A Prototype of Smart Navigation Service
(idea contribution)

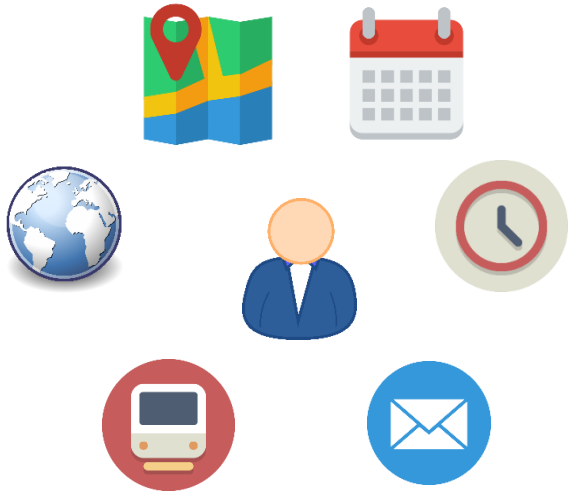
Chia Hung Kao (chkao@nttu.edu.tw)
Department of Applied Mathematics
National Taitung University, Taiwan

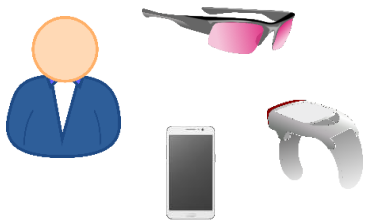
About Me

- Current Position
  - Assistant Professor, Department of Applied Mathematics, National Taitung University, Taiwan
- Education
  - Ph.D. Department of Electrical Engineering, National Cheng Kung University, Taiwan
- Research Interests
  - Software Engineering, Cloud Computing, Big Data Analytics
- Contact Information
  - https://sites.google.com/site/nttuchkao/
  - chkao@gm.nttu.edu.tw

Introduction

- Before a trip, travelers may arrange tourist destinations, plan a travel route, book a hotel accommodation, and reserve a restaurant through different online services
- During the trip, travelers can use smart devices to search for corresponding travel information preserved in different services





Introduction

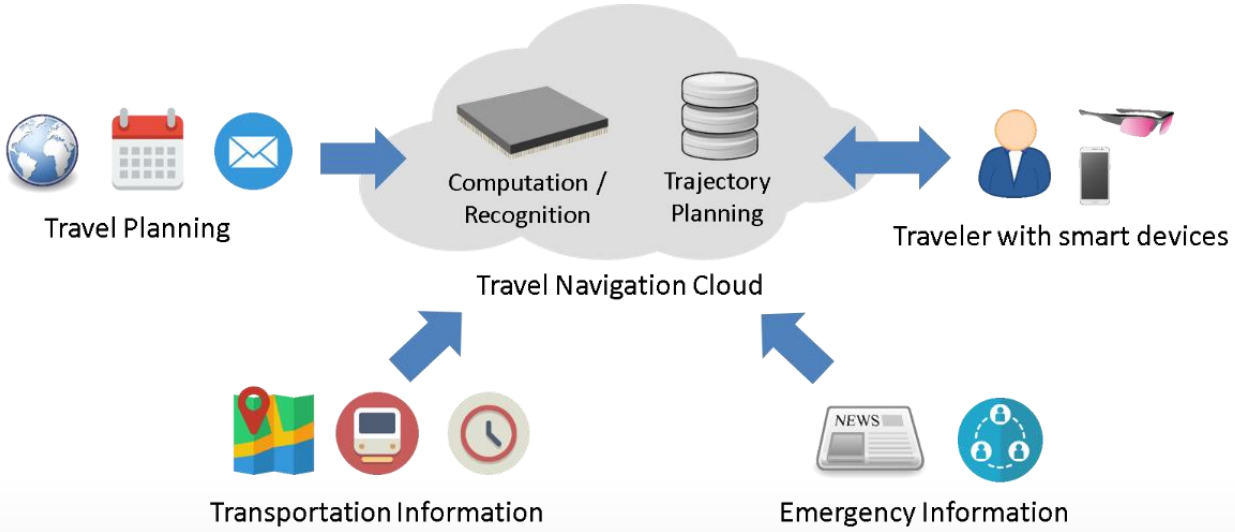
- Travelers need to manually perform several tasks through different services to achieve their purposes in the trip

- The scattering of travel information
  - Information associated with the trip could exist in several services, including online calendar, note applications, booking services, and mail services

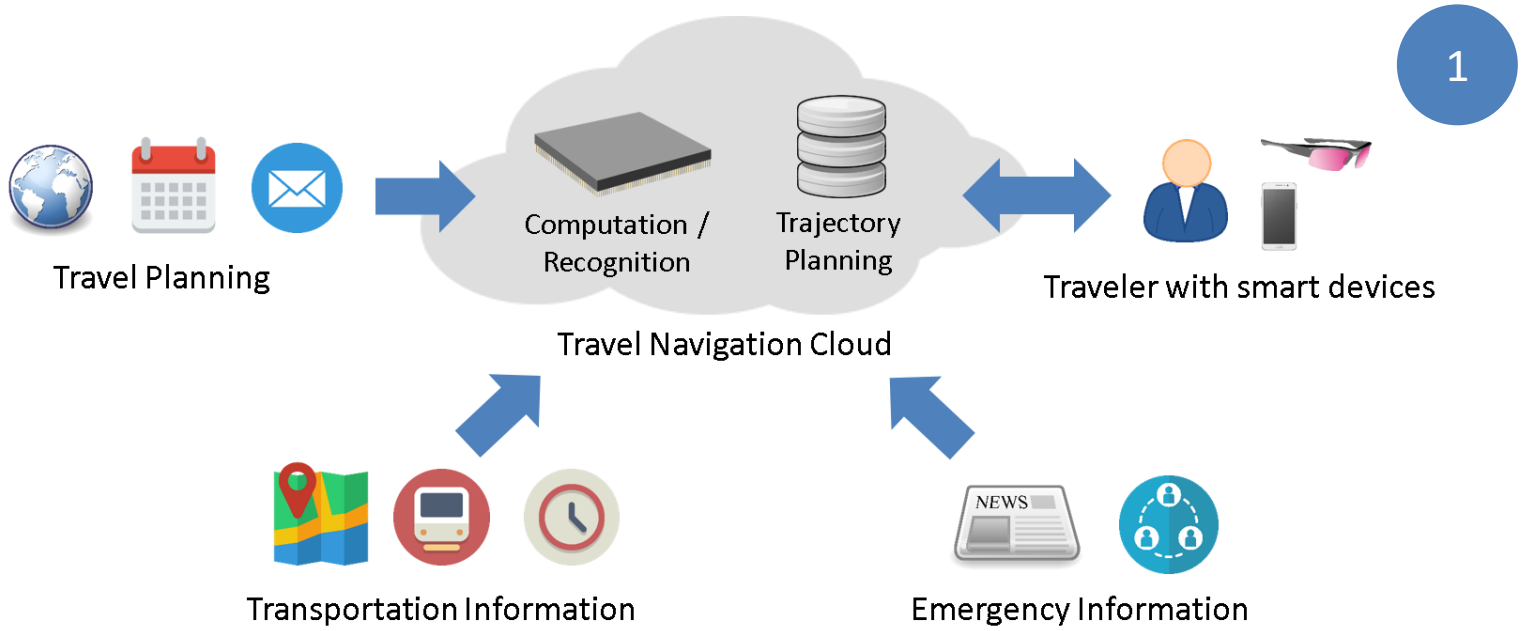
- The lack of personalized guidance
  - Based on information (e.g., destination, transportation, and reservation) preserved in the travel plan and the travel context of travelers (e.g., date, time, and location), corresponding navigation could be identified and provided proactively

Introduction

- A smart navigation service is proposed to provide timely and personalized navigation for travelers
  - Derive a comprehensive travel plan based on travel information from different services
  - Collect travel context of travelers and identify the purpose based on derived travel plan
  - Collect information about transportation or emergency events continuously
  - Provide personalized navigation information for travelers proactively

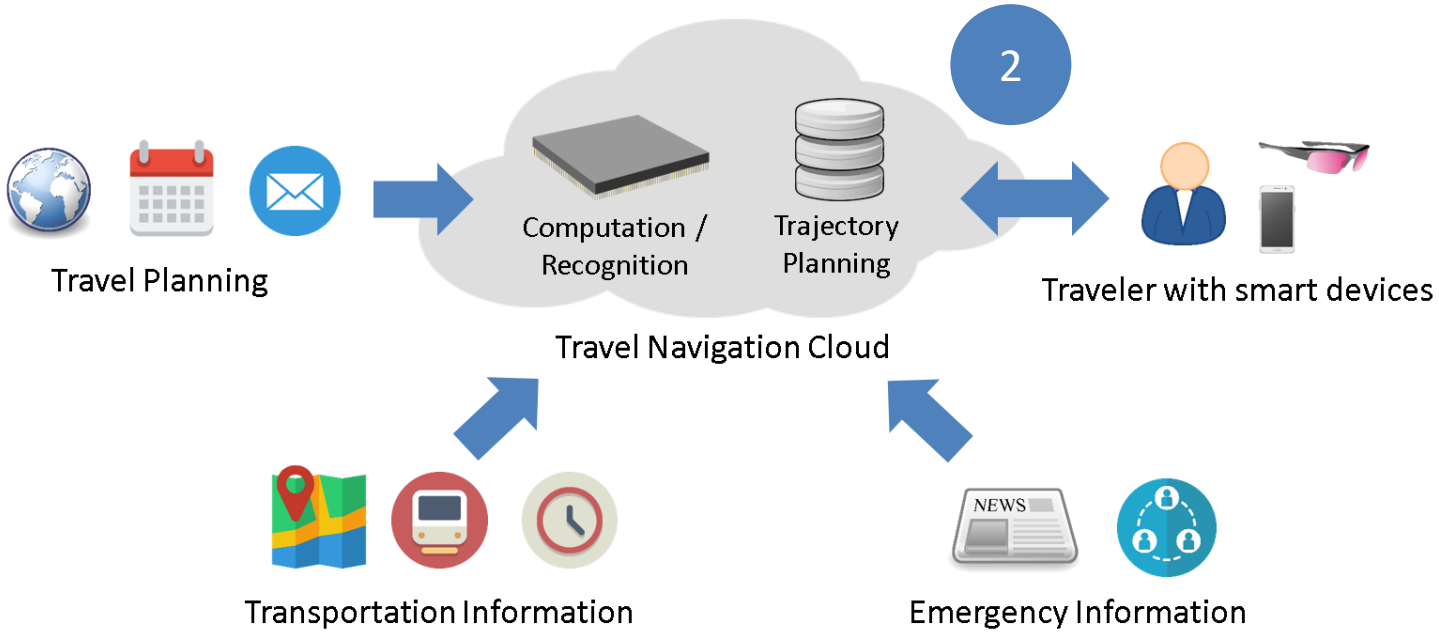


Architecture of Smart Navigation Service



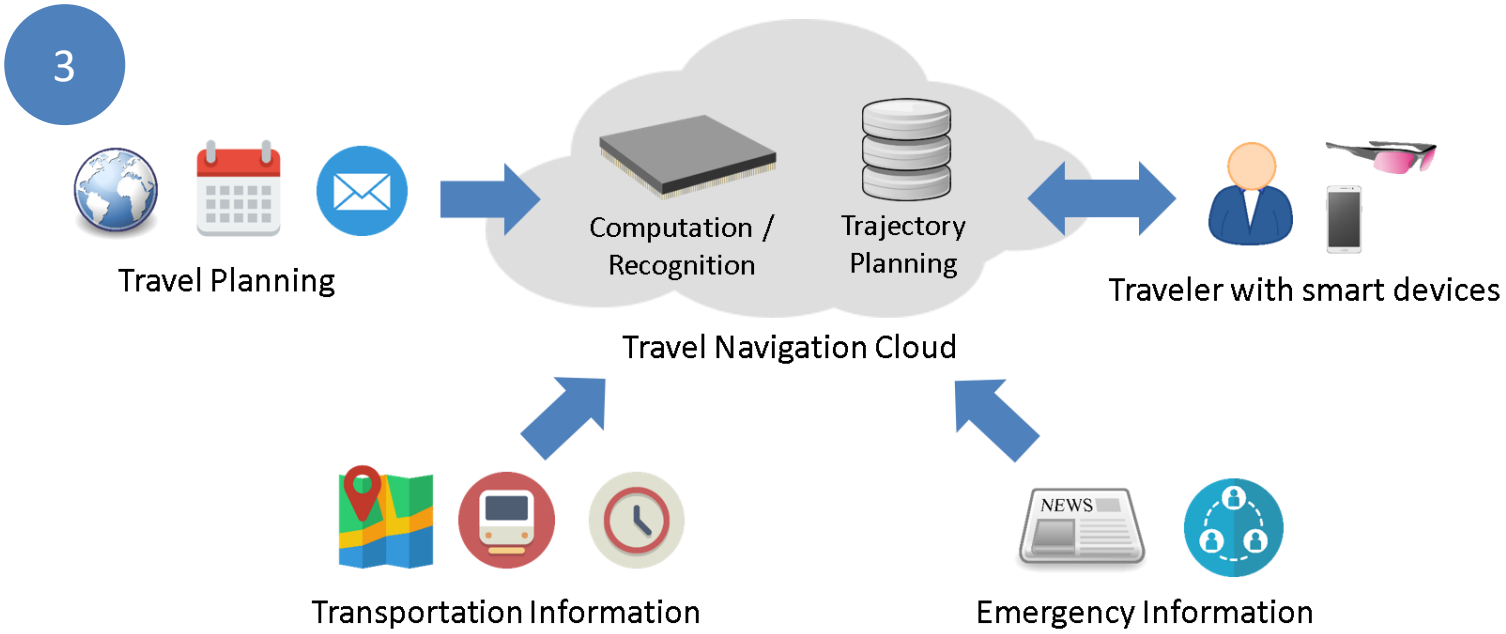
- Acquire travel context (e.g., date, time, and location) and transmit the information to the travel navigation cloud continuously
- Display corresponding navigation information provided by travel navigation cloud

Architecture of Smart Navigation Service



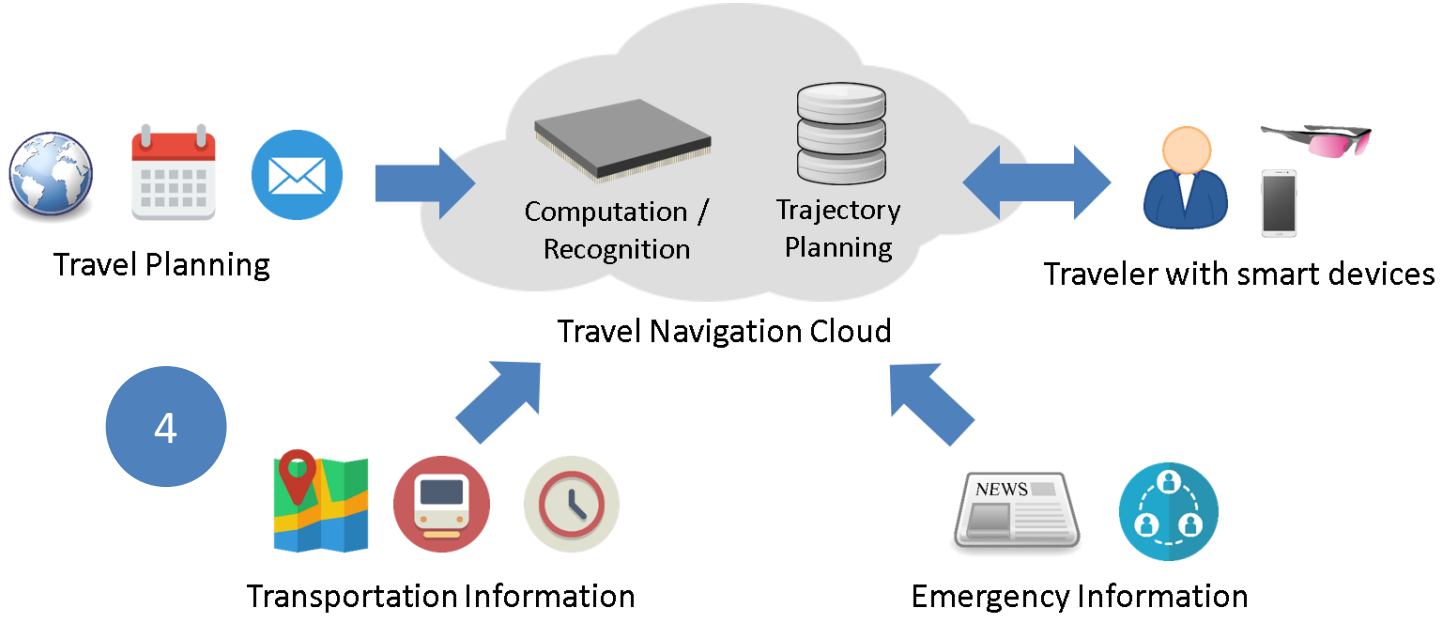
- Construct a comprehensive travel plan based on information preserved in online services
- Collect travel context of travelers and identify the purpose based on the travel plan
- Collect information from transportation services and news services continuously
- Identify and provide navigation information for travelers proactively

Architecture of Smart Navigation Service



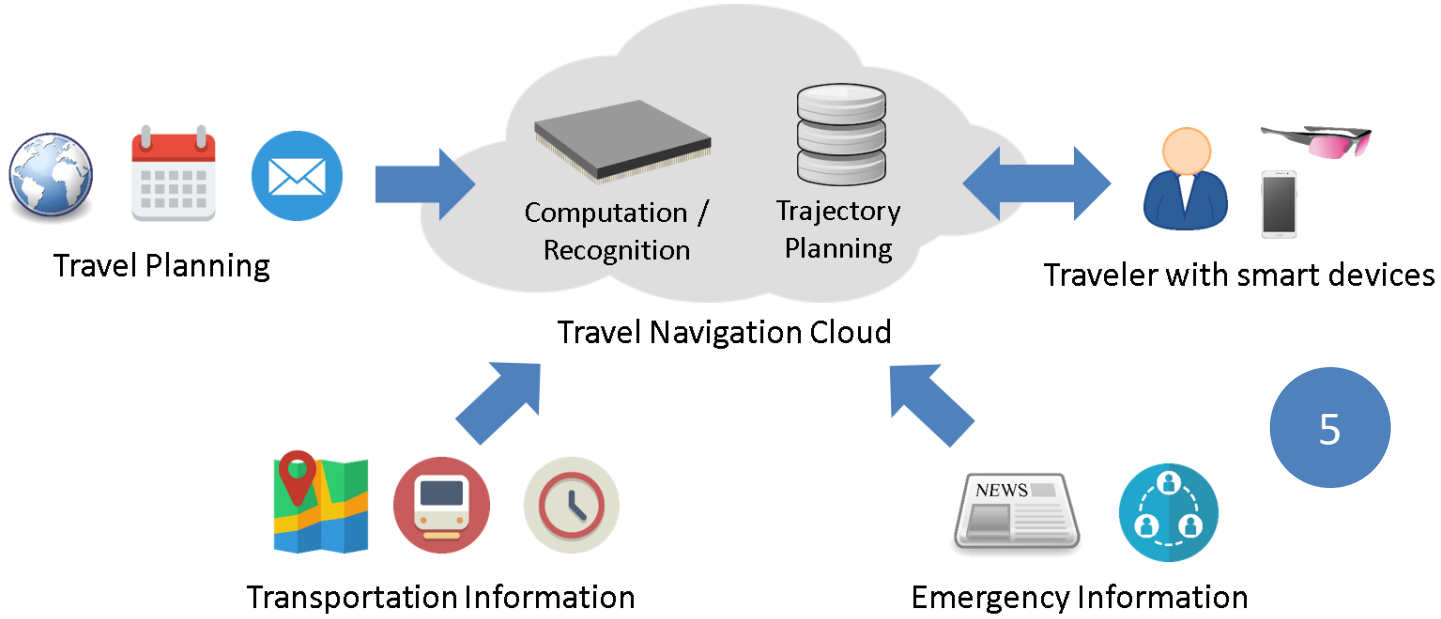
- Travelers can arrange their travel plans through various online services nowadays
- Under the authorization of travelers, the travel navigation cloud acquires, analyzes, and identifies a comprehensive travel plan of travelers for proactive navigation during the trip

Architecture of Smart Navigation Service



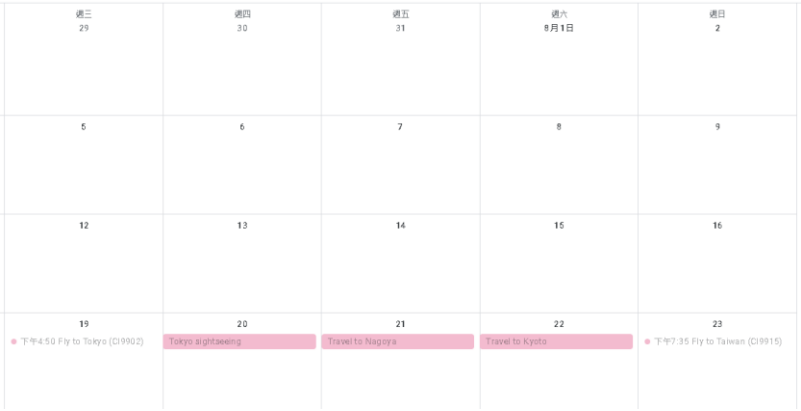
- Information of airport, rail service, ferry service, bus, and so on will be retrieved by the travel navigation cloud through APIs provided by service providers or government open data
- Based on derived travel plan, identified travel context, and the transportation, proactive navigation can be provided for travelers for better travel experience

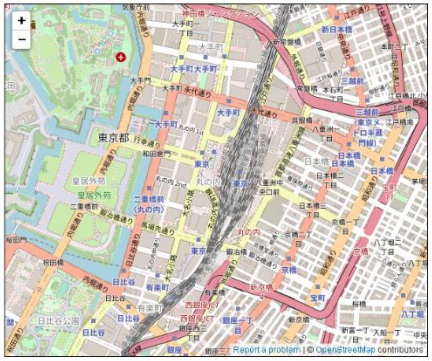
Architecture of Smart Navigation Service



- The travel navigation cloud retrieves news from different news services or social networks
- Based on transportation information and emergency information, the travel navigation cloud can identify and provide alternative travel choices for travelers to avoid emergency situations

Case Study





1. A traveler arranges a list of cities (i.e., Tokyo, Nagoya, and Kyoto) on a journey and puts the information in online calendar
2. In a specific day during the trip, the traveler arrives at the train station of the city (i.e., Tokyo)
3. Through the travel context acquired by the smart device and the travel plan (destination city) retrieved from online calendar, the travel navigation cloud identifies the current travel status and the purpose of the traveler (i.e., travel to Nagoya)
4. Based on the identified purpose of the traveler and the transportation information retrieved from the government open data, train number, departure time, and arrival time of appropriate train can be identified and provided by the smart navigation service

Conclusion

- A smart navigation service is proposed in this work to provide timely and personalized navigation for travelers
  - Based on travel planning and travel context of travelers, the smart navigation service identifies the purpose of travelers, and provides corresponding navigation through the information retrieved from transportation services or news services proactively

- Future work includes the integration of more online services, transportation services, and news services for comprehensive navigation for travelers

Chia Hung Kao

National Taitung University, Taitung, Taiwan

chkao@nttu.edu.tw