ROVER: A FRAMEWORK FOR CONTEXT-AWARE APPLICATIONS

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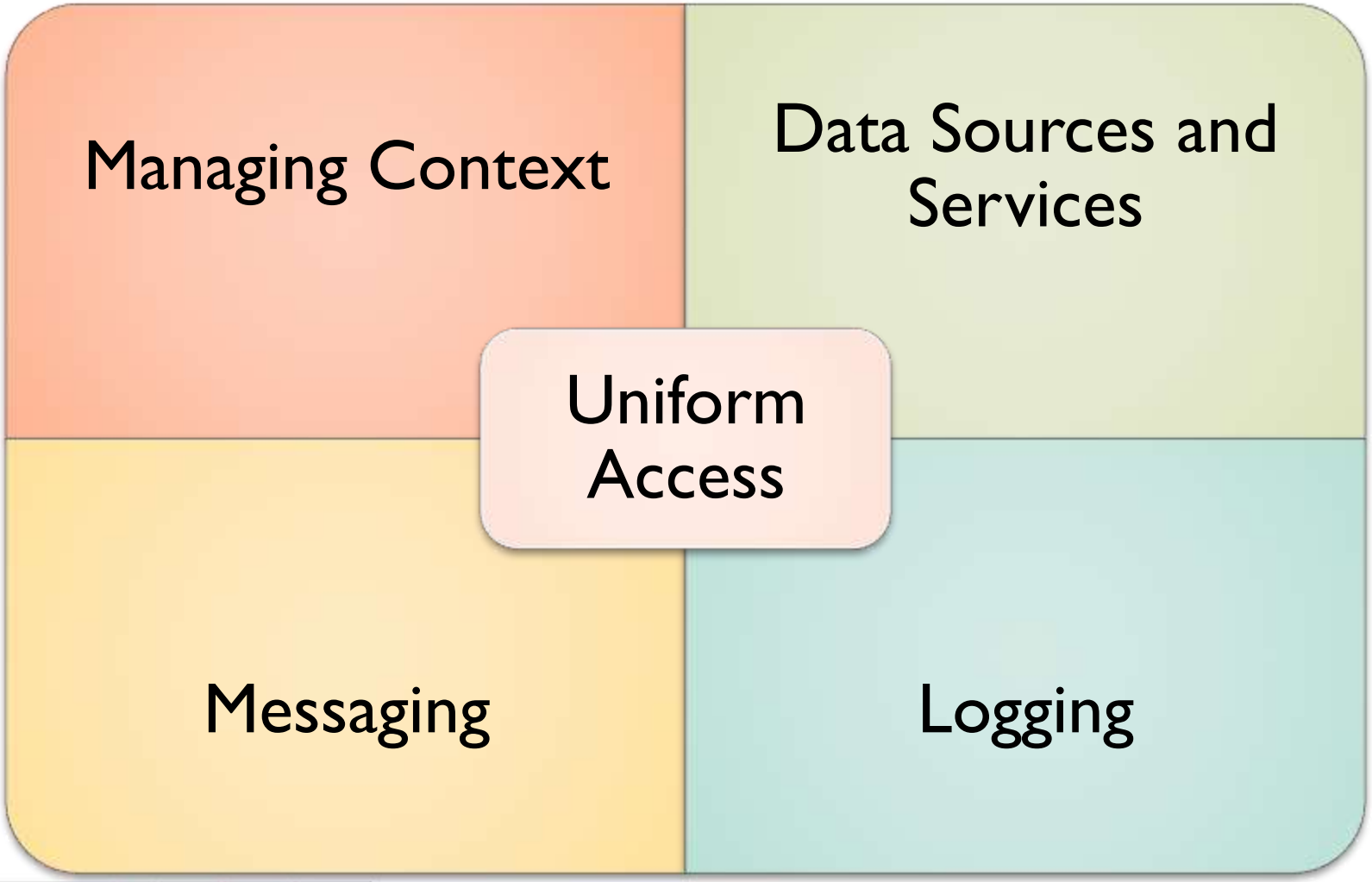
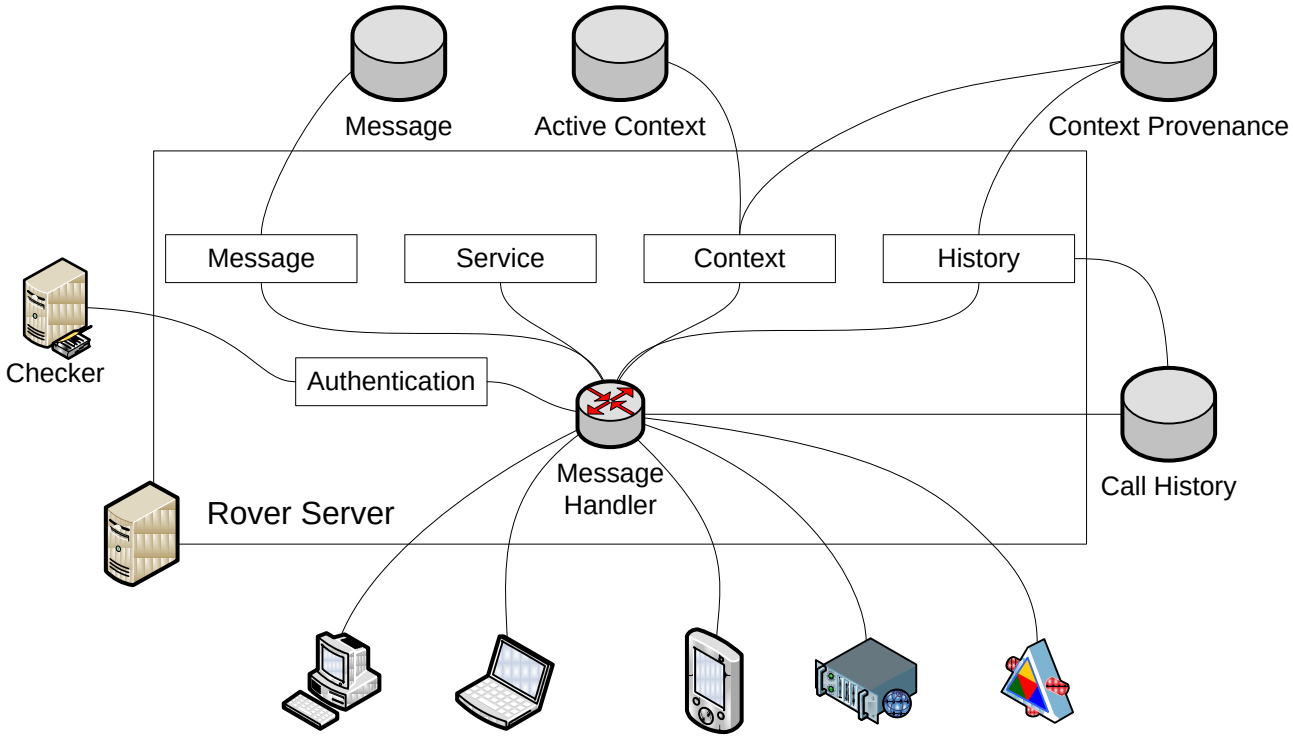
Overview of Rover

- Context-Aware Application Integration Platform
- Independent of
  - Client devices
    - Smart phones, PDA, Laptop,…
  - Communication Technology
    - WiFi, WiMAX, 2G, 3G, 4G

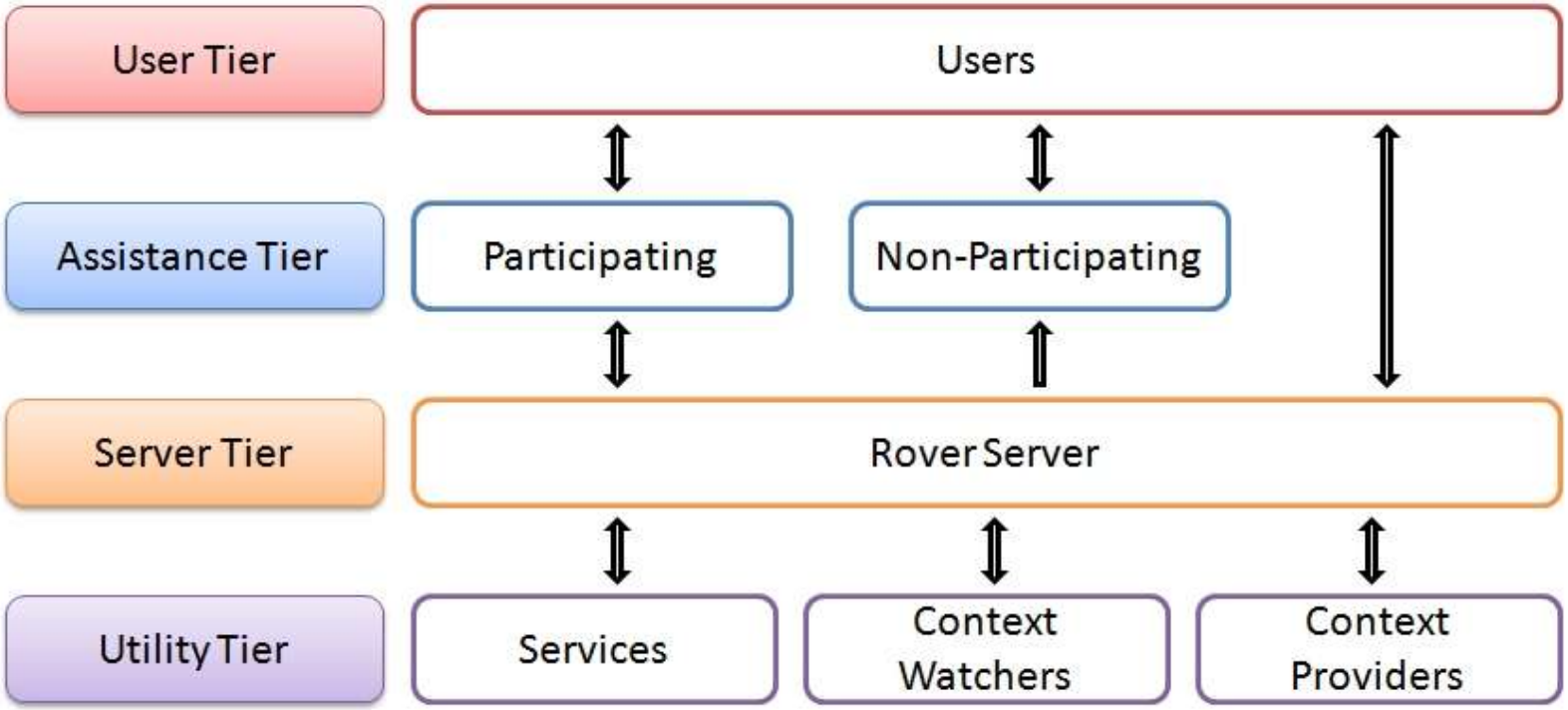
Overall Goals of Rover



Rover Server



Rover Ecosystem and Entities



What Rover Does Not Address

- Usability / Human-Computer Interaction
- Authorization
- Privacy Issues
- Dissonant Information
- Misinformation
- Methods of Reasoning
- Schema and Ontology Development

MyeVyu

Improving the Quality of Life on Campus

The Maryland Information and Network Dynamics Lab

Team

Faculty

- Ashok Agrawala
- Amitabh Varshney
- Neil Spring
- Bobby Bhattacharjee
- Atif Memon
- Evan Golub

Students

- Christian Almazan
- Thomas Krug
- Ankur Oberoi
- Rachana Gandhi
- Saurabh Kulkarni
- Vinay Gangadhar
- Paulo Shakarian
- Geoff Stoker
- Larry Michele
- …

Campus Organizations

- UMIACS
- OIT
- Facilities
- Department of Public Safety
- …

MyeVyu Goals – High Level

- Quality of Life
  - Education
  - Social/community
  - Safety
  - Transportation
  - …
- Quality of Life Support for
  - Students
  - Faculty
  - Staff
  - Visitors

- Integrate university services and enhance them with *context* (time, location, security, ...)

Enabling Technologies

- Communications
  - WiFi
  - WiMAX
  - Cellular
  - …
- Location
  - Horus
  - PinPoint
  - GPS
  - Cell-based location
  - …
- Time
  - Clock Synchronization
- Information Integration
  - Rover

Location Technologies

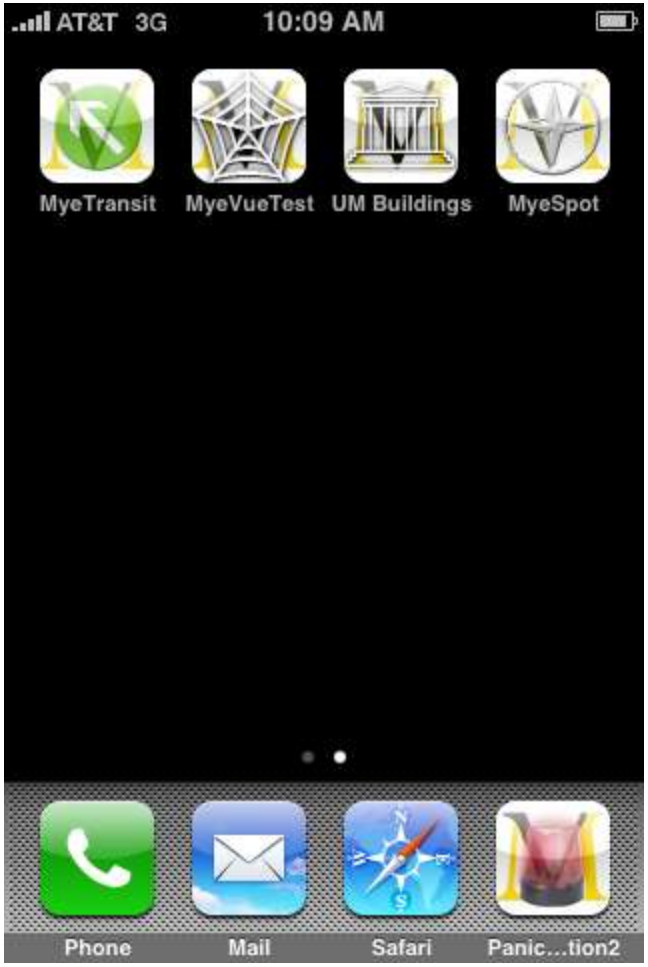
- Indoors and Outdoors
- Accuracy
  - Depends on Application
    - Few feet
- Rapid Deployability
- Robust
- ..

- Horus
  - Based on Signal Strength
- PinPoint
  - Based on Time of Flight measurement

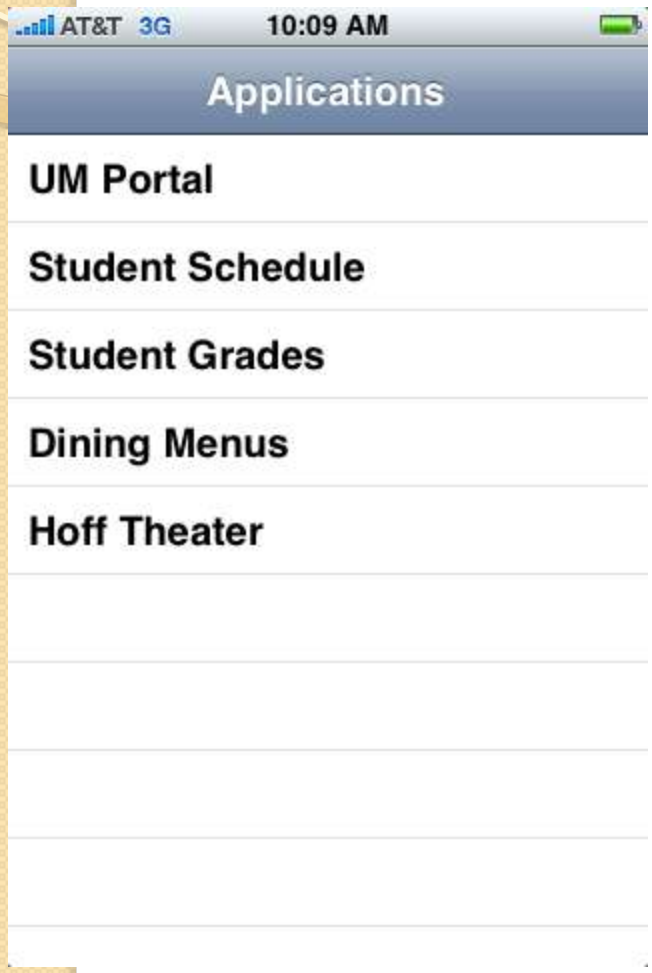
MyeVyu on Campus

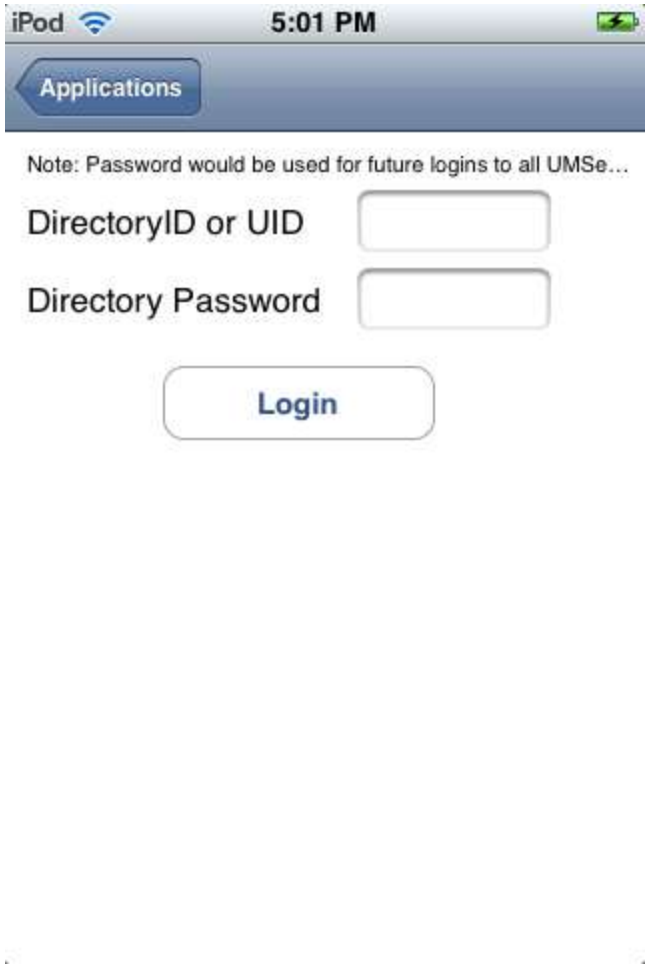
- Mobility Initiative
  - 200 undergrads are part of the initial test
  - Devices used
    - iPhone
    - iPod Touch
    - Palm Pre
    - Android
    - Windows Mobile - Samsung

MyeVyu Applications on IPhone



Logging to UM Portal

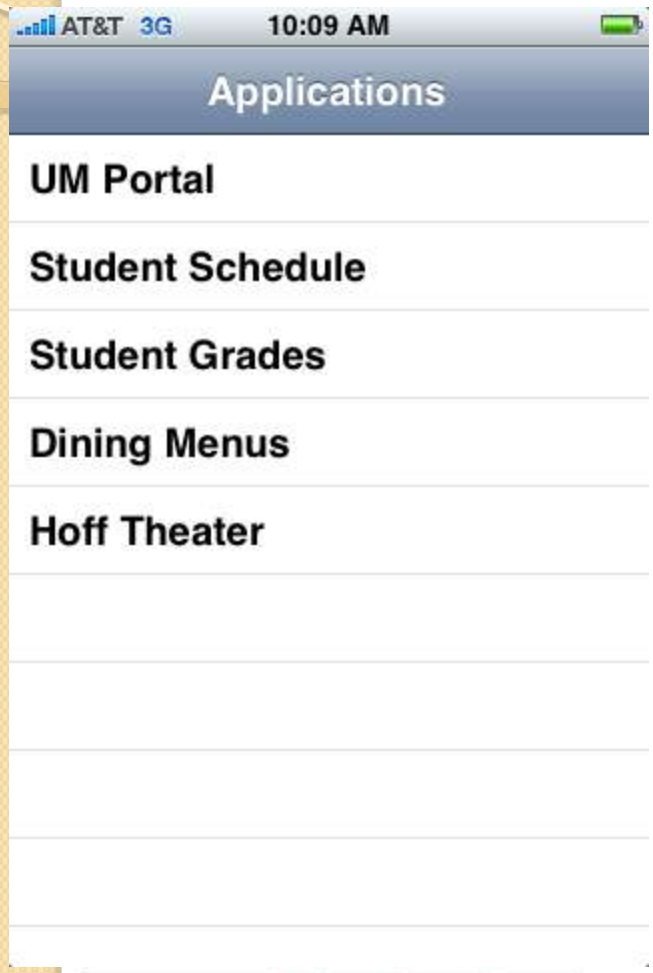




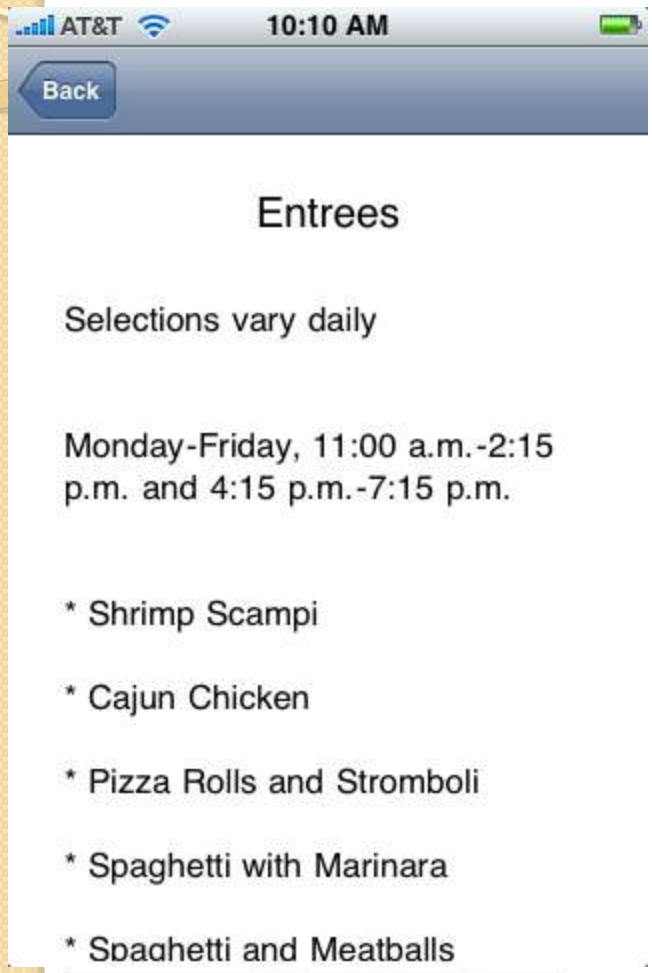
Testudo Access

UM Portal Access

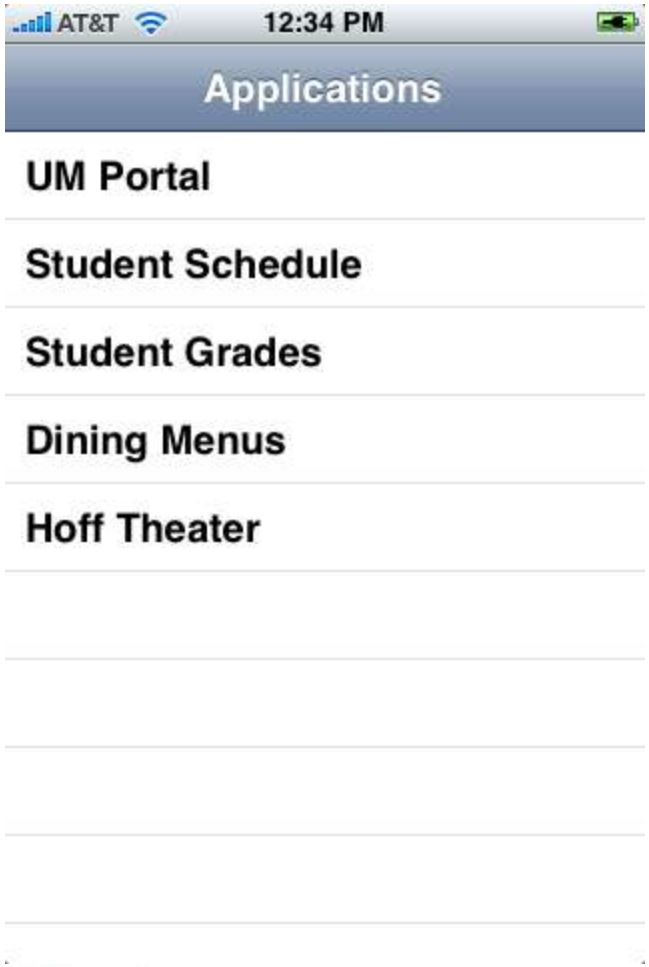
Dining Hall Menus



Dining Hall Menus

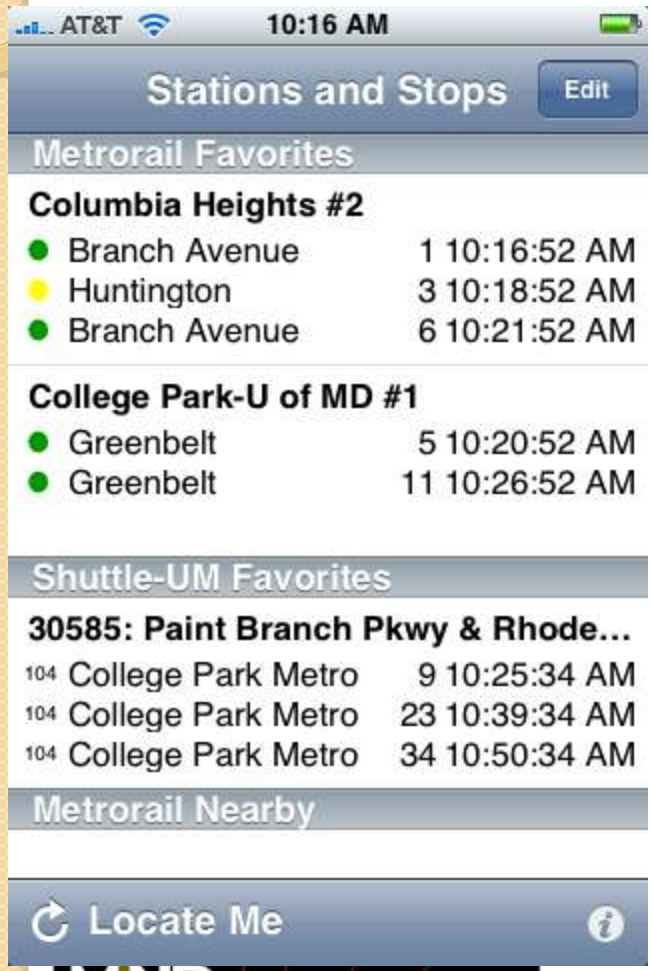


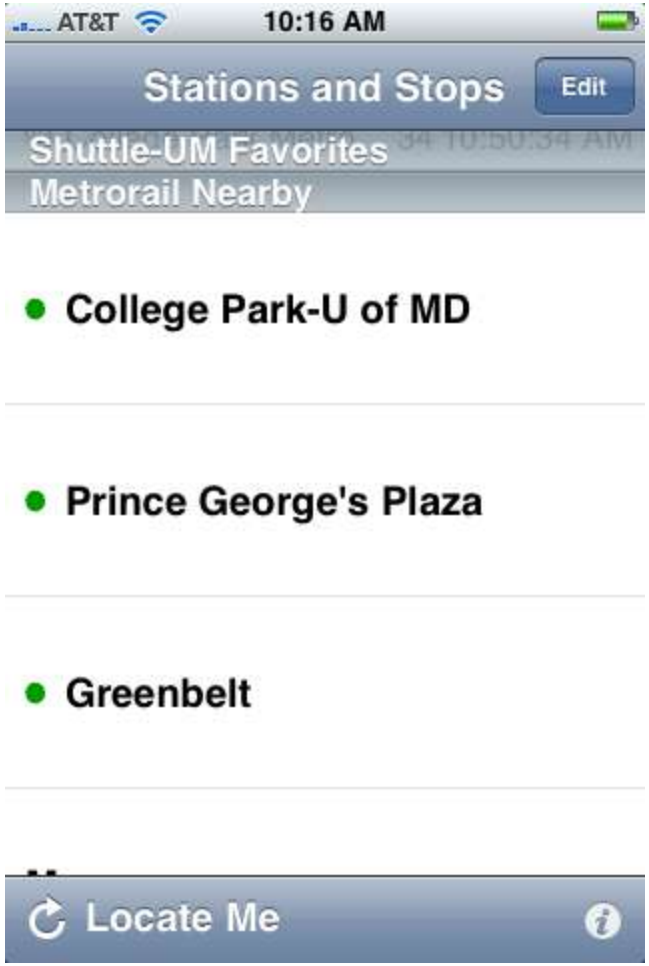
Hoff Theater Schedule



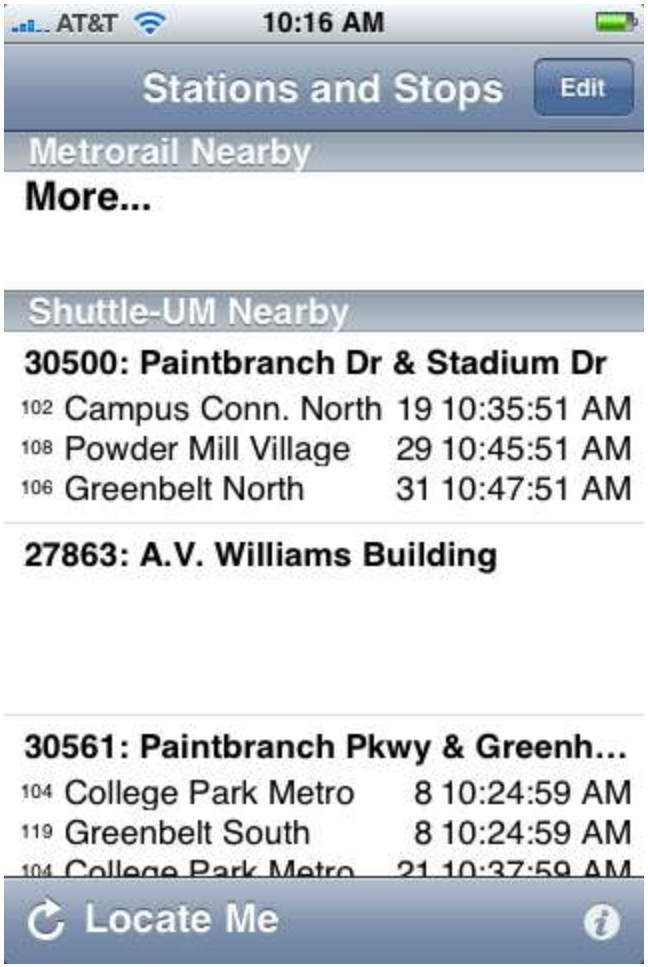
Hoff Theater Schedule

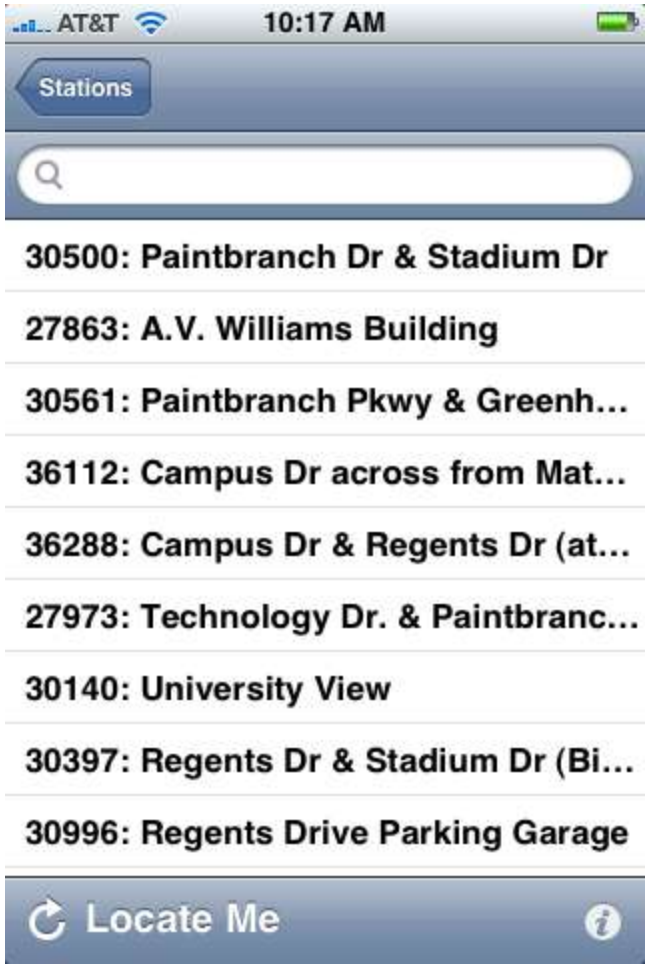
MyeTransit


AT&T
10:16 AM
Stations and Stops
Edit
Metrorail Favorites
Columbia Heights #2
Branch Avenue 1 10:16:52 AM
Huntington 3 10:18:52 AM
Branch Avenue 6 10:21:52 AM
College Park-U of MD #1
Greenbelt 5 10:20:52 AM
Greenbelt 11 10:26:52 AM
Shuttle-UM Favorites
30585: Paint Branch Pkwy & Rhode...
104 College Park Metro 9 10:25:34 AM
104 College Park Metro 23 10:39:34 AM
104 College Park Metro 34 10:50:34 AM
Metrorail Nearby
Locate Me

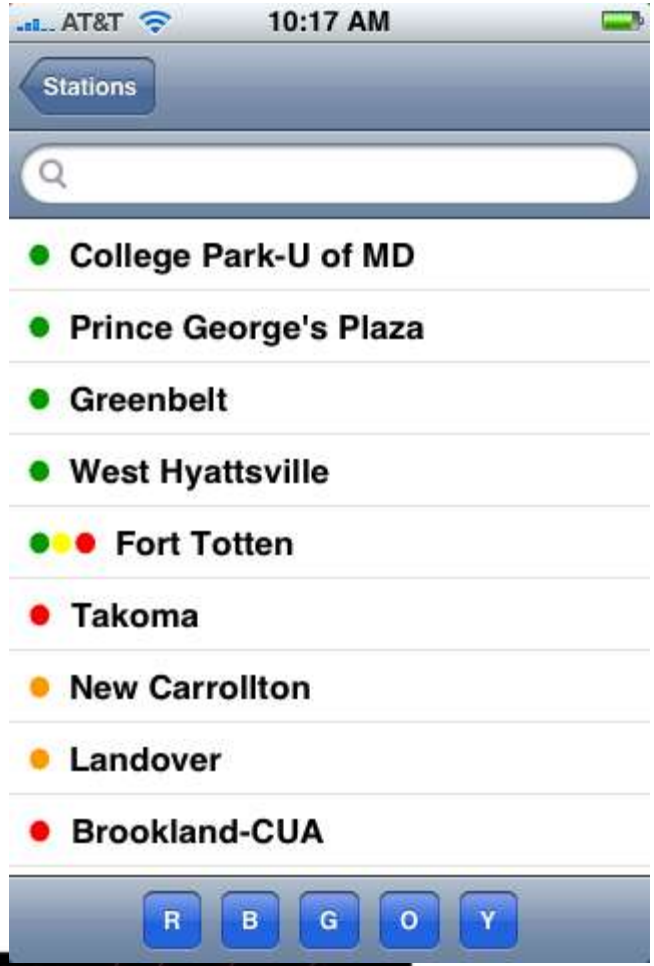

AT&T
10:16 AM
Stations and Stops
Edit
Shuttle-UM Favorites
Metrorail Nearby
College Park-U of MD
Prince George's Plaza
Greenbelt
Locate Me

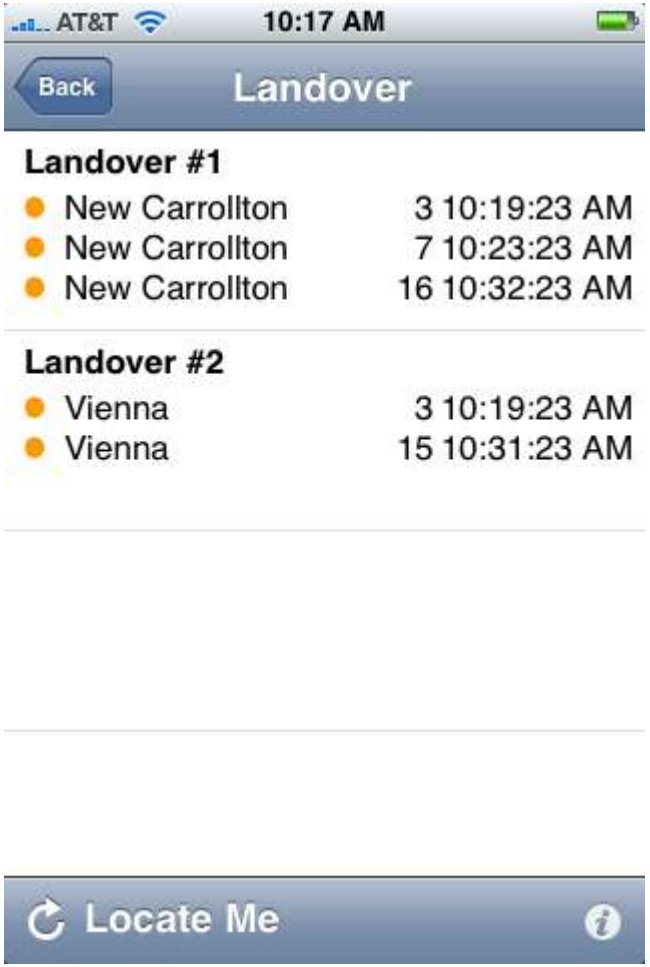
MyeTransit


AT&T
10:16 AM
Stations and Stops
Edit
Metrorail Nearby
More...
Shuttle-UM Nearby
30500: Paintbranch Dr & Stadium Dr
102 Campus Conn. North 19 10:35:51 AM
108 Powder Mill Village 29 10:45:51 AM
106 Greenbelt North 31 10:47:51 AM
27863: A.V. Williams Building
30561: Paintbranch Pkwy & Greenh...
104 College Park Metro 8 10:24:59 AM
119 Greenbelt South 8 10:24:59 AM
Locate Me

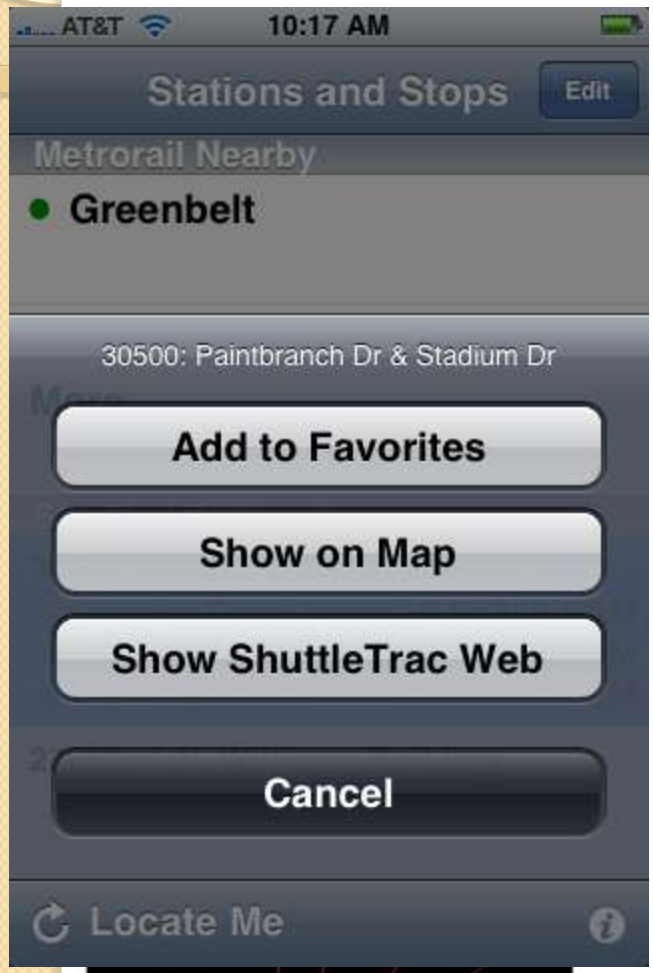

AT&T
10:17 AM
Stations
30500: Paintbranch Dr & Stadium Dr
27863: A.V. Williams Building
30561: Paintbranch Pkwy & Greenh...
36112: Campus Dr across from Mat...
36288: Campus Dr & Regents Dr (at...
27973: Technology Dr. & Paintbranc...
30140: University View
30397: Regents Dr & Stadium Dr (Bi...
30996: Regents Drive Parking Garage
Locate Me

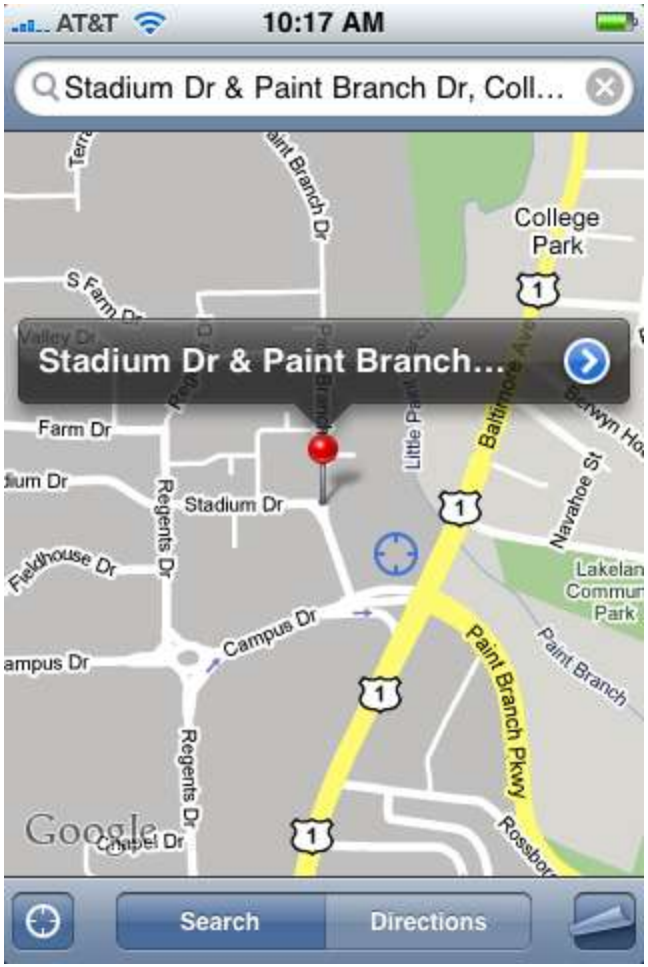
MyeTransit


AT&T
10:17 AM
Stations
College Park-U of MD
Prince George's Plaza
Greenbelt
West Hyattsville
Fort Totten
Takoma
New Carrollton
Landover
Brookland-CUA
R
B
G
O
Y


AT&T
10:17 AM
Back
Landover
Landover #1
New Carrollton 3 10:19:23 AM
New Carrollton 7 10:23:23 AM
New Carrollton 16 10:32:23 AM
Landover #2
Vienna 3 10:19:23 AM
Vienna 15 10:31:23 AM
Locate Me

MyeTransit

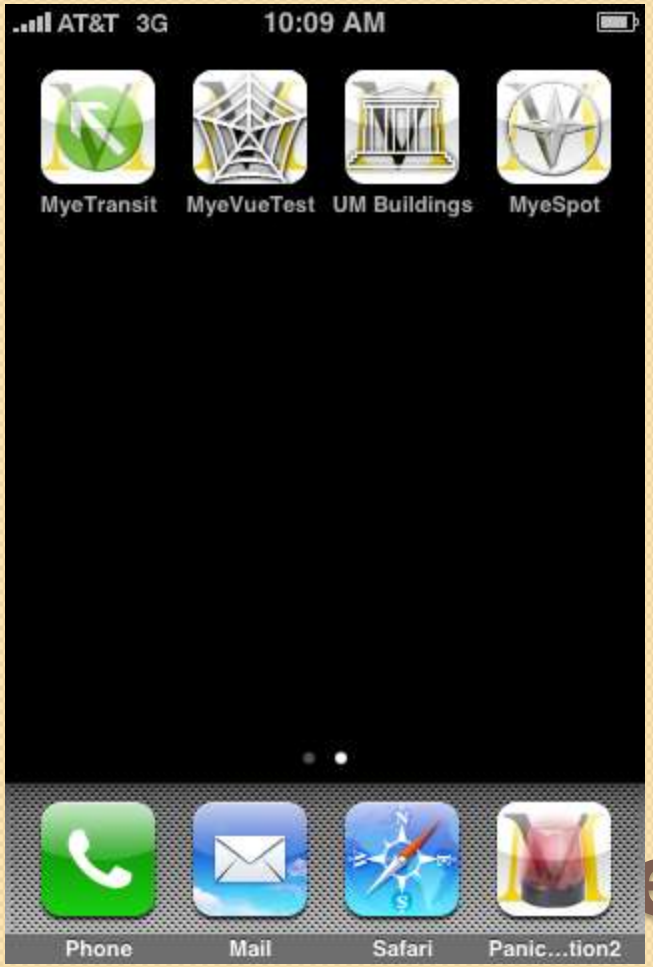




The Maryland Information and Network Dynamics Lab

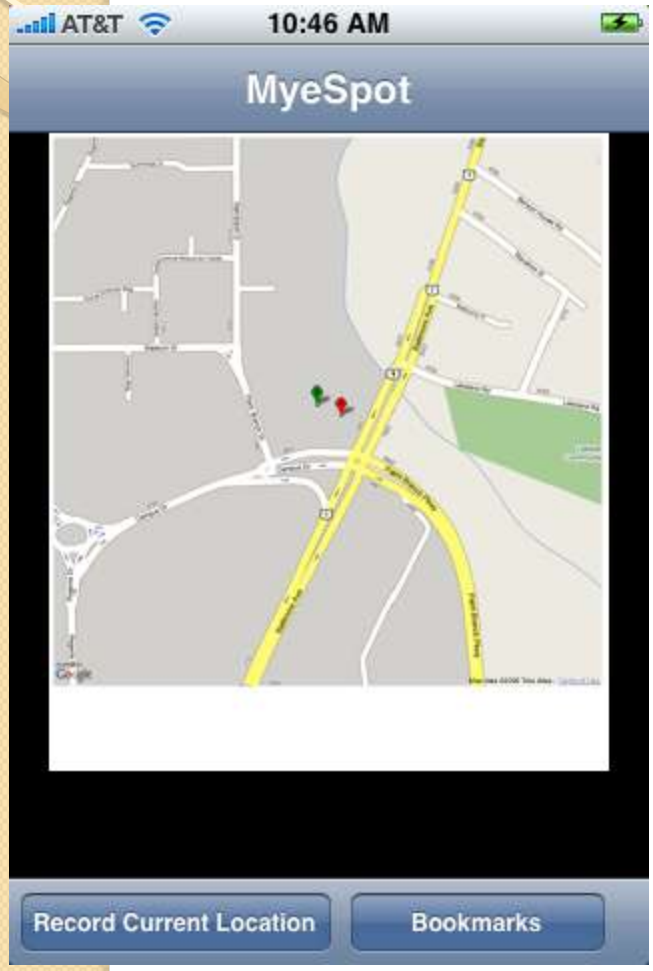
Remember a Spot of Interest

- Parking Location
- See how to get there from anywhere



eSpot

MyeSpot

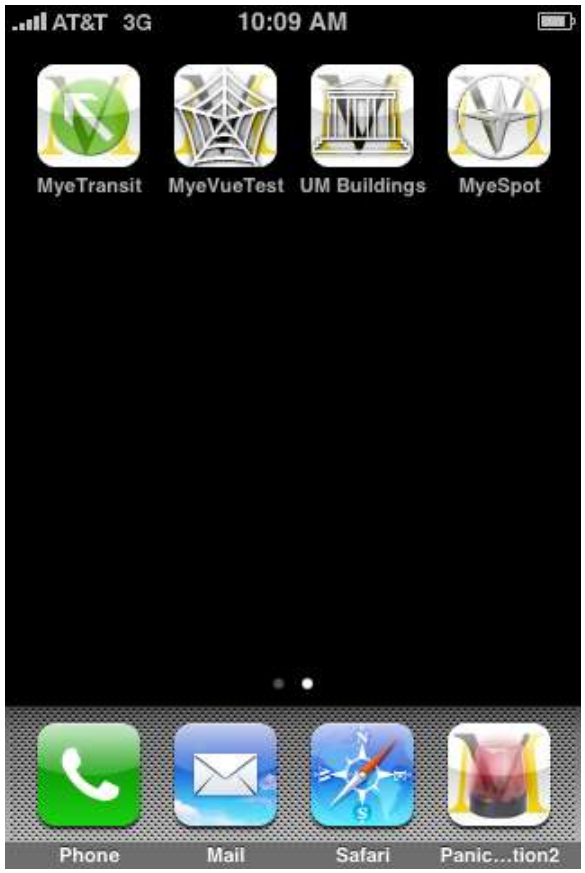

AT&T
10:46 AM
MyeSpot
Record Current Location
Bookmarks

AT&T
10:46 AM
Cancel
MyeSpot
+
Name this location
Car
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
Done

MyeSpot

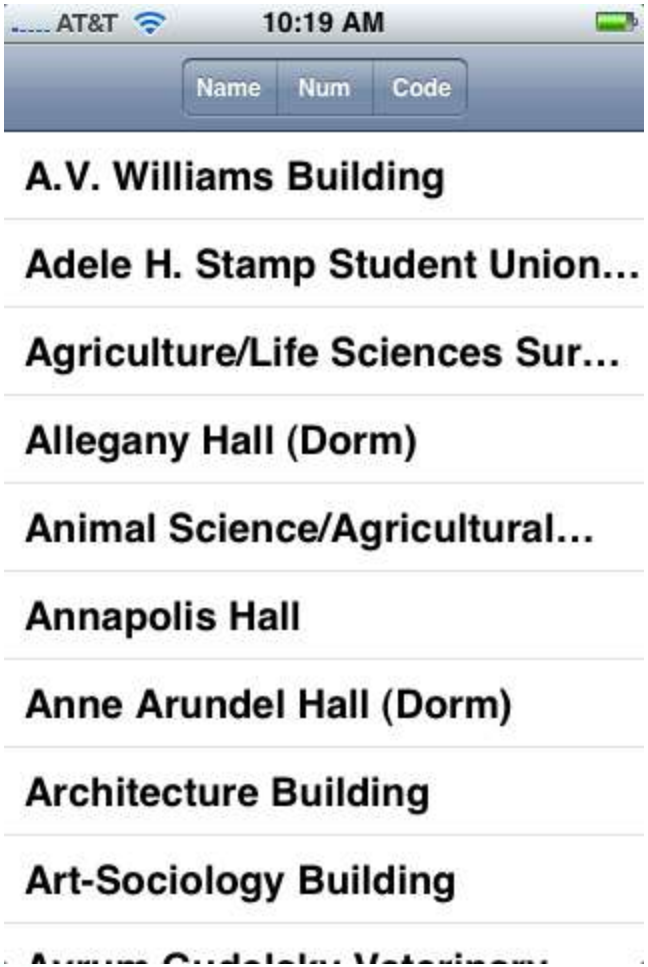
AT&T
10:50 AM
Cancel
Bookmarks
Class3
S Campus Dining Hall
Computer Lab
My Car

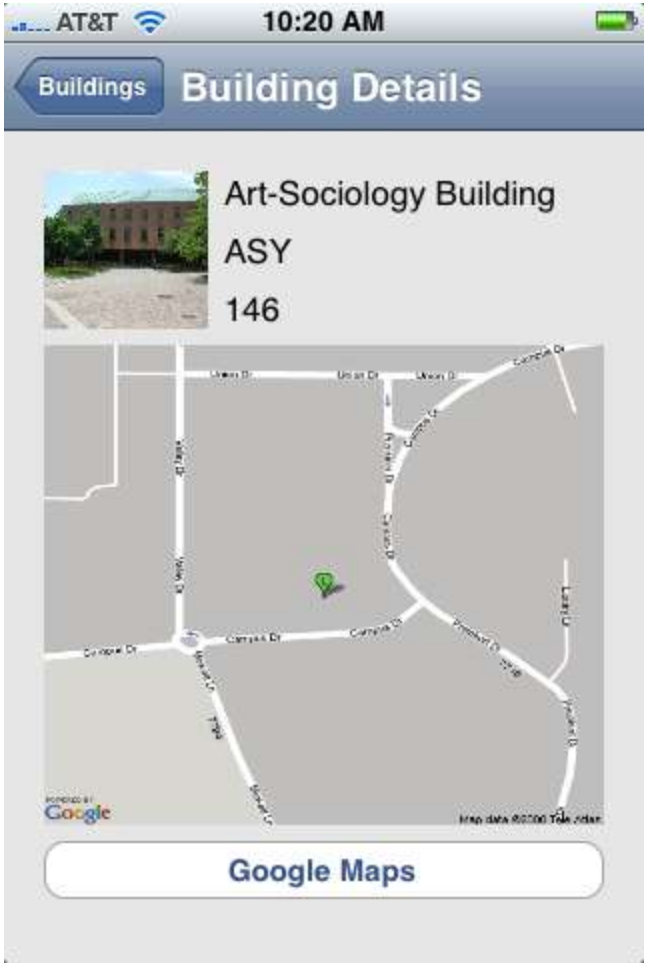
MyeBuildings



- Information about all buildings on campus
- Location on the map
- More to come

Mye Buildings





Usage of MyeVyu

- Log from 7 month period
  - 1,052,124 log entries
  - 1029 distinct IP addresses
- Session of a mobile application-
  - If the inter-click time between two application access is less than 15 minutes, it is considered one session
  - Some outliers (>200,000 clicks in a session) removed
  - 1365 sessions
  - Average Number of Clicks/session = 28.61

Most Frequent Sessions

Session Type	Count
['metro', 'shuttle']	845
['metro']	227
['hoff', 'meal']	80
['meal', 'misc']	44
['hoff', 'metro', 'shuttle']	34
['hoff']	32

Session vs Number of Clicks

Session	Number of Clicks
['hoff', 'metro', 'shuttle']	36
['metro', 'shuttle']	35
['metro', 'misc', 'shuttle']	29
['metro']	25
['meal', 'metro', 'shuttle']	22
['hoff', 'metro', 'misc', 'shuttle']	22
['hoff', 'meal', 'metro', 'shuttle']	14
['metro', 'misc']	13
['meal', 'metro', 'misc']	11
['hoff', 'metro', 'misc']	10
['shuttle']	8
['hoff', 'meal']	6
['hoff']	5
['hoff', 'meal', 'misc']	5
['meal']	4
['hoff', 'metro']	4
['misc']	3
['meal', 'misc']	3
['hoff', 'misc']	3
['hoff', 'meal', 'metro']	3

V911 - Public Safety

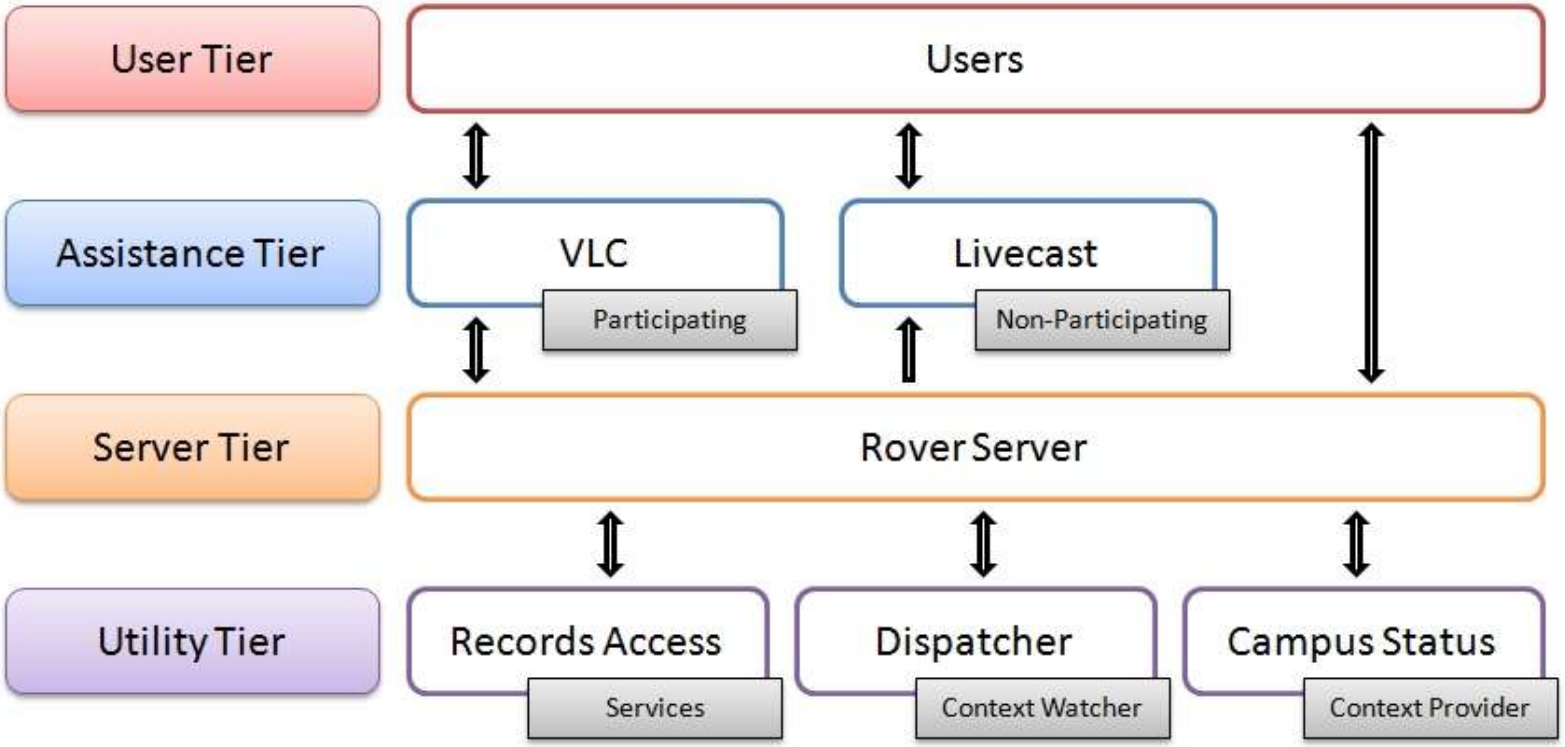
- Sources of information
  - Video
    - Static Cameras –CCTV
    - Mobile – Squad Cars
    - Alerts
  - Sensors
  - Databases
  - Web

- Resources
  - People
    - Roles
    - Capabilities
  - Equipment
  - Specialized

Common Situational Awareness

V 911

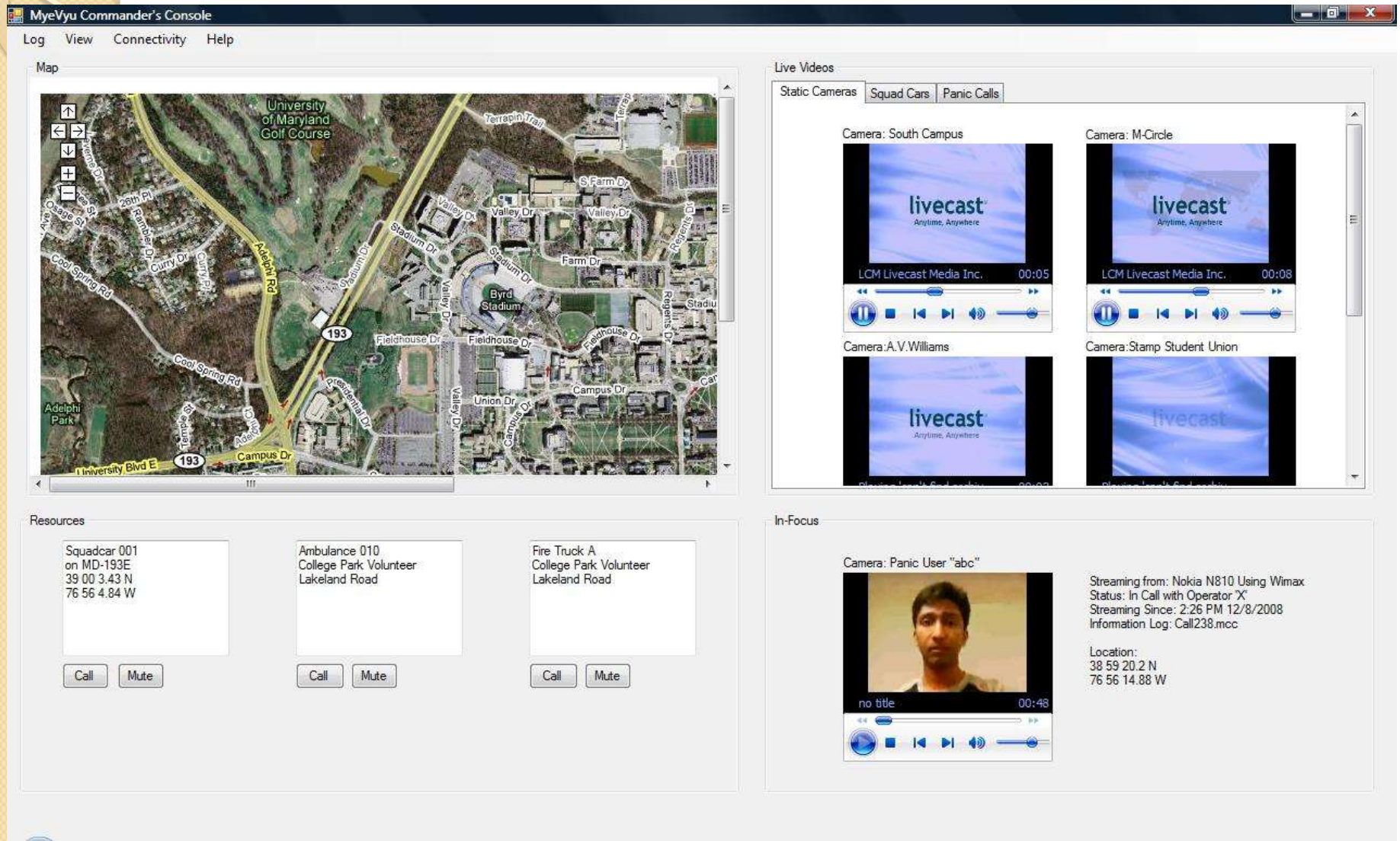
V911 Example



Commander's Console

- Information from multiple sources
- Available resources
- Issuing commands/tasks
- Real-time monitoring
- Distributed implementation
- Dynamic reporting
- Delegation

MyeVyu Commander's Console



MyeVyu Status

- IP – Patent application has been filed
  - Two patents for location technologies have been issued.
- Public Safety

- Next Steps
  - Devices –
  - Location
  - GIS
  - Public safety
  - Handicap Support
  - Visitors

TagMeAR:

Context Aware Augmented Reality Information Browser

Class Project in CMSC818G: Information-Centric Design of Systems

- Goal: TagMeAR is a mobile system which aims to be a personal information browser utilizing augmented reality to deliver relevant information/services to users at the right time and place.

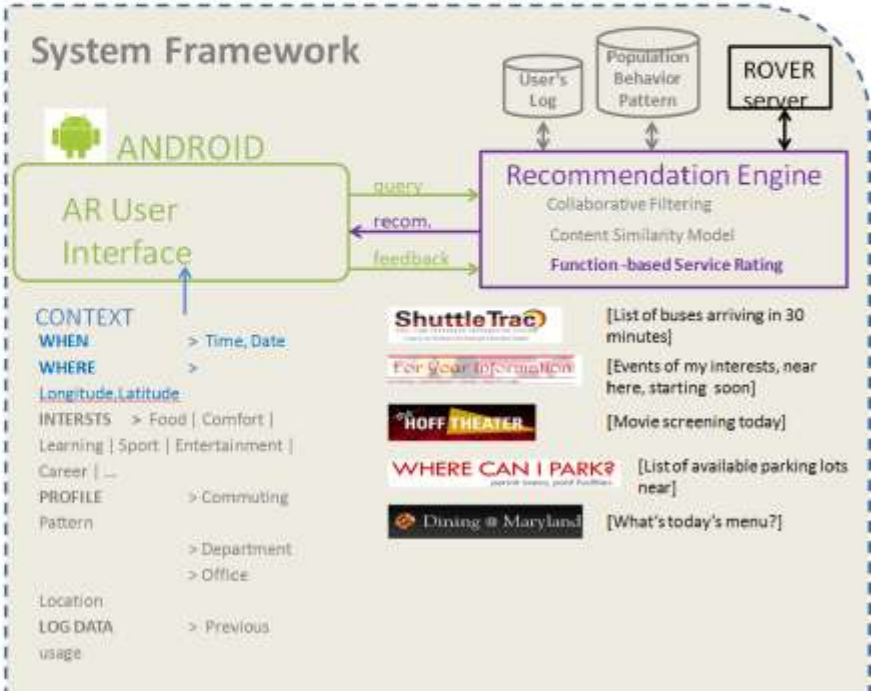
CONCEPT. Ideas

Augmented Reality User Interface

- Query without keyword → useful for "What is THAT building?",
- Mitigating information overloads by using device orientation
  - It might be faster if user knows where to point the device
- Recommendation Setting
  - Toggling dynamic filters (context entity, service, thresholds, amount of information and so on)
- Getting feedback from user → Updating MLN

... : services

System Framework



FixTerp

Tandeep Sidhu, Awalin Sopan, Andreea Olea

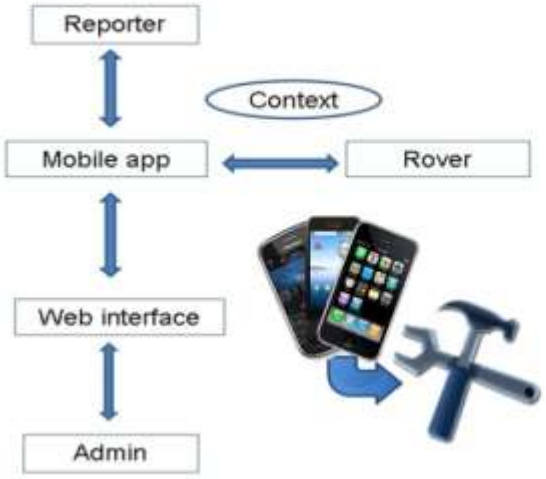
Concept

The Problem:

- Faculty and students come across many small problems on campus
- They do not know where to go for help
- Problems may happen when they do not have access to a computer

The Solution

- Create a unified issue tracking system
- Mobile app that faculty/students can use to report problems
- The underlying system will figure out where to direct the problem based on the information provided by the user



Mobile app

Users can to do the following:

- Submit new issues
- Track submitted issues

Users can describe their problem using:

- Free text
- Categorizing the issue
- Picture/Video of the problem

Users can specify the location of the problem (can augment this with information from Rover)

Users will be identified by a username in our system

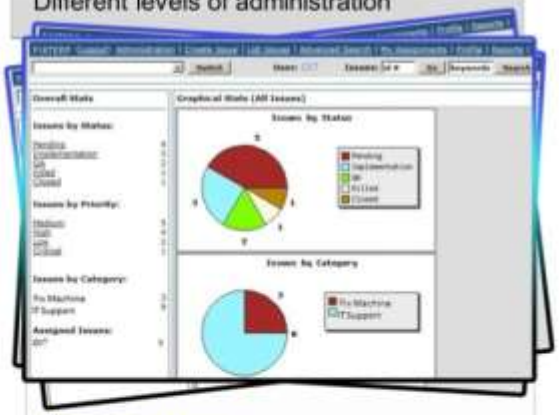
Web interface

System:

Track incoming issues
Users see, edit, and delete tickets
Use mobile app to submit issues to our Issue Tracking System

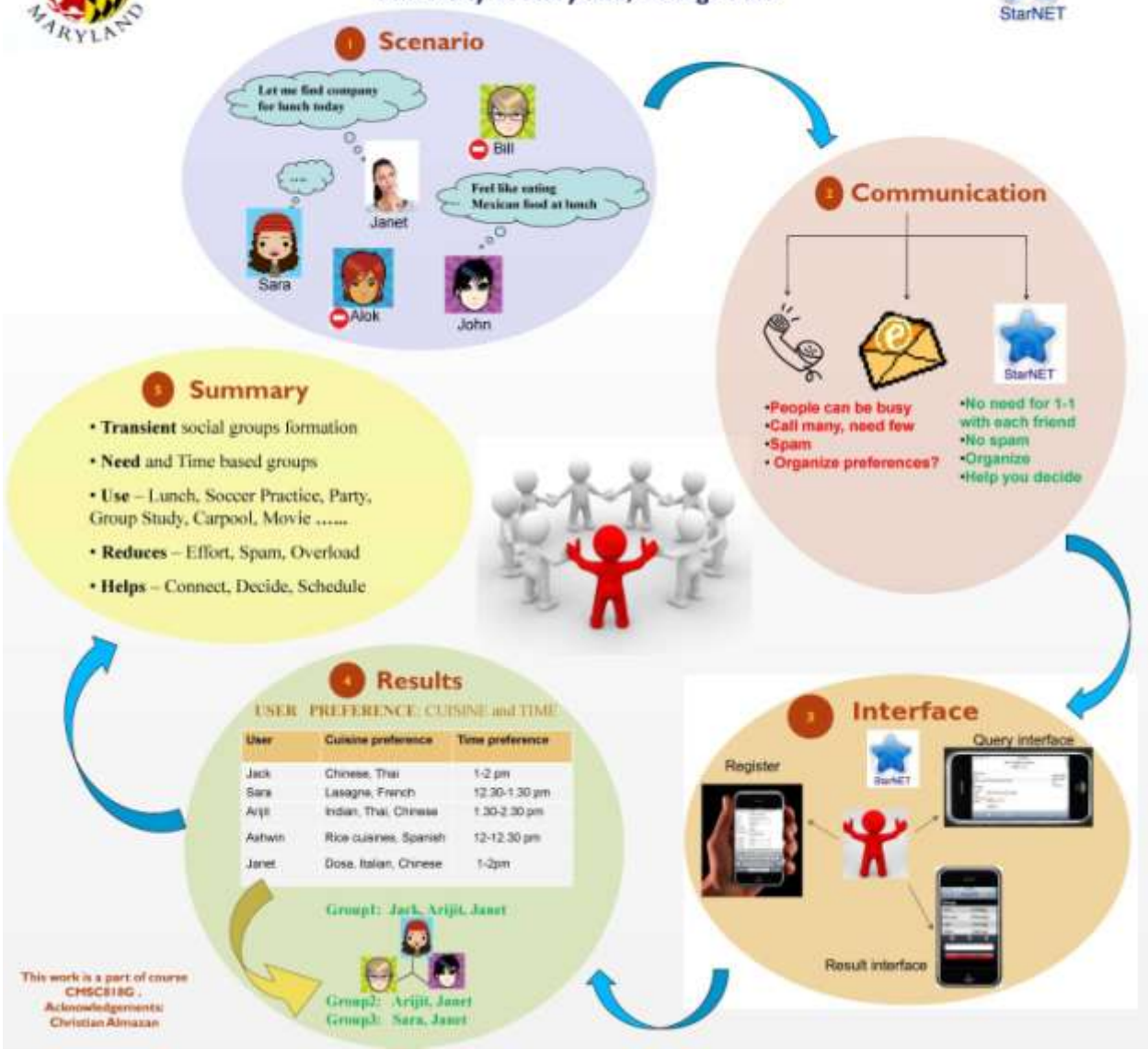
Possible enhancements:

Interactive map of campus issues
Admins manage mobile app categories
Different levels of administration



System Users

- **Faculty/Staff/Student**: Will use the mobile app to submit issues
- **FixTerp admins**: will use web-interface
  - Will manage issues in the issue tracker
  - Update status of the issue

StarNET – Transient Social Networks

K. Ashwin Kumar, Arijit Biswas, Udayan Khurana, Ashok Agrawala
University of Maryland, College Park