Optimizing Multi-Mobility Systems in Smart Satellite Cities: A Case Study of Kiryu City, Japan

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Abstract

Like some other cities in Japan, Kiryu City faces challenges such as an aging population and over-reliance on automobiles, making the development of new transportation methods an urgent necessity. Therefore, efforts focused on multi-mobility optimization utilizing autonomous vehicle technologies have gained attention. One of the main challenges Kiryu City faces is the increased risk associated with elderly drivers. Additionally, the excessive dependency on private vehicles throughout Gunma Prefecture is a significant problem. Furthermore, securing transportation for elderly individuals who have surrendered their driver's licenses and the weakening of public transportation due to population decline are serious concerns. Hence, there is a demand for new mobility services that combine safety, reduced environmental impact, and convenience by solving these problems. Therefore, this research aims to construct effective mobility services using autonomous vehicle technologies. We are developing a smart satellite city simulator as part of this initiative. Using this simulator, we conduct simulation analysis and optimization of mobility services, employing Kiryu City as a model case. Specifically, it employs various autonomous mobility options to meet citizens' transportation needs while optimizing multiple objectives such as revenue, operational costs, and user satisfaction. Through these efforts, we examine business models and strategies for implementation after the technology is completed to realize a sustainable urban transportation system.

Keywords
Smart city, mobility service, optimization and autonomous vehicles.