Indonesia. *Geoscience Letters*, *8*(1). https://doi.org/10.1186/s40562-021-00197-5

Pasaribu, A. F. O., Darwis, D., Irawan, A., & Surahman, A. (2019). Sistem Informasi Geografis Untuk Pencarian Lokasi Bengkel Mobil Di Wilayah Kota Bandar Lampung. *Jurnal Tekno Kompak*, *13*(2), 1. https://doi.org/10.33365/jtk.v13i2.323

Pompili, M., Serafini, G., Innamorati, M., Montebovi, F., Palermo, M., Campi, S., Stefani, H., Giordano, G., Telesforo, L., Amore, M., & Girardi, P. (2012). Car accidents as a method of suicide: A comprehensive overview. *Forensic Science International*, *223*(1–3), 1–9. https://doi.org/10.1016/j.forsciint.2012.04.012

Sari, E. P., Idha, R., Asnawi, Y., Simanjuntak, A., Humaidi, S., & Muksin, U. (2023). Faulting Mechanism of Tarutung Earthquake 2022 Mw 5.8 Using Moment Tensor Inversion. *Journal of Applied Geospatial Information*, *7*(1), 840–846. https://doi.org/10.30871/jagi.v7i1.5663

Setiyanto, R., Nurmaesah, N., & Rahayu, N. S. A. (2019). Perancangan Sistem Informasi Persediaan Barang Studi Kasus di Vahncollections. *Jurnal Sisfotek Global*, *9*(1), 137–142. https://doi.org/10.38101/sisfotek.v9i1.267

Setyadi, D., & Qohar, A. (2017). Pengembangan Media Pembelajaran Matematika Berbasis Web Pada Materi Barisan Dan Deret. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *8*(1), 1–7. https://doi.org/10.15294/kreano.v8i1.5964

Sihotang, B., Humaidi, S., & Simanjuntak, A. V. H. (2024). *An updated 1-dimensional seismic velocity model has been developed for the M w 6 . 1 Pasaman earthquake that occurred on February 25 , 2022*. *8*(1), 12–18.

Simanjuntak, A. V. H., & Muksin, U. (2022). A preliminary result of microtremor study to identify the subsurface condition in the Aceh Tenggara region. *E3S Web of Conferences*, *340*, 2–6. https://doi.org/10.1051/e3sconf/202234001018

Simanjuntak, A. V. H., Muksin, U., Arifullah, A., Lythgoe, K., Asnawi, Y., Sinambela, M., Rizal, S., & Wei, S. (2023). Environmental vulnerability characteristics in an active swarm region. *Global Journal of Environmental Science and Management*, *9*(2), 211–226. https://doi.org/10.22034/gjesm.2023.02.3

Simanjuntak, A. V. H., & Olymphia. (2017). Menggali Kebudayaan dan Arsitektur Desa Tenganan Bali. *Perbandingan Energi Gempa Bumi Utama Dan Susulan (Studi Kasus : Gempa Subduksi Pulau Sumatera Dan Jawa)*, *14*, 73–80.

Yusmaida, Y., Neneng, N., & Ambarwari, A. (2020). Sistem Informasi Pencarian Kos Berbasis Web Dengan Menggunakan Metode Hill Climbing. *Jurnal Teknologi Dan Sistem Informasi*, *1*(1), 68–74. https://doi.org/10.33365/jtsi.v1i1.212