CS587 Course Projects

Presented by Hien To
Schedule

- 2nd week – introduction to projects
- 3rd week – project proposal, decide team and project
- 4th week – project contract (1 page)
- 8th week – midterm progress report (1 page)
- 13-15th week – project presentation and demo
Rules

- Decide your team (1-4 students for each project)
  - A group of 3 or more students requires confirmation from TA.

- Choose the project that you wish to do

- Notify the TA hto@usc.edu (by Sep. 14th 12pm)
  - Names on the team
  - Project name
Grading

• A base credit (60%) will be given if basic features of the project is implemented
  – Program (50%)
  – Reports (5%)
  – Demo (5%)
• Credit on GUI/usability design (15%)
• Credit on creativity, new ideas, adding good features (25%)
Global Internet Device Sales

- The number of smart phones sold was greater than the number of standard computers sold in 2011.

Source: Gartner, IDC, Strategy Analytics, company filings, BI Intelligence estimates
Global Smartphone Market Share

Source: IDC, Strategy Analytics
Prepare yourselves

• How to get started?
  – Android
    • [https://developer.android.com/training/index.html](https://developer.android.com/training/index.html)
  – iOS
Project List

1. iCampusVideo
2. PalHunter
3. iCollaborator
4. iCampusProfiler
5. GeoFence
6. iCampusEvent
7. iWatchAudio
8. CrowdPath
9. CrowdWeather
10. GeocrowdViz
iCampusVideo

- Use mobile phone to take videos
- Record metadata about the video using built-in sensors
  - GPS location (lat, lng, altitude)
  - Time
  - Camera orientation
  - Shooting angles (sensors)
  - Moving speed
- Upload the video and metadata to a server
Reconstruct the path trajectory and the view area of the video on Google map.
iCampusVideo -- Server

• Design a simple DB to store the parameters along with each video file
• Reconstruct the path trajectory and the covering area of the video on Google map
• Show the trajectory and view areas of the video on the map while playing it
• Support queries on videos
• http://flowplayer.org/
iCampusVideo

Reconstruct the path trajectory and the view area of the video on Google map.
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PalHunter

- Mobile client record its location changes (moving trajectory)
- Server monitors the moving trajectories of all clients
- Clients can query trajectories of others
  - Time dependent range query (e.g. show me all the users within 20 meters)
  - User trajectory query (e.g. show me the trajectory of one user in the past 2 hours)
PalHunter-Client

• View the trajectory of yourself on mobile phone
• Send location updates to server in real-time
• Clients receive location updates when friends move close by (within some predefined range)
• Client can issue queries on the server
• Integrate with Facebook
PalHunter-Server

- Server receives location updates from users
- Server renders users’ moving trajectories on a Map view (real-time)
- Server supports queries from mobile client
  - E.g. show me all the users within 20 meters range
  - show me the trajectory of one user in the past 2 hours
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iCollaborator

• Virtually organize/monitor a class
• Auto Geo check-in/check-out students
• Share data with the server
Students

• Carrying mobile phone running your app

- Receive class schedule and directions from server
- Geo check-in/check-out a class
- Share location with server
Supervisor

• Supervisor gives out the schedule and instructions for each class
• Supervisor checks the attendance of students for each class meeting through a webpage
  – Student attendance report
• Real-time in class participation result
Server

• Design a simple DB to store the data
  – Class schedule, time, meeting location, topic, students, discussion results, etc
  – Student attendance info, check-in and check-out time, location

• Implement a server-side program
  – Send notification to clients
  – Receive mobile check-in/check-out events
  – Store data in the DB
Sample GUI

Class information

Class ID:
Discussion topic:
Meeting Time:
Location:
Classmates:

Check-in

Status: You are not checked in yet.

Class information

Class ID:
Discussion topic:
Meeting Time:
Location:
Classmates:

Check-out

Status: You have checked in for 20 minutes.
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iCampusProfiler

- Consider your cell phones as moving sensors
- Implement an app to collect information on/around campus in the interest of iCampus
- Share geo-tagged and timestamped messages with the server
- The server shows all messages on campus maps with location markers
iCampusProfiler

• Define your message, e.g. time, location, category, rating, content

• Typing-free input: enable voice input instead of using keyboard to input text messages

• Example 1: implement a project to collect food related information on/around campus
  – Recommend good meals of the day
  – Free food information
  – Special meals/drinks in the restaurants near campus
iCampusProfiler

• Example 2: implement a project to collect availability information about USC gym
  – Rate the overall crowdedness
  – The availability of treadmills, racquetball rooms, etc
  – The gym and pool hours

• Example 3: Ambience project
  – Light, A/C, noise, temperature, comfortableness of seats, projector, screen, white board, air condition, other multimedia equipments,
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GeoFence

• GeoFences are critical areas defined by either a mobile user or by a security officer
• GenFence information is stored in the database on Server
• Mobile clients received GeoFence alerts once their location are relevant to some GeoFences
GeoFence

- Define GeoFences from Mobile app
- Show GeoFences on Google map interface
- Clients receive alerts once a GeoFence is violated
1. Show user current location
2. Show all geofences returned by the server when the client query `getGeoFences()`
3. Periodically send the server current location of the client
4. Redraw geofences on the map when receive updates
5. Vibrate mobile phone when the user is in/close to a geofence
Geofence Mobile Client Interface

When user click on a GeoFence, show the detail information about the geofence returned by the server.
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iCampusEvent

• USC events data from online sources
• Store event data in database
• Event search function
• Show nearby events or search results on map interface
iCampusEvent

• User can search events by keywords, category, etc
• Mobile clients receive alerts of events by location
• Users can view details of a specific event
• Get walk directions to the event venue
Sample GUI

Student Reflections on Portraiture Port

In a show honoring Selma Holo, director of the USC Fisher Museum, students present work inspired by one of the museums exhibitions

2010-12-07 11:30:
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iWatchAudio - functions

- Record audio clips on mobile phone
- Submit audio clips to and store on server
- Play the audio on Android phone as the user is close to the location of the audio (e.g., closer than a threshold, play the nearest one)
- Show audio clips on maps according to locations
- Show nearby audio clips of user’s current location
iWatchAudio - Client

- Map-based mobile app
- Require communication with a server which stores the audio clips
- Acquire user current location and compute nearest neighbors, either on a server or on the client
iWatchAudio - Server

• Design a simple DB to store the data
  – Audio clips, detail info (length, time, location), etc

• Implement a server-side program to correspond with mobile clients
  – Send audio clips to server
  – Notify client if server receives successfully
  – Store data in the DB (audio files can be store as files)
Sample GUI

Time: 00:20 (in seconds)
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CrowdPath

• Crowdsourse the most “beautiful” path from source to destination.

CrowdPath

• Requesters submit a task, e.g., Los Angeles to San Francisco
  – Requesters can specify the number of POIs (e.g., 2) and must-go POIs, e.g., Santa Barbara

• Workers response a path, e.g., Los Angeles->Santa Barbara->San Luis Obispo->San Francisco
CrowdPath - functions

• Design a DB to store the data
  – Requesters, workers, tasks, etc

• Implement a web server and a client to
  – Submit tasks
  – Response tasks to client
    • Map-based GUI for selecting intermediate POIs
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CrowdWeather

- Crowdsource weather information (e.g., rain)
CrowdWeather - Functions

• Requesters submit a task, e.g., a location
• Workers within a distance (e.g., 5 miles) from the task can view the task and response (e.g., light/medium/heavy rain)
• Map-based GUI for posting tasks and reporting weather
Sample GUI

Report weather

- Rain
- Snow
- None

Last posted: 12:12 - 20/12/2013

Post a task

Pending tasks

Weather map

Set date/time report weather

From:
- Hour: 19, 20, 21, 22
- Minute: 39, 40, 41, 42

To:
- Hour: 19, 20, 21, 22
- Minute: 39, 40, 41, 42

Day: 24
Month: 03

OK | Cancel
Sample GUI
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GeocrowdViz

- Visualize task assignment process in spatial crowdsourcing [Kazemi, ACM GIS 12]
GeocrowdViz - functions

- Web-based client & services at server side
  - Import worker set and task set from files
  - Choose an algorithm and run
  - Show the concept of time instances where workers and tasks come and go
  - Show statistics about task assignment at each time instances, e.g., the number/percentile of assigned/expired tasks, the number of assigned workers.
  - Varying parameter settings

- Datasets and algorithms (in java) will be provided
Requirements

• Client: iOS or Android
• DB Server: any, e.g., Oracle, Postgresql, Mysql, Oracle, DB2, Mongodb
• Web Server: any, e.g., PHP, Java Servlet, Django
Deliverables

• Project packages (including src, res, lib, etc), both client and server
• Tech report on explaining the program and how it works (installation, execution, major modules, snapshots of the running program, etc)
• Final presentation slides in powerpoint
Useful links

- http://www.flaticon.com/
- https://bitbucket.org/
- https://ellislab.com/codeigniter
Questions?

Q & A