

# **Trip Production Modeling Using Fuzzy Inference System for Kirkuk City**

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## **A B S T R A C T**

A large number of deterministic and probabilistic mathematical approaches have been applied to address transportation planning process. The transportation planning data collected through a questionnaire survey process is usually associated with uncertainty subjectivity, imprecision, and ambiguity. In addition, some of the transportation planning variables is expressed by some linguistic terms. In this research, fuzzy logic is used to deal with the uncertainty, subjectivity and linguistic variables. In this research, Kirkuk city is selected as a case study. To collect data, this city is divided into eighteen internal zones and six external zones. Traffic, land use and socioeconomic characteristics data (car ownership, family income, employee number, family number, population, family size, time and cost of the trip, distance to the center and area of the dwelling) are collected from field surveys and questionnaires . To select the most effective input variables on trip production, a stepwise regression analysis is conducted by considering the effect of the individual input variable. Then, trip generation models are developed for the whole trip and according to trip purpose by using fuzzy inference system (FIS), for Kirkuk city in Iraq. The results show a high correlation for trip generation model for whole trips based fuzzy inference system. Moreover, the results show that the developed models for various trip purposes have very good accuracy in estimating trip production.