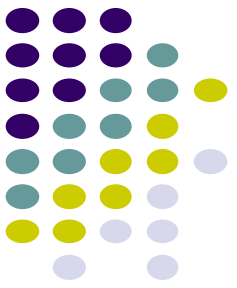


# SmartCommute

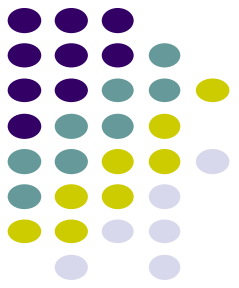
GROUP: JEFFREY CHAVES, CORY TAPPLY, TREVOR VALCOURT

# Problem



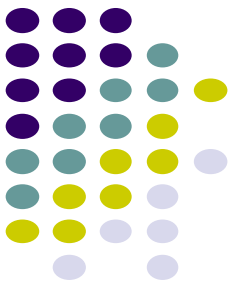
- ▶ Being late negatively impacts lives in many ways
- ▶ Traffic conditions can cause employees to be late to their job because of the longer-than-usual commute
  - ▶ Examples: weather, accidents, etc.
- ▶ Tardiness can damage reputations and embarrass individuals in addition to hindering productivity in the workplace [2]
- ▶ Being late is also indicative of negative personality traits [2]

# Consequences



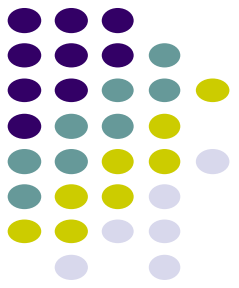
- ▶ According to a new CareerBuilder survey[1]:
  - ❖ 29% of workers admitted to coming in late at least once a month
  - ❖ 16% of workers say it is a weekly occurrence for them
  - ❖ 53% of employers expect employees to be on time every day
  - ❖ 41% of employers have fired someone for being late
- ▶ An ABC study also found that[2]:
  - ❖ 15 to 20 percent of the U.S. population is "consistently late," especially when it comes to work
  - ❖ American CEOs are late to eight out of every 10 meetings, and when CEOs are late by 10 minutes every day, it costs the U.S. economy \$90 billion in lost productivity.

# Solution



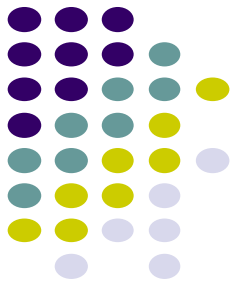
- ▶ Application to prevent tardiness while maximizing time sleeping, working, etc.
  - ❖ Set alarm(s) for each commute you need to make
  - ❖ Simple interface to provide application with supporting information
  - ❖ Machine learning to analyze and predict the user's habits
  - ❖ Option to cancel the alarm if activity is detected

# Social Benefits & Target Community



- ▶ Social Benefits:
  - ▶ User arrives on time to appointments / meetings / etc.
  - ▶ Saves the user from embarrassment of arriving late
- ▶ Target Community:
  - ▶ Those who are frequently late
  - ▶ Any users who commute to work
  - ▶ Any users who have time sensitive appointments
  - ▶ Any user who commutes to different work locations

# Related Work: Interruptive [3]



Sketch 9:41 AM 42%

## Set Recurring Alert

Monday, February 2nd, 2015

4:45p - 5:00p  
Pick Up The Kid  
Daycare  
15 mins

Repeats every Weekday

### Tasks To Do Before This Event

- Get Ready 5 min
- Drive to Daycare 5 min

### Add More Tasks

Type to add new task **ADD**

- Buy Groceries
- Check In For Flight

**Cancel** **Save**

Sketch 9:41 AM 42%

## Events

Thursday, February 5, 2015

**ON TIME** 12:00p - 1:00p  
Lunch With Tony  
J.R.'s Pub  
1 hour

4:45p - 5:00p  
Pick Up The Kid  
Daycare  
15 mins

**DELETE EVENT**

**ON TIME** **UNDER 10 MIN LATE** **OVER 10 MIN LATE** **NOT SURE**

Friday, February 6, 2015

12:30p - 1:30p  
Lunch with Pat  
Annapolis, MD  
1 hour

**BE ON TIME**

**Events** **Insights** **Settings**

Sketch 9:41 AM 42%

## Late Status

**30% LATE**  
2 EVENTS

Bummer! You've been **late for 30%** of your events this week.  
You should adjust your tasks for next time.

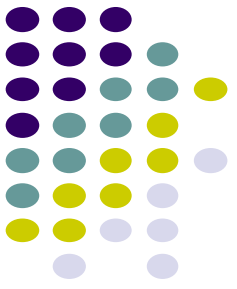
**UNDER 10 MIN LATE** 4:45p - 5:00p  
Pick Up The Kid  
Daycare  
15 mins

### Adjust Task Lengths For Next Time

- Get Ready 5 min
- Drive to Daycare 5 min

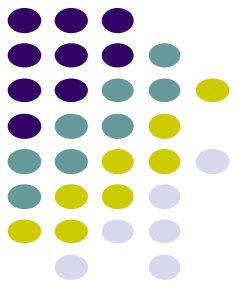
**Done**

# Related Work: Interruptive [3]

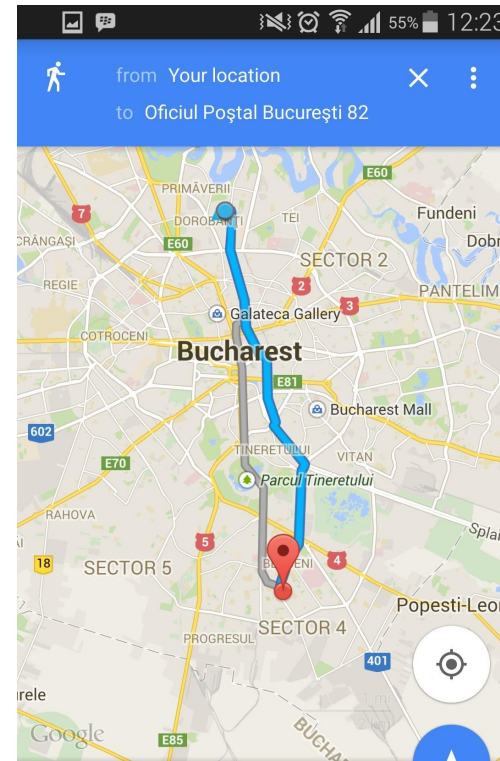


- ▶ Similarities
  - ▶ Application to prevent tardiness
  - ▶ Can specify preparation time needed
- ▶ Differences
  - ▶ Doesn't calculate commute time based on traffic conditions
  - ▶ Not specifically for commuting, doesn't launch Google Maps
  - ▶ Must manually change preparation time if inaccurate
  - ▶ Must manually input tardiness if late to destination

# Related Work: Google Maps



- ▶ Similarities
  - ▶ Calculates time needed to reach destination
  - ▶ Provides directions to destination
  - ▶ Launches from within SmartCommute
- ▶ Differences
  - ▶ Doesn't account for time needed to prepare
  - ▶ Not aware of what time the user needs to arrive



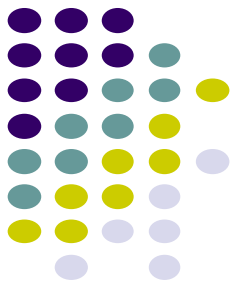
2 hr 5 min (9.9 km)

via Calea Văcărești

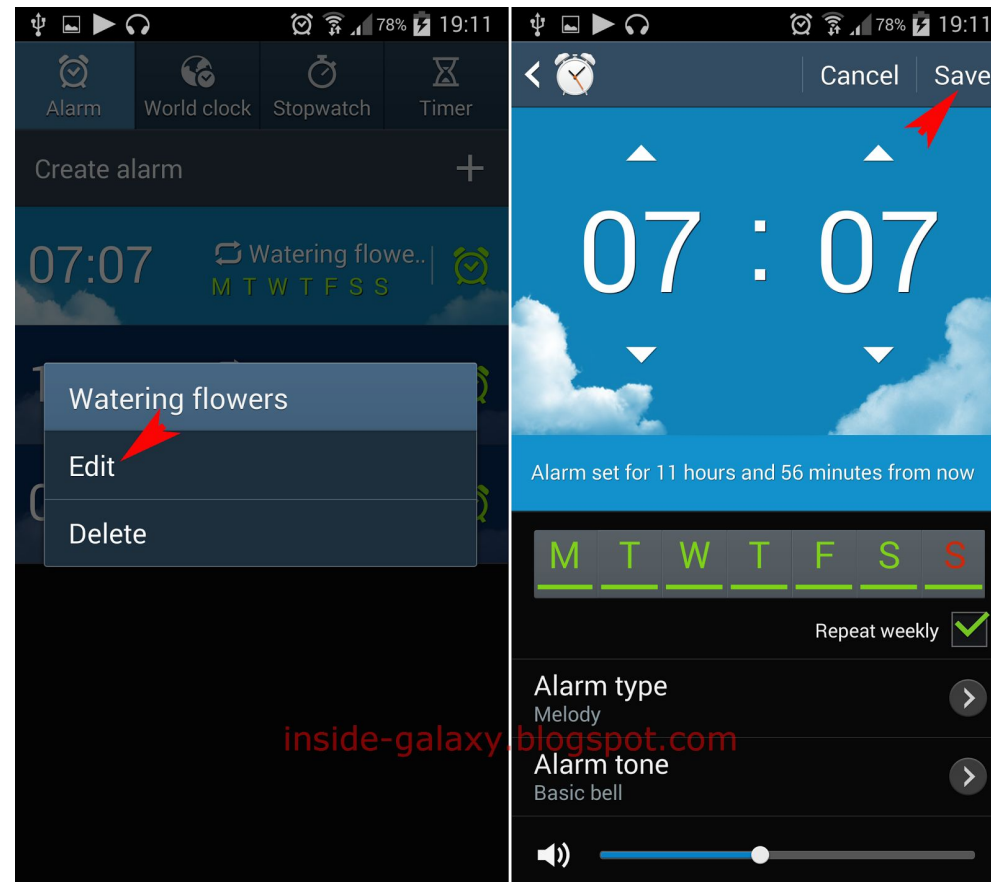
SOFTPELIX



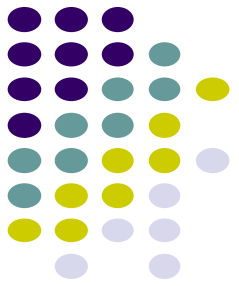
# Related Work: Alarms



- ▶ Similarities
  - ▶ Alarms to alert user
- ▶ Differences
  - ▶ Alarms don't automatically adjust when inappropriately set
  - ▶ Cannot launch Google Maps directions automatically



# Methodology / App Design



11:25 AM 68%

Commute Name:  
|

Arrival Time:  
CHOOSE ARRIVAL TIME

Preparation Time:  
CHOOSE PREPARATION TIME

Alarm Tone: Silent  
CHOOSE ALARM TONE

Destination:  
CHOOSE DESTINATION

Days of the Week:  
S M T W T F S

ADD NEW COMMUTE

powered by Google

10:44 AM 75%

Search

Select this location

Or choose a nearby place

Worcester Polytechnic Institute  
100 Institute Rd, Worcester, MA 01609, U...

powered by Google

10:46 AM 74%

Commute Name:  
Team Meeting

Arrival Time: 4:00 PM

Use this place?

WPI Park  
106, 126 Salisbury St, Worcester, MA...

CHANGE LOCATION SELECT

S M T W T F S

EDIT COMMUTE

powered by Google

10:37 AM 78%

Commute Name:  
Go to Work

Arrival Time: 9:00 AM  
CHOOSE ARRIVAL TIME

Preparation Time: 45 minutes  
CHOOSE PREPARATION TIME

Alarm Tone: Quantum Bell  
CHOOSE ALARM TONE

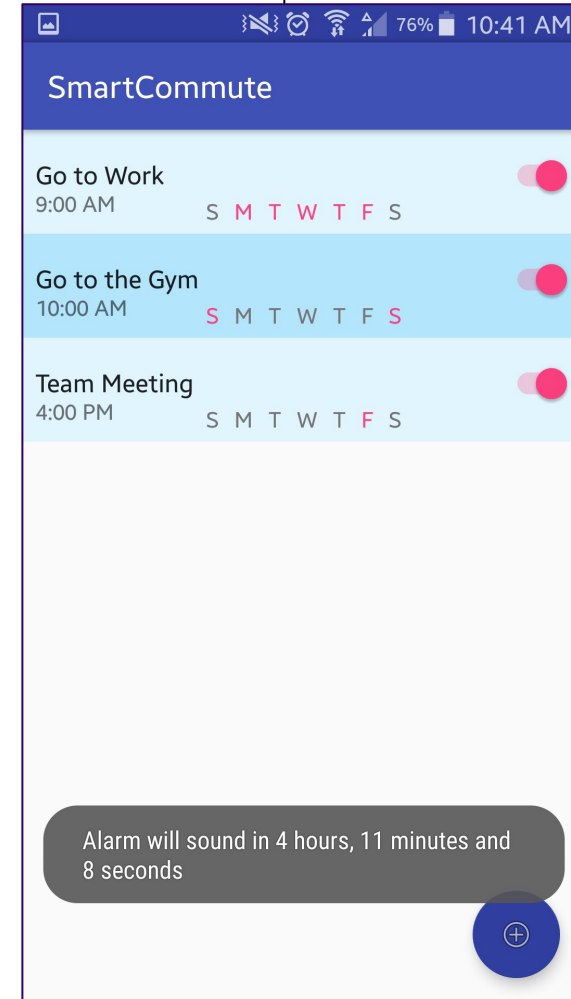
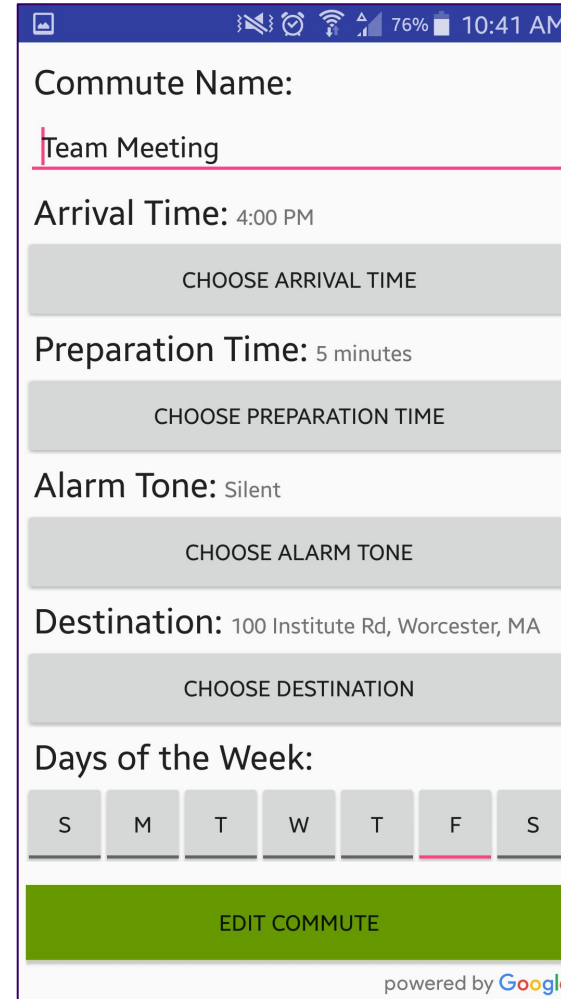
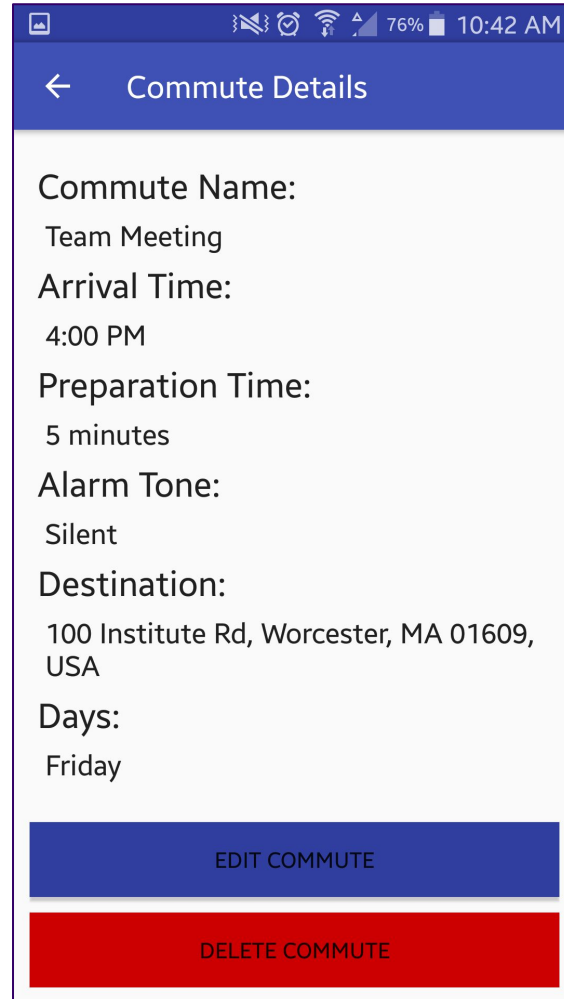
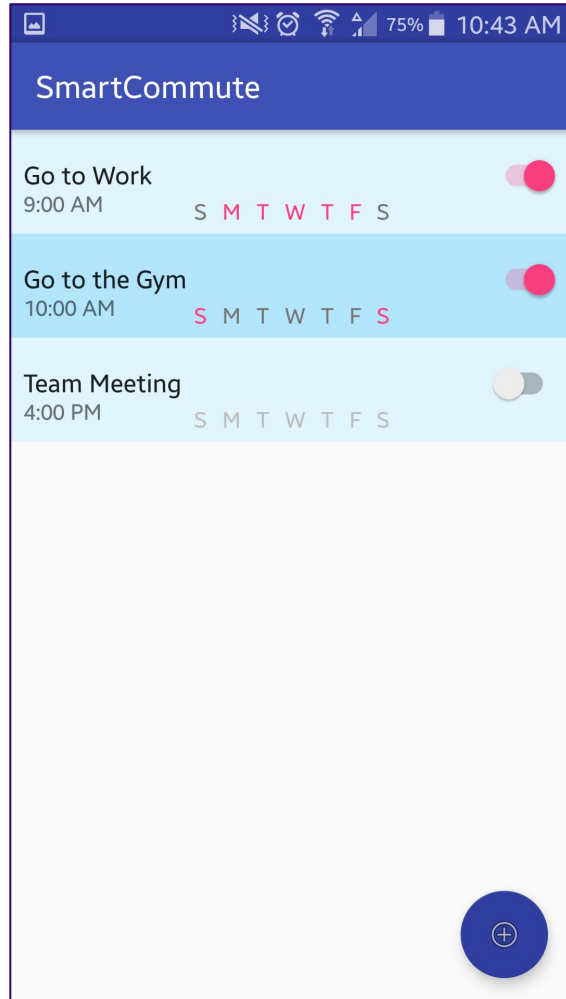
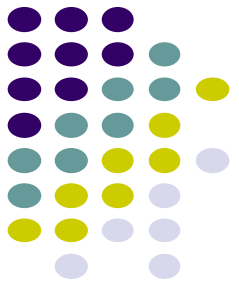
Destination: 1030 Main St, Waltham, MA  
CHOOSE DESTINATION

Days of the Week:  
S M T W T F S

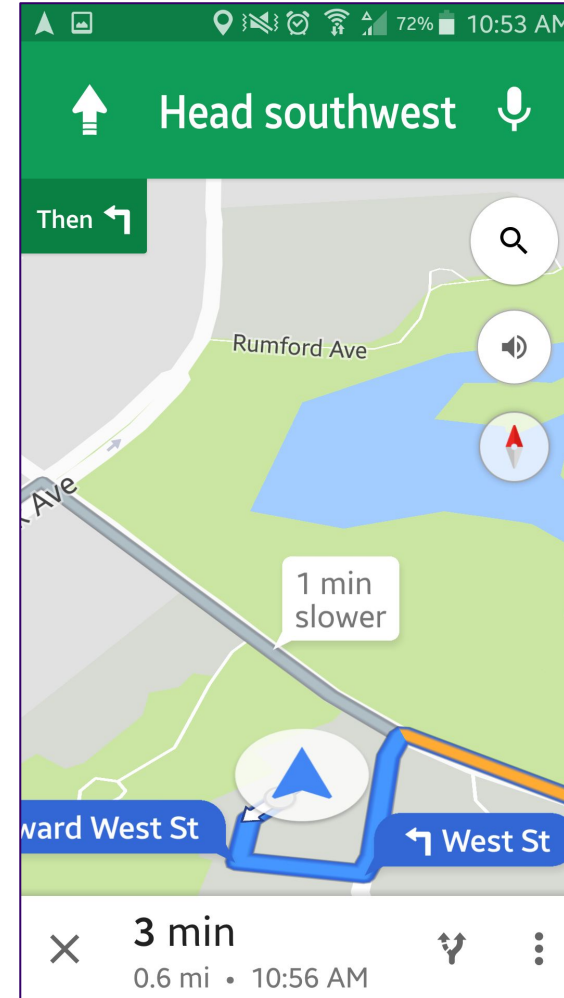
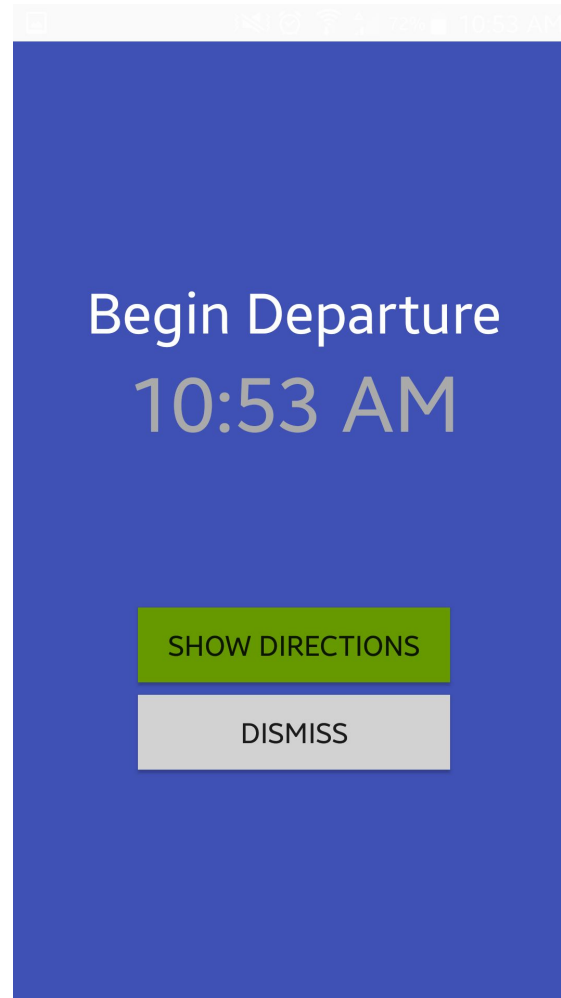
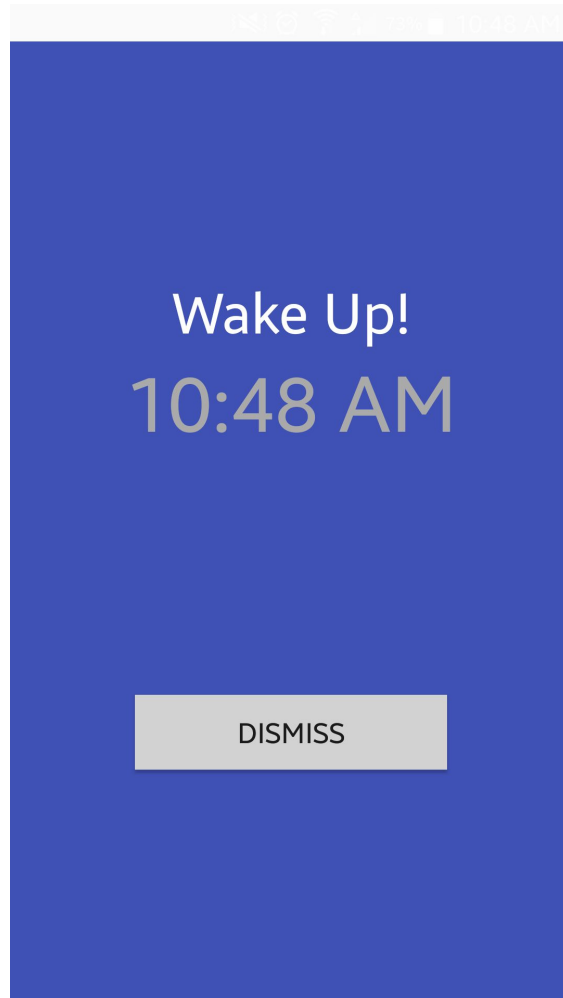
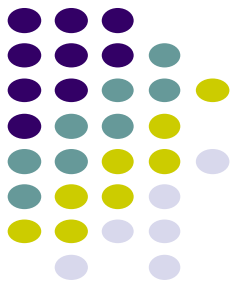
ADD NEW COMMUTE

powered by Google

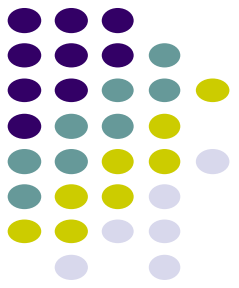
# Methodology / App Design



# Methodology / App Design

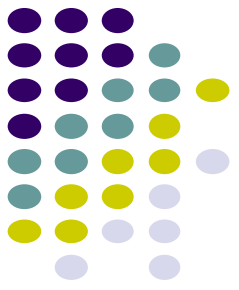


# Methodology



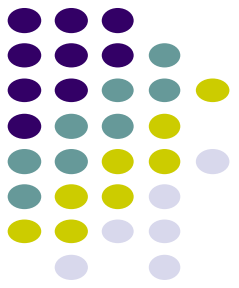
- ▶ For each commute user enters:
  - ❖ Location of destination
  - ❖ Desired time of arrival (ToA)
  - ❖ Time needed to prepare
  - ❖ Days of the week
- ▶ Application sets two alarms for each commute:
  - ❖ When to begin preparation (wake up)
  - ❖ When to depart
- ▶ Application launches Google Maps with directions to the destination after departure alarm sounds
- ▶ Detect user's arrival using Google GeoFence

# Methodology



- ▶ User can easily add new commutes, edit and delete existing commutes, and toggle the alarms on or off for each commute
- ▶ Application uses machine learning to analyze commute patterns and automatically edit alarm times based on user history
- ▶ If driving user activity is not recognized when user should be commuting, additional alarm will sound (Vision)
- ▶ If user awakens from sleeping before preparation alarm is set off the application gives the option to cancel alarm (Vision)
  - ❖ Departure alarm will still be active

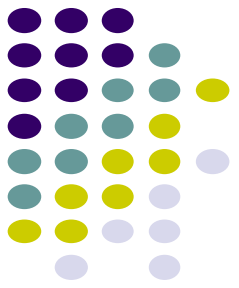
# Implementation



- ▶ Software/Libraries Used:
  - ❖ Google Maps Directions API
  - ❖ Google Maps PlacePicker
  - ❖ OpenWeatherMap API
  - ❖ Encog Machine Learning
  - ❖ Android AlarmManager Library
  - ❖ SQLite for Android
  - ❖ Geofences



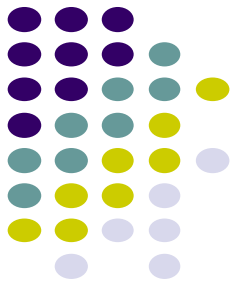
# Evaluation



- ▶ Complete evaluation requires weeks of use.
- ▶ User testimonials revealed:
  - ▶ Users would love to be woken up earlier if they needed to due to weather but don't want to have to think about it. (plan ahead)
  - ▶ Users work at a different office once a week and sometimes forgets to leave a little early that day. SmartCommute alleviates that problem.
  - ▶ Users liked to be shown a different route to work if their usual route had an accident slowing down traffic.
  - ▶ One user said "How soon can I have this app?"

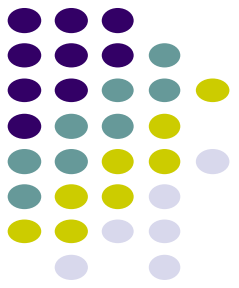


# Vision / Future Work



- ▶ Integrate Activity Recognition
- ▶ Integrated as an Internet of Things app
  - ❖ Linking with your smart/autonomous vehicle
  - ❖ Cooking breakfast after morning alarm
- ▶ Move heavy computations to a server
- ▶ Base models for training data
- ▶ Multi-Threading for better performance

# References



1. <http://resources.careerbuilder.com/hr-news/this-year-s-most-bizarre-excuses-for-being-late-to-work-2>
2. <http://abcnews.go.com/GMA/story?id=2920989&page=1>
3. <http://www.residue.io/2015/02/01/finally-an-app-to-cure-chronic-lateness/>
4. <http://i1-news.softpedia-static.com/images/news2/Google-Rolls-Out-Maps-9-0-for-Android-with-Materials-Design-UI-Screenshot-Tour-464402-8.jpg>