

ABSTRAK

Penelitian ini membahas permasalahan distribusi lahan parkir yang belum optimal, di mana penentuan area parkir masih dilakukan secara manual oleh petugas keamanan berdasarkan pengamatan visual yang bersifat subjektif. Penelitian ini bertujuan untuk membangun aplikasi pengelolaan area parkir dengan penerapan algoritma fuzzy metode Tsukamoto berbasis *mobile* dan basis data firebase. Aplikasi ini dikembangkan menggunakan metode pengembangan perangkat lunak Agile Extreme Programming (XP). Pendekatan penelitian yang digunakan adalah kualitatif, dengan teknik pengumpulan data melalui wawancara, observasi, dan dokumentasi. Hasil penelitian menunjukkan bahwa aplikasi yang dibangun mampu mengoptimalkan distribusi lahan parkir serta meningkatkan keamanan kendaraan. Algoritma Fuzzy Tsukamoto terbukti memberikan rekomendasi area parkir secara akurat. Selain itu, implementasi metode Agile XP menghasilkan sistem yang terstruktur dengan baik melalui tahapan *planning*, *design*, *coding*, dan *testing*, sehingga menghasilkan perangkat lunak yang lebih stabil dan adaptif untuk pengembangan di masa depan.

Kata kunci: Fuzzy metode Tsukamoto, Agile Extreme Programming (XP), Java, Firebase, sistem pendukung keputusan.

ABSTRACT

This study addresses the issue of suboptimal parking space allocation, where parking area assignments are still made manually by security personnel based on subjective visual observations. The study aims to develop a parking area management application by implementing the Tsukamoto fuzzy algorithm on mobile devices using the Firebase database. This application was developed using the Agile Extreme Programming (XP) software development methodology. The research approach employed was qualitative, with data collection techniques including interviews, observations, and documentation. The results show that the developed application is capable of optimizing parking space allocation and enhancing vehicle security. The Tsukamoto fuzzy algorithm was proven to provide accurate parking space recommendations. Furthermore, the application of the Agile XP methodology resulted in a well-structured system through the planning, design, programming, and testing phases, thereby producing more stable and adaptive software for future development.

Keywords: *Fuzzy Tsukamoto method, Agile Extreme Programming (XP), Java, Firebase, decision support system.*