UPPAAL-based Design and Analysis of Intelligent Parking System

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Abstract : The demand for parking spaces in urban areas, particularly in developing countries, has led to a significant issue in the absence of sufficient parking spaces in crowded areas, which results in daily traffic congestion as drivers search for parking. This not only affects the appearance of the city but also has indirect impacts on the economy, society, and environment. In response to these challenges, researchers from various countries have sought technical and intelligent solutions to mitigate the problem through the development of smart parking systems. This paper aims to analyze and design three models of parking lots, with a focus on parking time and security. The study used computer software and Uppaal tools to simulate the models and determine the best among them. The results and suggestions provided in the paper aim to reduce the parking problems and improve the overall efficiency and safety of the parking process. The conclusion of the study highlights the importance of utilizing advanced technology to address the pressing issue of insufficient parking spaces in urban areas.

Keywords : preliminaries, system requirements, timed Au- tomata, Uppaal

Conference Title : ICB 2023 : International Conference on Botany

Conference Location : Phuket, Thailand

Conference Dates : February 20-21, 2023