# Social Networking Application

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## 1 Overview

The goal of this capstone is to develop a social networking application for the Android mobile platform. The application will allow users to register an account with a user name and password. Account information will be stored in a database on a back end server. Users will authenticate using their user names and passwords every time they launch the application. User account authentication will be handled by the server to help ensure secure login. User account credentials will be encrypted before they are sent from the application to the server.

The application will provide an interface for the user to create a "User Profile". Every user will create a User Profile when they log into the application for the first time. User Profiles contain personal information about the user obtained at the time that the user creates their User Profile. A user is not required to enter information for all input fields in the User Profile creation interface. This information will be stored in the back-end database. Input fields for user profiles will include their name, university, course schedules, and an identifying picture of their choosing. The list of potential user input fields may be expanded in the future.

The User Profile feature will provide a way for users to identify other users that they may already know, or that they may wish to become friends with by exposing some of the personal information, such as their name and university, to other users. Users will be free to modify/delete information from their User Profile at any time.

The application will contain three other entities existing alongside users: 'Likes', 'Groups', and 'Events'. Groups are entities that contain zero or more other groups, and zero or more Users. The default group will be known as "World". Users may create other groups that exist under "World". For example, a group may be created and named "Western Carolina University." Users could then join this group, and their user name would be added to the group roster. A user's group membership will be visible from their profile as additional identifying information.

## 2 Problem Statement

The purpose of this project is to develop a social networking application targeted at the Android Mobile platform which will provide context- and location-based communication and event scheduling with other users backed by an external database, maintaining user profiles and other information, to simplify data processing. We are also to design a Campus Safety application targeted at the Android platform in order to provide public safety information, from both on-campus and off-campus sources, to students in an easily accessible manner.

## 3 Requirements Specification

- The android application should provide the ability to create a persistent profile containing information, of which some will be publicly available and some will be private. We will investigate using facebook authentication for this app, as it seems to be both popular and reduce the complexity of building a login system [1].

- The android application should allow a user to join groups, add 'likes' to their profile, and broadcast/receive events based on these likes and groups. Users should be able to create likes/groups if a reasonable protocol for doing so becomes apparent while maintaining security and without overcomplicating the app.

- The android application should provide the ability for users to search/query for other users, 'likes', and groups available within the app. The user should also be able to upload their schedule; this will allow the application to deactivate itself or take other action when the user is 'busy' according to their schedule.

- The user should be able to have a 'friends' list, a special group which allows viewing of additional

profile information such as the user's class/work schedule. This will also allow the user to broadcast their location to their friends, making meetups easier. GPS is notoriously known for using large amounts of power, draining the battery in a short amount of time. We will be investigating methods for efficiently making use of the GPS transmitter as well as using other technologies in place of GPS in order to conserve power [2] [3].

- The application should provide different levels of events and determine if events warrant a push notification versus a log under their respective page. The server should provide a stable, consistent database of user credentials, profiles, and other information.

- The server should be able to provide information about a user without revealing personal information (i.e. extract 'busy' status from a user's schedule and deliver it to other users, without revealing the actual details of the schedule).

- The server should provide user authentication; this user authentication will be encrypted if it is feasible to include this within the scope of this project.

# 4 Testing Plan

Testing will be completed as the application is developed. We will create Regression/Integration tests using the Android TestSuite - a derivative of JUnit. An adequate server-side unit testing framework will be selected based on the final language decision; presently, there is no concrete language decision for the server while we weigh our concerns about performance, usability, and database and API availability. Testing will also include an evaluation of the user experience on Android devices of multiple sizes, and conceivably performance concerns. Ideally, we will be able to generate and/or simulate a large number of registered users as well as simulated users to test usability. Our server will be the server Polaris. Our test android devices will be a Samsung Galaxy Neo, an LG G2, a Google Nexus 7 (2012), and any other devices we can allocate during the course of this project. We will be targeting Android Version 2.3 for the Campus Police application and Android Version 4.0 for the 'Friend Finder' application.

# 5 Schedule of Completion

**Tuesday, September 16, 2014**

We will have completed the emergency application for the Western Carolina campus police. The plan-

ning stage for the second part of our capstone will also be finished; this includes the layouts for the Android application and UML diagrams for the entire 'Friend Finder' project.

**Tuesday, September 30, 2014**

At this meeting, we will have the skeleton of the Android application finished. This contains the screens that will be used, including the graphics, layouts, styling, and non event-driven buttons. The options to enter text, change forms, and making sure the user enters valid input will have been implemented as well. We will have the normalized database schema completed, setting the layout for the information stored in the database by the application.

**Tuesday, October 21, 2014**

By this time, there will be user authentication and encryption. The information for all the user profiles will also be uploaded into the database. We will also have created several different 'likes' and 'dislikes' that users can choose to add to their profile, which will then be updated in the database.

**Tuesday, November 4, 2014**

At this point, all the information from the users stored in the database can now be queried for 'likes' and 'dislikes'; a user can choose a 'like' or 'dislike', and the database will return a list of the current users who also have that same interest or disinterest. The user will also be able to create groups of different people, called 'circles', that will be saved into a group database. There will also be standard groups created by us that will be gathered from users based on their location, schedule, and other information.

**Tuesday, November 18, 2014**

The user will now be able to create meetings and invite either one of his own custom groups or one of the standard groups to the event. There will also be the option to input their course schedule. When the user is in class, it will display that they are busy on the user's profile.

**Tuesday, December 2, 2014**

Whenever a user is invited to an event, they will get a notification sent to their phone. If the user has entered the schedule and is currently in class, their notification will be delayed until they are free; if they have their options set to not receive invitations, no notification will be sent. We will also have implemented

a map which shows nearby users who have the hidden mode disabled in their settings; hidden mode allows a user to accept invites and create events without being visible on the map to other users.

## References


[1] Konstantinos Mourtzoukos and Ioannis T. Christou. Experiences running a prototype location-aware mobile social networking system. In *Proceedings of the 8th International Conference on Advances in Mobile Computing and Multimedia*, MoMM '10, pages 362–365, New York, NY, USA, 2010. ACM.

[2] Wolfgang Narzt. A generic context-based architecture for energy-efficient localization on mobile devices. In *Proceedings of International Conference on Advances in Mobile Computing & Multimedia*, MoMM '13, pages 33:33–33:42, New York, NY, USA, 2013. ACM.

[3] Zhenyun Zhuang, Kyu-Han Kim, and Jatinder Pal Singh. Improving energy efficiency of location sensing on smartphones. In *Proceedings of the 8th International Conference on Mobile Systems, Applications, and Services*, MobiSys '10, pages 315–330, New York, NY, USA, 2010. ACM.