Improving City-Bike in Hilly Cities:
A Transport Analytics and Modelling Study

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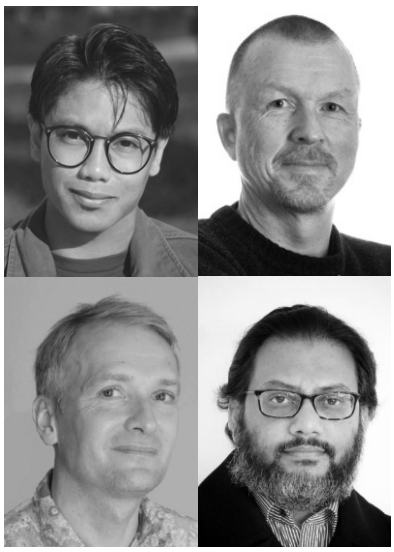

This PhD examines how city-bike systems can be enhanced in hilly cities through transport analytics and spatial modelling. Using Trondheim, Norway, as a case study, it explores how topography, climate, and policy influence ridership and how data-driven planning can support more inclusive and efficient systems.

The research proceeds in three stages. First, it analyses changes in city-bike usage between 2019 and 2024, linking variations in ridership to elevation, weather, accessibility, and policy integration with public transport. Second, it segments users into frequent, occasional, seldom, and one-time riders to uncover differences in spatial behaviour and route preference shaped by environment and infrastructure. Finally, it models optimal locations for new bike stations using grid-based spatial optimisation, comparing Weighted Linear Combination (WLC), Maximal Coverage Location Problem (MCLP), and Supervised Machine Learning Classifier (SMLC) approaches.

Together, these analyses advance understanding of cycling behaviour in challenging terrains and provide practical insights for designing equitable, data-informed bike-share networks.