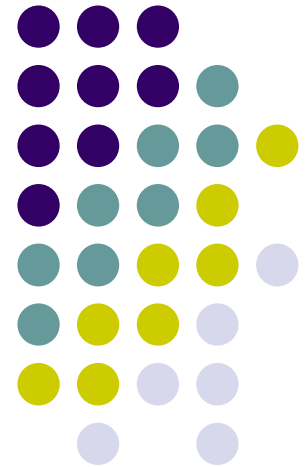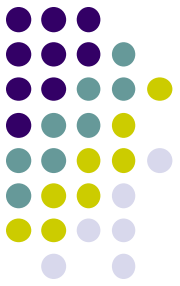# Ubiquitous and Mobile Computing
## CS 528: *NewHome*

Serdarcan Dilbaz, Carla Duarte, Trusting Inekwe, Shruti Mahajan, William Mosby

*Computer Science Dept.*
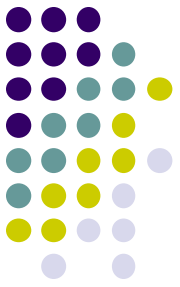
*Worcester Polytechnic Institute (WPI)*

# 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:
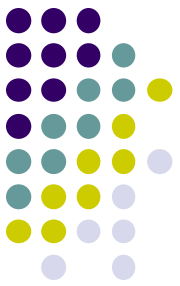# Facebook WPI Homeless, Facebook
# Marketplace: SPAM!



Hi! We sell these two items by tomorrow morning:

vacuum cleaner 15$
adjustable clothesline 10$

3 Comments

# Related Work:
# Facebook WPI Homeless, Facebook Marketplace: SPAM!



Beautiful bedroom, studio, flat, apertment, sublet, partition, aaccommodation available here site. Within your budget.https:https:https://sites.google.com/view/roomlisting421/home
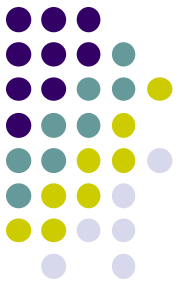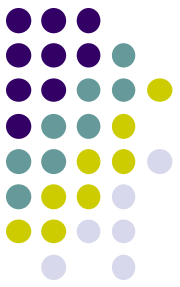
SITES.GOOGLE.COM
Home

# 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



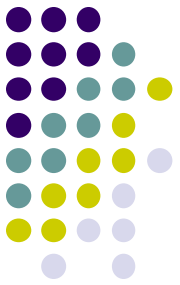rice    beef curry    sushi    fried rice    tempura bowl    toast    hamburger    pizza    sandwiches    udon noodle

# 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
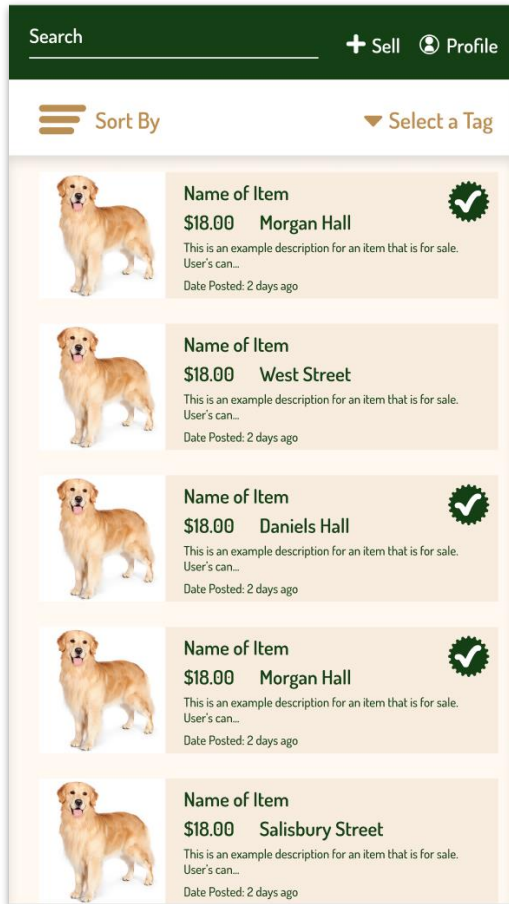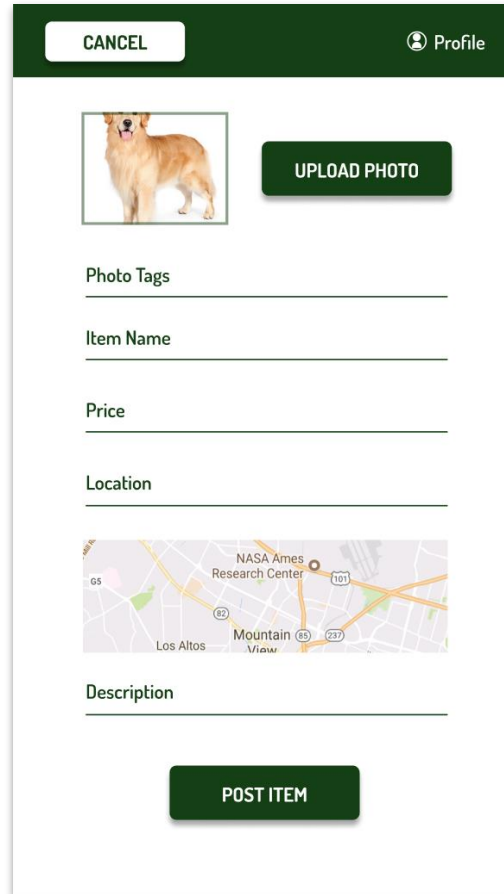
# Mock Ups
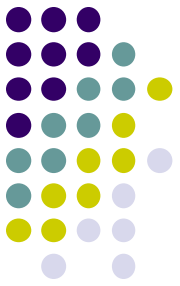


**Create an Account**
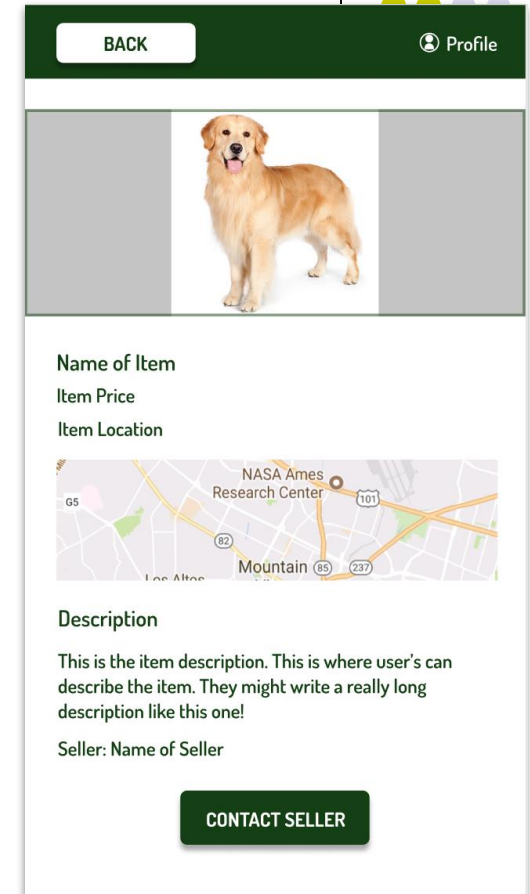


**Login to an existing account**

# Mock Ups



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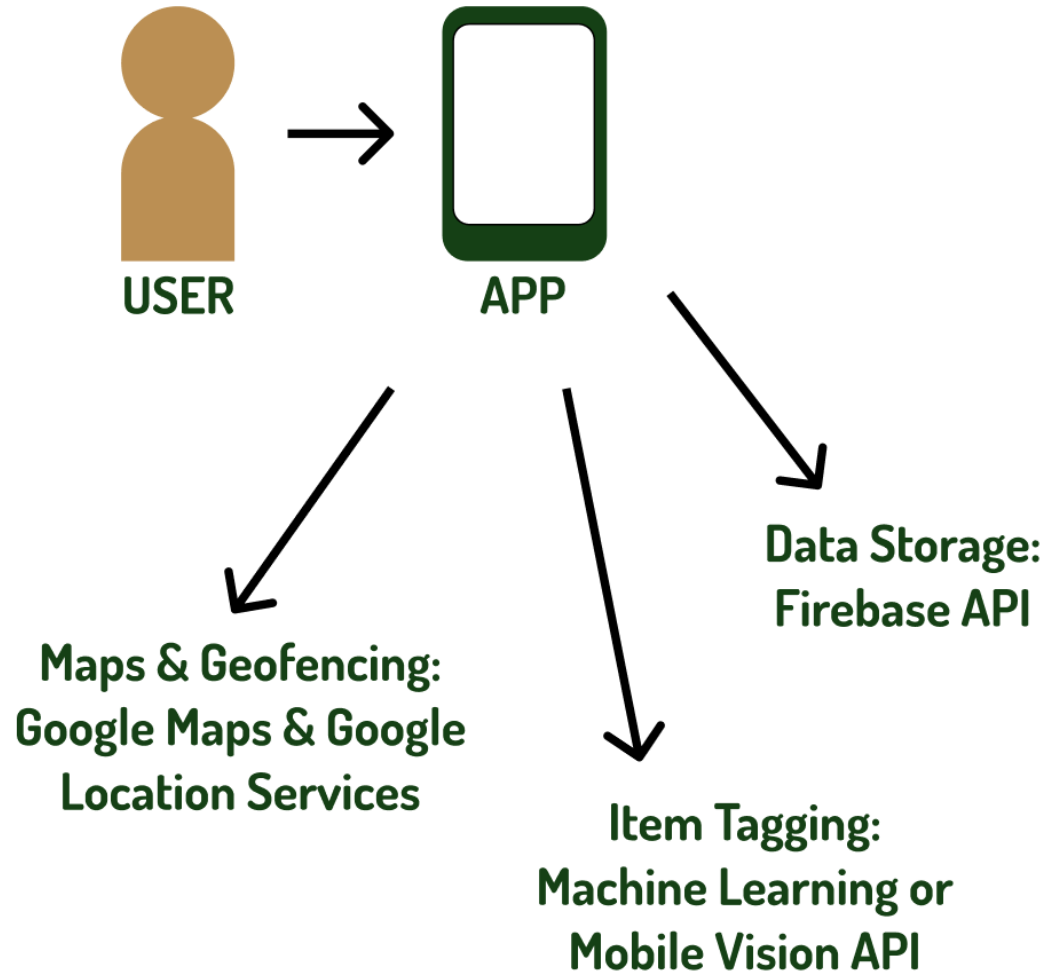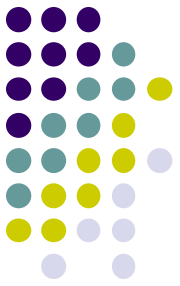Users can filter items by tag or sort them by date, price, location

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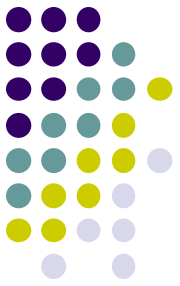Geofencing will determine if they are in a dorm or near campus. The image attached to the item will be sorted by tag

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

# System Architecture

# Timeline

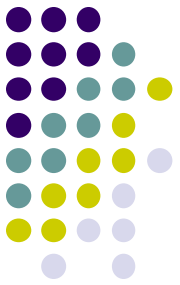| | |
|---|---|
| **Week 1** | Divide tasks based on functionality<br>Begin creating screens |
| **Week 2** | Begin implementing database<br>Collect data for machine learning<br>Finish creating screens |
| **Week 3** | Connect screens to real-time database (Firebase)<br>Continue evaluating photo identification 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.
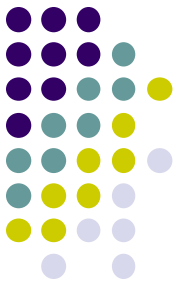
# **Difficulty Calculation**

- 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

- Kawano, Y. and Yanai, K., 2013. Real-time mobile food recognition system. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops (pp. 1-7).
-  Farris, B., 2018. Campus Sustainability Initiatives. Faculty Executives. https://facilityexecutive.com/2018/06/question-of-the-week-campus-sustainability-initiatives/
-  Office of Sustainability, Worcester Polytechnic Institute. https://www.wpi.edu/offices/sustainability/programs