Ubiquitous and Mobile Computing
CS 528: NewHome

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Introduction

- "Move-out season" is a large source of waste on college campuses
- Our app will approach sustainability on WPI's campus
- Why mobile?
  - Portability and Accessibility
  - SMS messaging
  - Sensors
Related Work: Facebook WPI Homeless, Facebook Marketplace: SPAM!

Hi! We sell these two items by tomorrow morning:

vacuum cleaner 15$
adjustable clothesline 10$
Related Work:
Facebook WPI Homeless, Facebook Marketplace: SPAM!
Related Work: WPI potpourri list

- Avoid annoying emails
- Receive information only when you want
- Uniform all information inclusive posts
Related Work:

- Apps that use Object Recognition:
  - Google Lens
  - Flow powered by Amazon
  - ScreenShop

- Categorize and Tag Items:
  - Mobile Food Recognition System
Goals

- User can validate that they are WPI students
- Users post items for sale and provide a pickup location
- When the buyer for an item approaches the meetup point, the seller will be notified
- Notifications for related items for sale will be sent to buyers
Android Modules

- WPI Student Verification (two options)
  - Email verification
  - ID card verification (*Tensorflow / FirebaseMLVision / OpenCV4Android* face matching)
- **Google Maps**: to display the location of items for sale
- **Google Location API**: to leverage geofencing to assist assigning locations to items
- **Firebase**: to store user information and items for sale
- **SmsManager API**: to alert users about their items
Mock Ups

Create an Account

Login to an existing account
Mock Ups

List of all items for sale
Users can filter items by tag or sort them by date, price, location

Create a sale post for an item
Geofencing will determine if they are in a dorm or near campus. The image attached to the item will be sorted by tag

View item details
Users can see the item in greater detail and contact the seller to arrange pickup and payment.
System Architecture

USER → APP

Maps & Geofencing: Google Maps & Google Location Services

Data Storage: Firebase API

Item Tagging: Machine Learning or Mobile Vision API
## Timeline

| Week 1     | Divide tasks based on functionality  
|            | Begin creating screens             |
| Week 2     | Begin implementing database        |
|            | Collect data for machine learning   |
|            | Finish creating screens            |
| Week 3     | Connect screens to real-time database (Firebase) |
|            | Continue evaluating photo identification techniques (machine learning, Mobile Vision API, etc.) |
| Week 4     | Connect photo identification method to app |
| Week 5     | Test app with real users            |
| Week 6     | Bug fixes and final touches         |
| Week 7     | Prepare for final submission and presentation |
Evaluation Plan

- To evaluate the app we will conduct a small user study among friends and family.
- After the study we will give the participants a survey to provide feedback on what worked and what could be improved.
- Sadly the optimal testing time would be at the end of the school year, which is outside the scope of the class.
Difficulty Calculation

- Mobile Vision API/Machine Learning: (6-10 points)
- SMS: (4 points)
- Location sensing: (4 points)
- Camera: (4 points)
- Geofencing: (6 points)
- 5 Pages (4 points)
- Total points: 28-32
References