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# A microsimulation model to evaluate the demand of the national forest lodges

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**Abstract:**

In recent times, an increasing number of people are visiting mountains on weekends and holidays for health and leisure. This work aims to develop a microsimulation model that can accurately predict the demand for national forest lodges and identify areas where additional facilities are needed. Unlike previous studies that estimated potential demand based solely on the residential population in districts where the lodges are located, our model incorporates more factors, such as the location, accessibility, and capacity of the lodges, as well as household preferences. The model also accounts for temporal changes to enhance the accuracy of demand forecasting.

The main entity in the proposed model is a household. Each entity is characterised by household size, householder's age, and annual average income, and these attributes were assigned based on national household statistics. Every entity goes through four stages at each time instance: consideration, exploration, decision, and confirmation.

1. *Consideration*: The household decides whether or not they are willing to visit a forest lodge during that time instance.
2. *Exploration*: If the household is willing to visit, it searches for lodges that meet their preferences.
3. *Decision*: The household makes a final decision about the visit after considering travel distance and cost.
4. *Confirmation*: If the household decides to visit a lodge, the lodge stochastically accepts or rejects the household.

This process is repeated at every time instance. Over time, the entities may evolve, but interactions among the entities are assumed not to occur.

The model is validated using both hypothetical and empirical data sets. Figure 1 illustrates the hypothetical distributions of the population and lodges, along with the estimated demands for each lodge.

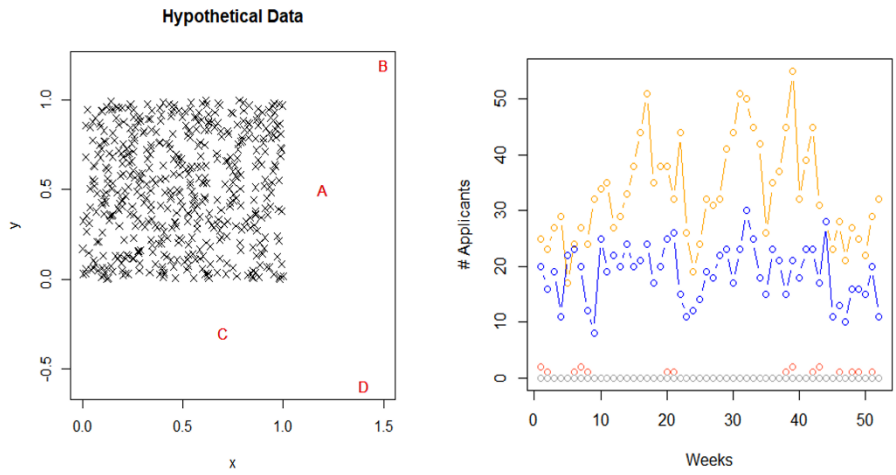


Figure 1. Hypothetical distributions of the population and lodges (left) and validation results (right)

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Preliminary results indicate that the location of lodges is crucial; lodges A and C, which are closer to the population, show much higher visitor density compared to the more distant lodges B and D. However, further validation with larger hypothetical data sets is needed to confirm this finding. For empirical validation, we will use natural recreation forest data from South Korea for 2019.

The ultimate goal of this study is to develop a model capable of addressing various policy-related questions, such as whether additional facilities should be added to existing overcrowded locations or if new facilities should be established in entirely new areas.

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