*d*STOP:

Notification system estimating arrival of destination with multimodal approach

Presented by Team 9
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Team 9

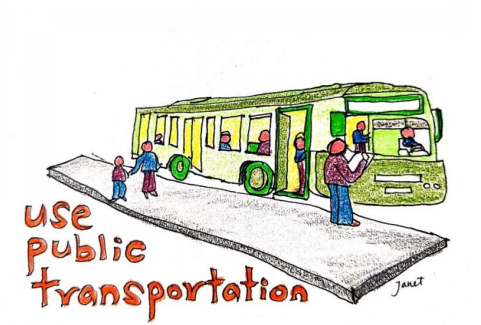
- Minhyo Jung / Human-Centered Computer Systems Lab
- Jisup Lee / Co-design and Parallel processing Lab
- Farid Talibli / Software Foundations Lab

Outline

- Motivation & Problem
- Our Idea
- Existing Solutions
- User Scenario
- System Overview
- Project Plan
- Final Deliverable

Motivation & Problem

- Everyday, we travel using various public transportations
  - By a subway, bus
  - For everyday routines, e.g. commuting, going to meet a friend, etc.
  - Even for special occasions such as having a job interview. (maybe much more important)
- Sometimes more attention may be necessary to the time
  - To go to unfamiliar places
  - To attend important meetings on time
  - When traveling abroad
  - Do you remember your first time in SNU campus? How was that?



Motivation & Problem

- Due to developed mobile computing, we have a solution
  - An exact current location information will be given by gps
  - The shortest (time) path will be given through maps application.
- However, there might be a small improvement through…
  - More effective destination alarm will be suggested.
  - Sometimes location isn't exact in the subway because gps from the satellite…
  - So an indirect inference occurs (people should calculate the time and location)
  - An advertisement covers the displays rather than station information in the train.

Motivation & Problem

- Target Users
  - Who do not want to focus on the *maps application* while on transportation
  - Newcomers in Korea or SNU
  - We may narrow down the problem of the project for Newcomers in SNU
- Scope
  - Our three researchers' routine on the way inside SNU
  - When it comes to a Shuttle Buses.. multi-modal approach will raise the precision

Our Idea

- It’s a **Mobile Application** which is a notification system estimating arrival to the destination using multimodal approach
  - Multimodal inputs
    - User’s destination
    - Ambient sounds
    - Real-time location information (gps, wifi, etc)
    - Accelerometer, etc.
  - Output
    - Alarm at right destination and on right time
- Naturally pervasive interface is what we aim for

Existing Solutions

- Map applications are widely known
  - Google, Naver, Kakao, and other many featured applications.
- Tracking the location based on GPS doesn’t work in the underground
- Sometimes, we calculate that
  - The rest of the time to destination by switching applications (maps-others)
  - Where exactly am I which station? stop?

Challenges

- More naturalistic approach to find the destination
  - We would like to suggest a better approach for existing solutions
- Sound recognition in real-world
  - To collect announcement data in noisy environment
  - Teach a model to recognise the name of station or bus stop

User Scenario

- First, enter user's destination
  - User runs the app on the public transportation
  - Then enter their destination then user can forget everything about maps
- Second, app is running background.
  - App may run in background while listening to the announcements, gathering location information
- Third, when user approaches the destination, the app pushes the alarm/notification

System Overview

Manual input

- Destination

Automatic input (Multimodal)

- GPS
- Sound
- Acceleration
- etc

Functions

- Sound to text
- Recognizing stop and departure
- Location search

Output

- Notification
- what else?

Evaluation Strategy

- How it can deliver the exact notification when the user has arrived
- Does it really help user to forget to navigate?
    - User study

Project Plan

- Here is the detailed plan for “*d*Stop”. You can access it by the link below.

Project Planning

Project Name	dSTOP	No. of Team	9
Manager	Minhyo Jung	Date	2022. 3. 21

No	Title	Owner	Process rate	Phase 1														
				W4					W5					W6				
				M	Tu	W	Th	F	M	Tu	W	Th	F	M	Tu	W	Th	F
1	Project Design / Class requirements																	
1.1	refine ideas based on a feedback	Minhyo, Jisup, Farid	0%	o	o	o	o	o										
1.2	search necessary techniques	Minhyo, Jisup, Farid	0%						o	o	o	o	o					
2	Proof of Concept/Preparation Data																	
2.1	collect the announcement data	TBD	0%											o	o	o	o	o
2.2	collect the label of location	TBD	0%											o	o	o	o	o
2.3	test multi-modal approach	TBD	0%											o	o	o	o	o
3	Algorithm Development																	
3.1	Architecture design	TBD	0%															
3.2	Process location information	TBD	0%															
3.3	Process sound information	TBD	0%															
4	Development of Application																	
4.1	Application Architecture Design	TBD	0%															
4.2	Application UX&UI Design	TBD	0%															
4.3	Implementation	TBD	0%															
5	User Study & Validation																	
5.1	user study	TBD	0%															
5.2	validation	TBD	0%															
5.3	write a report	TBD	0%															

No	Phase 2														
	W7					W8					W9				
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3.1	o	o	o	o	o	o	o	o	o	o					
3.2									o	o	o	o	o	o	o
3.3									o	o	o	o	o	o	o
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4.1	o	o	o	o	o	o	o	o	o	o					
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5															
5.1															
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No	Phase 3														
	W10					W11					W12				
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4.3	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
5															
5.1															
5.2															
5.3															

No	Phase 4														
	W13					W14					W15				
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5.3									o	o					

https://docs.google.com/spreadsheets/d/1nYiOSoIaEC6m5i07V531NIxb0RYjYtLBdshszvHuKxs/edit?usp=sharing

Final Deliverable

- A mobile application that:
  - Aids newcomers to SNU in finding their way around campus
  - Allows users to forget about navigation after entering public transportation
  - Is intuitive and easy to use for everyone
  - That precisely guides people to their destinations with second accuracy

  through a combination of location, acceleration information and

- a model that
  - Accurately recognizes speech (station names) when in realistic natural environment

Thank you!

- Q&A