先端科学技術研究科　修士論文要旨

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要旨

With the advancement of autonomous driving technologies, passengers are increasingly freed from conventional driving tasks, making in-car entertainment an important way to utilize travel time. However, engaging in entertainment activities inside the car may worsen motion sickness, and passengers may also feel anxious due to a reduced sense of control over the vehicle's operation. To improve the autonomous driving experience, this study explores an in-car VR game design approach that synchronizes the virtual vehicle's motion with the real vehicle's planned driving path and speed, while providing a virtual sense of control through interactive mechanisms to enhance enjoyment and mitigate motion sickness. We developed a VR coin-collection game in which a virtual car follows the route planned by the autonomous driving system. We then conducted a user study to examine two key design factors. The first factor was viewpoint, comparing first-person and third-person perspectives. The second factor was controllability, comparing controllable and non-controllable interaction modes. Together, these factors yielded a two-by-two experimental design with four conditions. Thirty participants experienced all conditions inside an autonomous vehicle and reported motion sickness, perceived control, immersion, and overall comfort via questionnaires and interviews. The results show that the first-person controllable condition provides the best overall experience: it significantly increases perceived control and engagement, while no evident motion-sickness responses were observed. These findings offer an implementable system design and empirical evidence for developing in-car VR entertainment in autonomous driving contexts.