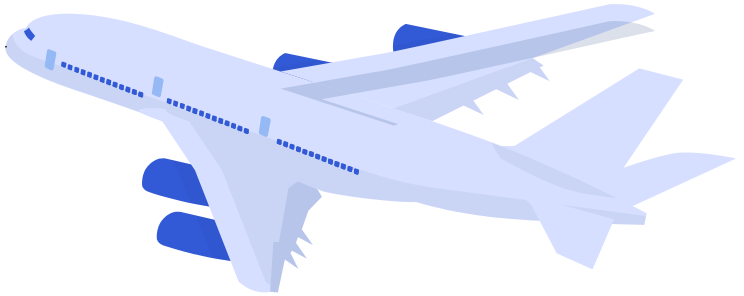
Selecting the optimal location for air taxis to relieve urban traffic congestion



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Background & Necessity

Introduction to the real-world problem

Background of This Project Proposal

Traffic congestion problems are frequent throughout the metropolitan area, including **Seoul.**

Necessity of This Project

Problems

Increased traffic congestion

- Limitations of existing transportation methods
- Large population in the metropolitan area

Alternative Solution

If both underground and above ground are blocked,

why not try using the sky?

2

Purpose of the Analysis

Proposal of the project

Purpose of the Analysis

Seoul Air Taxi, which can avoid congestion on the ground and has high speeds, will alleviate traffic problems.

Accordingly, if **Seoul Air Taxi** is introduced with sufficient consideration, it is expected to establish itself as a new transportation method that can realize both convenience of use and reduction of travel time.

3

Specific Plan for Data Acquisition

Plan for source and utilization of data

Data Acquisition Plan

• Select the best location for air taxi station for convenience of use and reduction of travel time, considering **expected users and traffic information**

• Transportation Data based on user characteristics
  - departure point, arrival point, user, purpose, time, etc.

• Regional Data with its characteristics
  - location, population, land price, etc.

• Constraint Data based on legal, noise problem
  - noise, flight restriction zone in Seoul, etc.

➔ **Acquisition from local governments and state agencies**

Data Acquisition Plan

1. Location Selection for Air-Taxi Station

- **The number of commuting time by various transportation usage according to user characteristics and region** - Korea Transport Database (www.ktdb.go.kr/)
- **Mileage by public transportation** - Ministry of Land, Infrastructure and Transport.: Transportation Card Big Data Integrated Information System (stcis.go.kr/)
- **Population Density** - Seoul Population Density (by district) Statistics - Seoul Open Data Plaza (data.seoul.go.kr/)
- **Income Level** - Household Characteristics Information – Ministry of Environment (bigdata-environment.kr)

국가공간정보포털 국토교통부 National Spatial Data Infrastructure Portal
국가교통DB KTDB Korea Transport DataBase
교통카드빅데이터 통합정보시스템
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DATA 공공데이터포털 .GO.KR
SGIS plus 통계지리정보서비스

Data Acquisition Plan

2. Flight Route Selection

- **Noise Problem**

- Considering population density, noise complaint data:
Seoul Open Data Plaza, National Statistical Office (data.seoul.go.kr/, kostat.go.kr)

- **Flight Restriction Zone**

- Ministry of Land, Infrastructure and Transport Flight Restriction Zone (data.go.kr/)

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Formulation & Expected Results

Expected methods to be used and result of analysis

Analysis Steps

Step1) Location Selection for Air-Taxi Station

1-1) Analysis of traffic volume in Seoul

1-2) Select top N candidates group based on traffic congestion

1-3) Spatial Clustering: Cluster regions with similar characteristics using K-means or DBSCAN.

1-4) Find more specific location considering salary_level, population density

1-5) Select optimal candidate area from each clustered region

***** Visualize candidate regions by creating a various kinds of map reflecting traffic and regional characteristics

Analysis Steps

STEP 2) Flight Route Selection

2-1) Considering zone where air-taxi cannot fly (ex. Air prohibition zone)
2-2) Using Dijkstra or BFS algorithm to select the optimal shortest path

STEP 3) Calculate route efficiency

3-1) Compare time required for distance to each station with existing transportation

Expected Result & Impact

1. Expected Result

- Optimized air taxi station location
- Efficient route planning

2. Expected Impact

- Traffic congestion reduction
- Time-saving
- Economic benefits

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Thank you