

***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



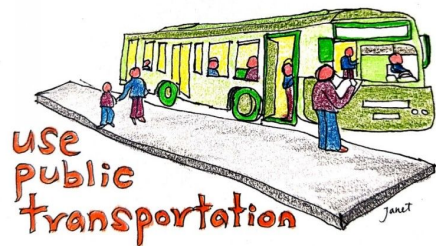
# Outline

- Motivation & Problem
- Our Idea
- Existing Solutions
- User Scenario
- System Overview
- Evaluation Strategy
- 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



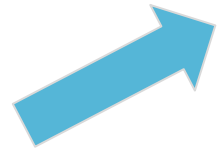
# System Overview

## 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 “dStop”. 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			Phase 2			Phase 3			Phase 4		
				W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
				M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F	M Tu W Th F
1	<b>Project Design / Class requirements</b>														
1.1	refine ideas based on a feedback	Minhyo, Jisup, Farid	0%	o	o	o	o								
1.2	search necessary techniques	Minhyo, Jisup, Farid	0%		o	o	o	o							
2	<b>Proof of Concept/Preparation Data</b>														
2.1	collect the announcement data	TBD	0%				o	o	o	o					
2.2	collect the label of location	TBD	0%				o	o	o	o					
2.3	test multi-modal approach	TBD	0%				o	o	o	o					
3	<b>Algorithm Development</b>														
3.1	Architecture design	TBD	0%					o	o	o	o	o	o		
3.2	Process location information	TBD	0%						o	o	o	o	o	o	o
3.3	Process sound information	TBD	0%						o	o	o	o	o	o	o
4	<b>Development of Application</b>														
4.1	Application Architecture Design	TBD	0%					o	o	o	o	o	o		
4.2	Application UX&UI Design	TBD	0%							o	o	o	o	o	o
4.3	Implementation	TBD	0%							o	o	o	o	o	o
5	<b>User Study &amp; Validation</b>														
5.1	user study	TBD	0%											o	o
5.2	validation	TBD	0%											o	o
5.3	write a report	TBD	0%											o	

[https://docs.google.com/spreadsheets/d/1nYiOSoIaEC6m5i07V531NIxb0RYjYtLBdshszvH\\_uKxs/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1nYiOSoIaEC6m5i07V531NIxb0RYjYtLBdshszvH_uKxs/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

