Predicion of subway usage by time according to weather

2023 Summer QI AI Program team C

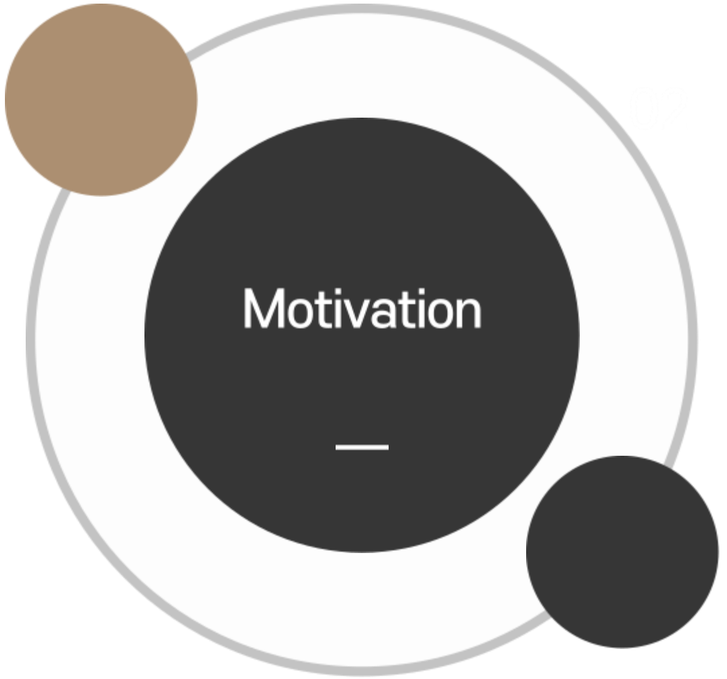
TEAM C

Index

Motivation

Increased demand for public transportation

Explosive Public Transportation Usage Increase After COVID-19



Few domestic studies on weather

In addition to the weather, most of the related studies have been conducted due to other factors such as delays and road conditions

Detailed Topic

Description

Temperature

Rainfall

Fine dust

Realated
Dataset

1. Information on the number of people getting on and off by daily time zone by Seoul Transportation Corporation station
Total row: 199080(line 2 in Seoul 36500) Column:26

2. Seoul Daily Weather Observation 2020-December data
Row: 44634 Column:10

3. Sensory temperature in Seoul (Source: Meteorological Data Open Portal of the Korea Meteorological Administration)
2020-05-01~2023-04-30 2 years
Row: 667 Column: 4

Related Studies

1. A Study on the Prediction of Public Transportaion Consumption in Seoul by Weather

A Study on the Prediction of Public Transportation Consumption in Seoul by Weather

Hee-Jin Kim*, Sujin OH**, Ung-Mo Kim***
*College of Natural Science, Sungkyunkwan University
**College of Information and Communication Engineering, Sungkyunkwan University
***College of Software, Sungkyunkwan University

요 약

현대 사회에서는 다양한 이동수단 중 지하철, 버스 등의 대중교통에 대한 수요가 높은 편이다. 본 연구의 배경이 되는 서울특별시의 경우에는 출퇴근 시, 과반 수 이상이 대중교통을 이용한다. 대중교통 이용량에는 날씨, 평일-주말, 연착, 도로현황 등 여러 가지에 원인을 둔다. 본 연구에서는 여러 요인 중에서도 날씨 데이터(기온, 강수량, 미세먼지)에 초점을 두어, 날씨에 따른 대중교통 이용량의 변화 양상을 학습하여 예측하는 연구를 진행한다. 서울특별시 25개 자치구마다의 날씨 데이터와 대중교통 이용 데이터를 이용하여 Regression을 통한 데이터 학습을 진행하였으며, 학습된 모델을 통한 날씨에 따른 서울특별시 대중교통 이용량 예측에 따른 평균 오차율은 15.49%로 낮은 오차율을 가진다. 본 연구 결과는 날씨에 따른 버스와 지하철의 배차 간격 조절 등의 대중교통 배치 판단 결정에 기초자료로 사용될 것으로 기대된다.

2. The Effect of Weather Conditions on Transit Ridership

최상기* · 이종호** · 오승훈***
Choi, Sang Gi*, Rhee, Jong Ho**, Oh, Seung Hwoon***

The Effect of Weather Conditions on Transit Ridership

ABSTRACT

In this study, the effects of weather conditions such as rainfall, discomfort index, snowfall, and sensible temperature on public transport demand in Seoul were analyzed using statistical data. The reasons were also derived from the survey. The data for the analysis were collected over the weekdays and weekends, and seasonal data of summer and winter were also gathered separately. Rainfall amount, discomfort index, and sensible temperature except snowfall amount, whose samples were insufficient, decreased the public transport demand by 2-7%. Rainfall amount and sensible temperature were statistically significant. Correlation analysis also showed that rainfall amount and sensible temperature are highly correlated with the demand. To find the reasons, the survey was conducted on citizens living in the Seoul Metropolitan Area. About 30% of the respondents wished to give up using bus when rainfall was heavy or temperature was low. On the contrary, auto and subway users increased by 10%. The results of this study could be used as the basic data when the public transportation planning or operation related policies according to the weather condition are concerned.

Key words : Weather condition, Bus demand, Subway demand

Differences from previous studies

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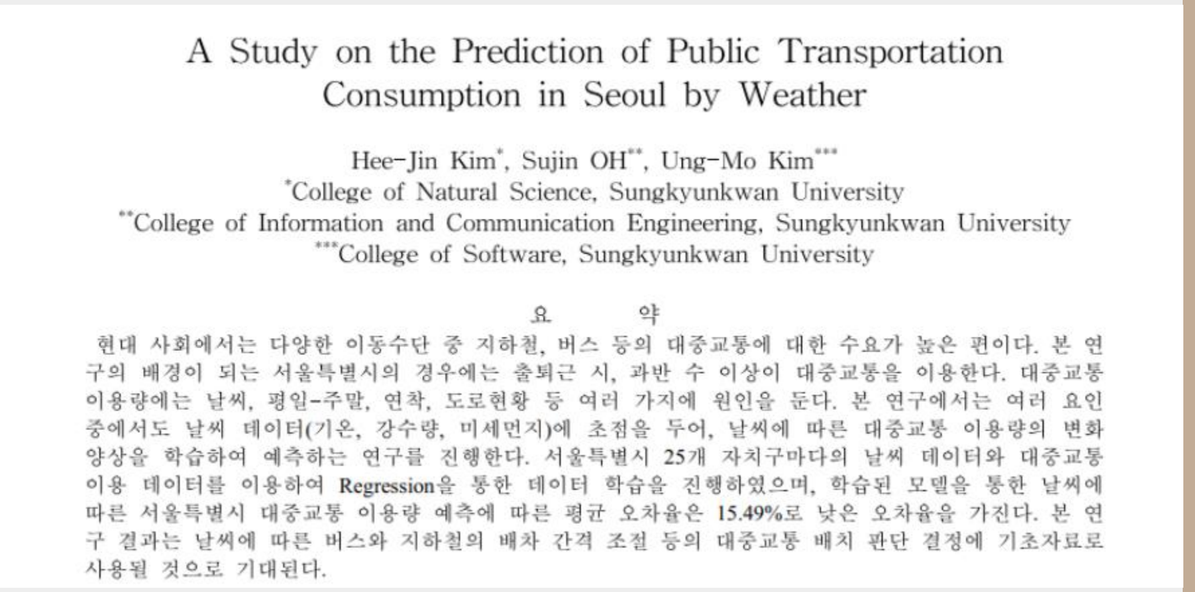

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- Using data from 2011 to 2015

- Temperature,
- wind speed,
- humidity, rainfall,
- presence or
- absence of rainfall

- The number of single passenger&transfer
- passenger

- Use the latest 2 years

- time,
- temperature,
- cumulative precipitation,
- wind volume,
- wind speed,
- humidity

- Get on and off information by time zone per day

Differences from previous studies

- Using python's library
- Monthly
- Using the Gaussian Process Regressor for validation data

- Using KNIME
- Daily and comparing them on an hourly basis
- adding weather data to sensible temperatures

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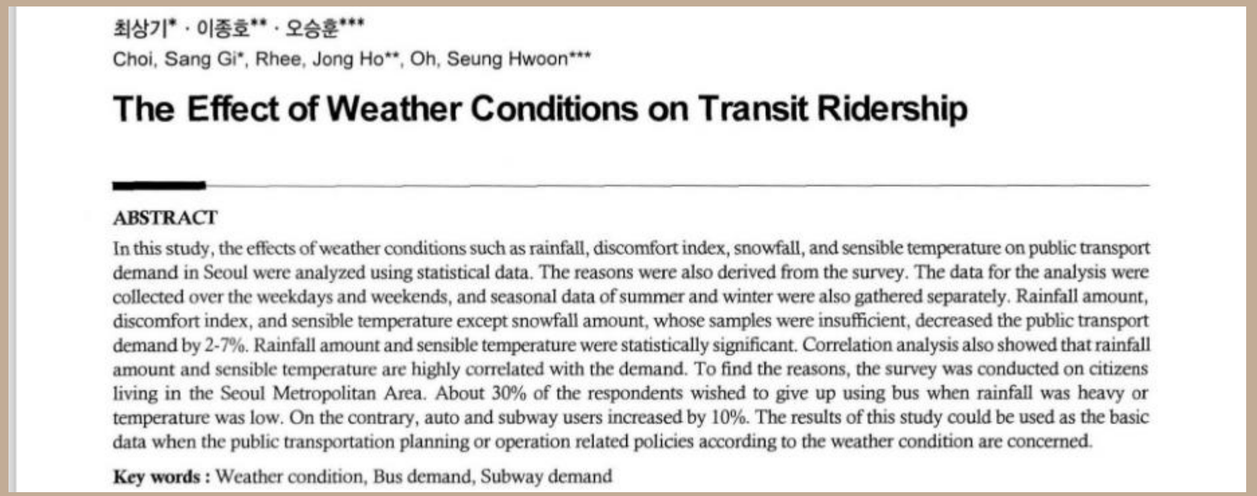

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THANK YOU