

Research on forecasting the expansion of space for high-speed mobile internet networks in Ha Giang province

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Abstract: This study develops a predictive model for expanding high-speed mobile internet coverage in Ha Giang province, a mountainous region of northern Vietnam characterized by challenging topography and dispersed population centers. Utilizing spatial analysis and machine learning techniques, the research integrates geographic information system (GIS) data, current network infrastructure parameters, demographic density, and economic activity indicators to forecast optimal locations for future base station deployment. The model evaluates terrain obstacles, signal propagation constraints, and existing service gaps to prioritize areas with the highest demand and feasibility for 4G and 5G expansion. Findings indicate that approximately 35% of the province's communes currently lack adequate high-speed connectivity, with the most significant deficits in remote valleys and highland areas. The predictive framework demonstrates over 80% accuracy when validated against recent network upgrades, offering a cost-effective planning tool for telecommunications operators and policymakers. This research contributes to bridging the digital divide in rural Vietnam by providing data-driven recommendations for targeted infrastructure investment, ultimately supporting socio-economic development and equitable access to broadband services.

Keywords: Expanded forecast, cyberspace, high-speed mobile internet, Ha Giang