

CONNECTING PEOPLE THROUGH A MOBILE SOCIAL NETWORK

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Introduction

- ❖ Online social network has become popular and indispensable for human life.
- ❖ Online social network has two types: public social network and private social network.
- ❖ Public social network is open to public to serve big communities of users. It provides several of general and common features to interact and share common interests. For example, Facebook is a public online social network which serves a huge community of users.
- ❖ Private social network serves small closed groups such as family members, employees, partners, or colleagues. It provides dedicated features to private groups such as sharing and tracking locations, sharing books, upload files of school projects, practice programming, and so on. For example, Edmodo private social network is designed for use in education. With Edmodo, teachers can control student chatter on the main classroom page. Students can upload files of school projects. Edmodo also has a feature to ensure that no student will forget to study for tomorrow's quiz once he or she has left school.

Introduction

- ❖ Tracking location allows a user tracking location of other users who are carrying a built-in GPS mobile device. For example, Facebook has a function to see locations of other users, but only one user at a time.
- ❖ Tracking location feature is more useful if it is not limit tracking one user at one time, but also tracking multiple users at a time. It also supports group management which allows a user manages targets into groups for monitoring their locations.

Introduction

- ❖ With the growing number of mobile platforms, mobile application development for multiple platforms becomes more complex and consumes more time and more money for labors.
- ❖ To relieve this scenario, cross mobile platform solution emerges as a good solution. It reduces cost and shortens time of mobile application development.

Introduction

- ❖ For the server application deployment, cloud computing becomes popular.
- ❖ Cloud computing has some advantages such as
 1. Cost Efficiency
 2. Flexibility, Convenience and Continuous Availability
 3. Scalability and Performance
 4. Resiliency and Redundancy
 5. Backup and Recovery

Objective

- ❖ Develop a private mobile social network service that is based on the cloud server, instead of a local server.
- ❖ Design an extensible architect which is able to be extended to support additional features without re-writing the core APIs.
- ❖ Build some features that would connect the people via the online social network with ease, including the core features such as chatting and location tracking and some extended features such as Python Fun, Car Trace, Earthquake Info.

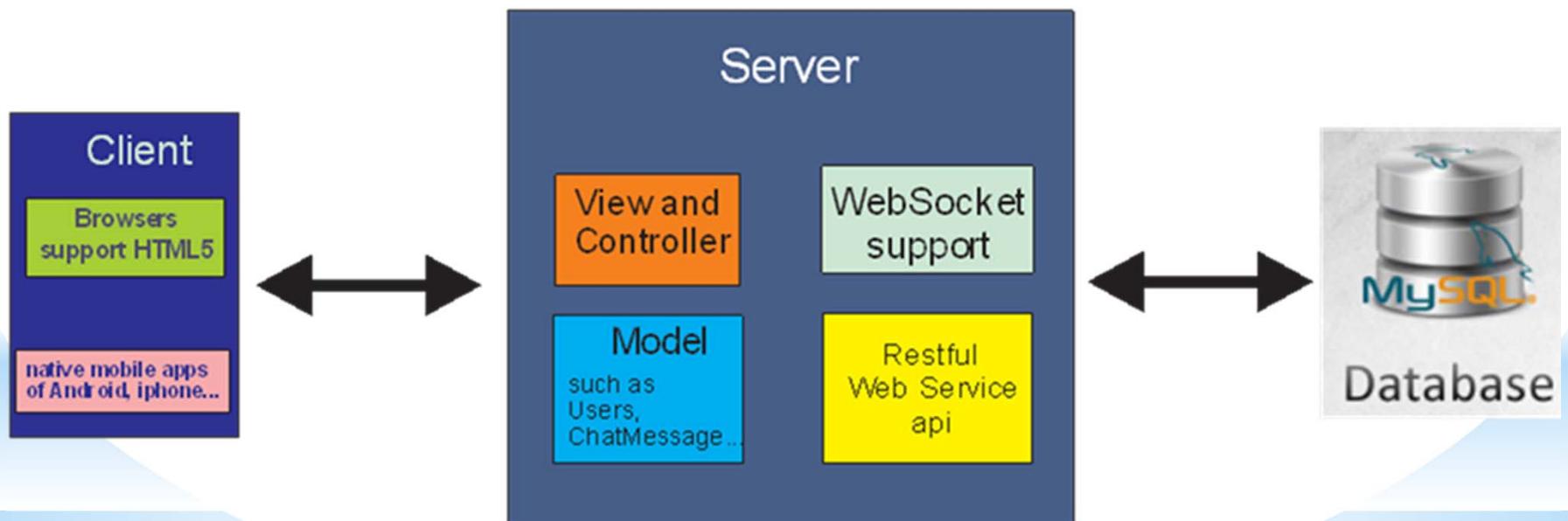
Objective

- ❖ With the tracking location feature, users are able to track one or multiple other users at same time. It also supports group management to manage users into groups.
- ❖ Support multiple device platforms by using cross mobile platform solution.

Architecture Design

Project architecture has three parts.

- * Client part
- * Server part
- * Database part



Model View and Controller

- * The “Model” module contains all of classes which are used for Object-Relational Mapping (ORM) with tables in the database such as Users.java mapping to Users table, and represents chat messages such as ChatMessage.java.
- * The “View and Controller” module contains all of HTML, Javascript, jQuery mobile, and Java codes which provide views to clients and communicate with the database.

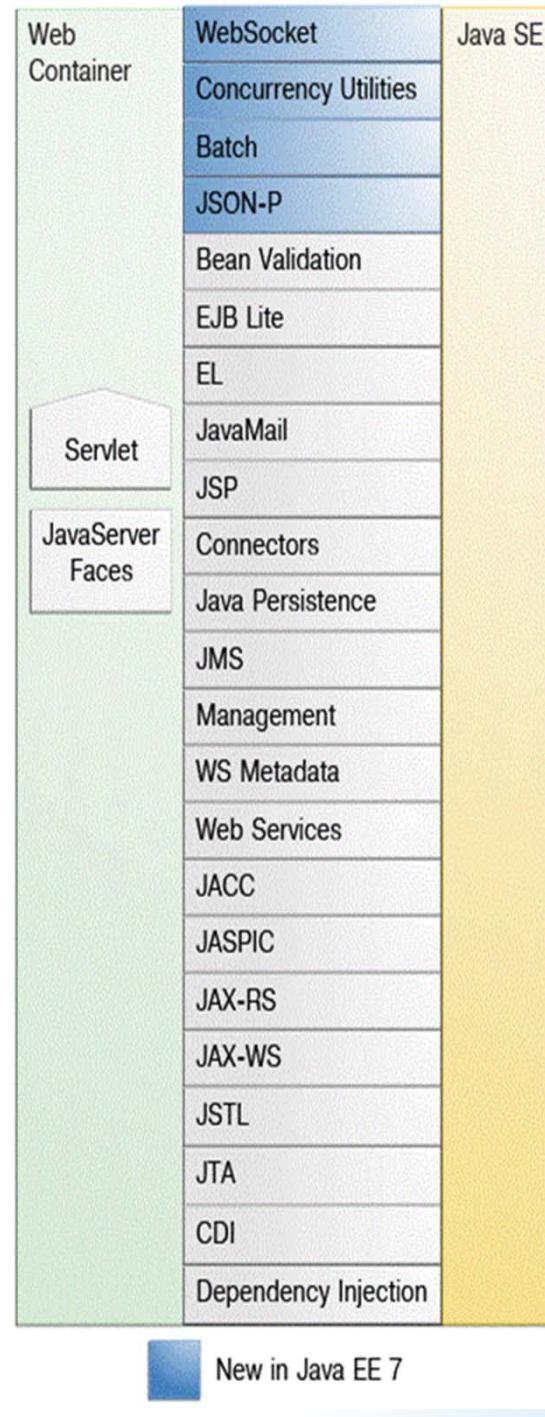
Restful Web Service

WebSocket

- * The "Restful Web Service API" module contains all of URI methods which are used by "View and Controller" module. All of URI methods are used to manage all of the tasks between clients and the server such as chatting, tracking location, turn on and off broadcast location option, group management, make friends, change password and so on.
- * The "WebSocket support" module contains codes which are used to support WebSocket in the chat and location feature. It is used to push messages among users and notify location change to users. Users don't need to send request at interval time (polling technique). This module is written by using Java EE 7.

WebSocket

Java EE APIs in the Web Container



New in Java EE 7

WebSocket

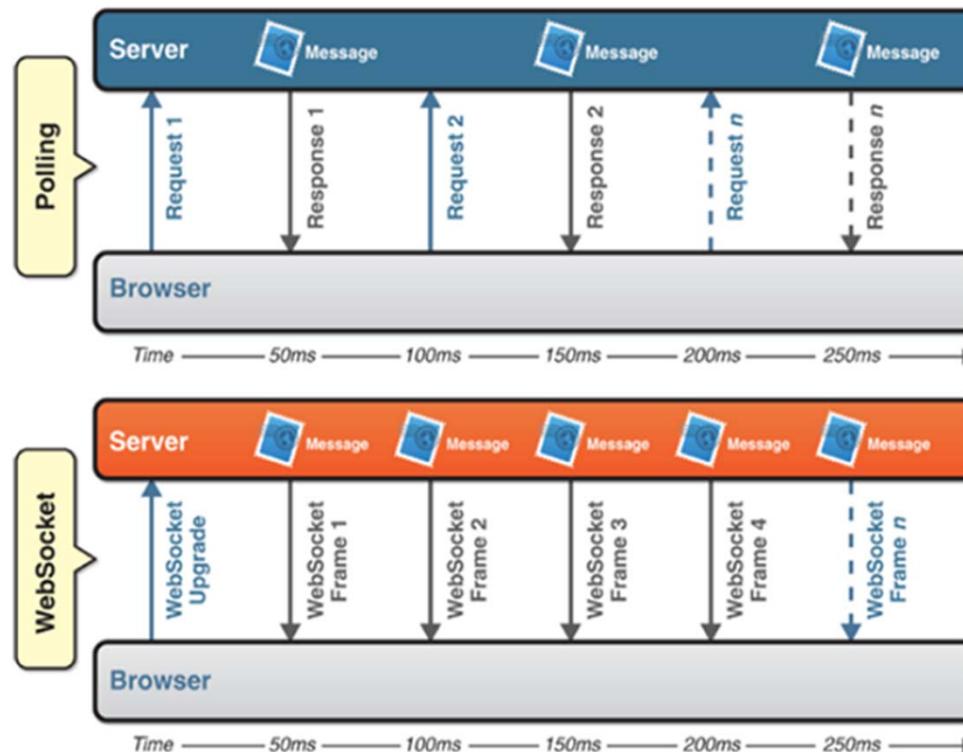
- * WebSocket is server-side push technology.
- * With HTTP, by nature, the server cannot push data to clients. Every time clients want to get the most updated data such as stock prices, news, weather information, or traffic, they need to send an HTTP request to the server and wait responses from the server.
- * Polling is one of techniques to provide real-time web applications and it simulates server-side push technology.

WebSocket

- * Polling means a client makes a request to the server with interval timed synchronous call to check if there is any information available for it. The client receives a response, regardless of whether data is new or old.
- * However, real-time data is un-predictable.
- * With polling technique, unnecessary requests from clients could happen. Needless connections are inevitable.

WebSocket

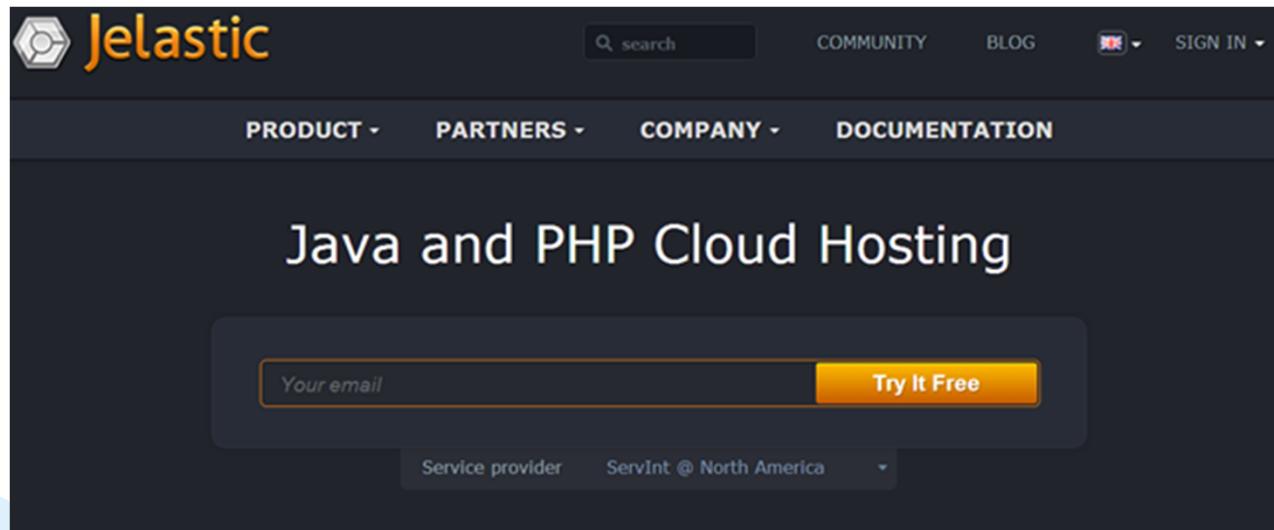
- * WebSocket emerges to eliminate these issues.
- * WebSocket provides a significant reduction in needless network traffic and latency compared to the polling technique.



WebSocket vs Polling

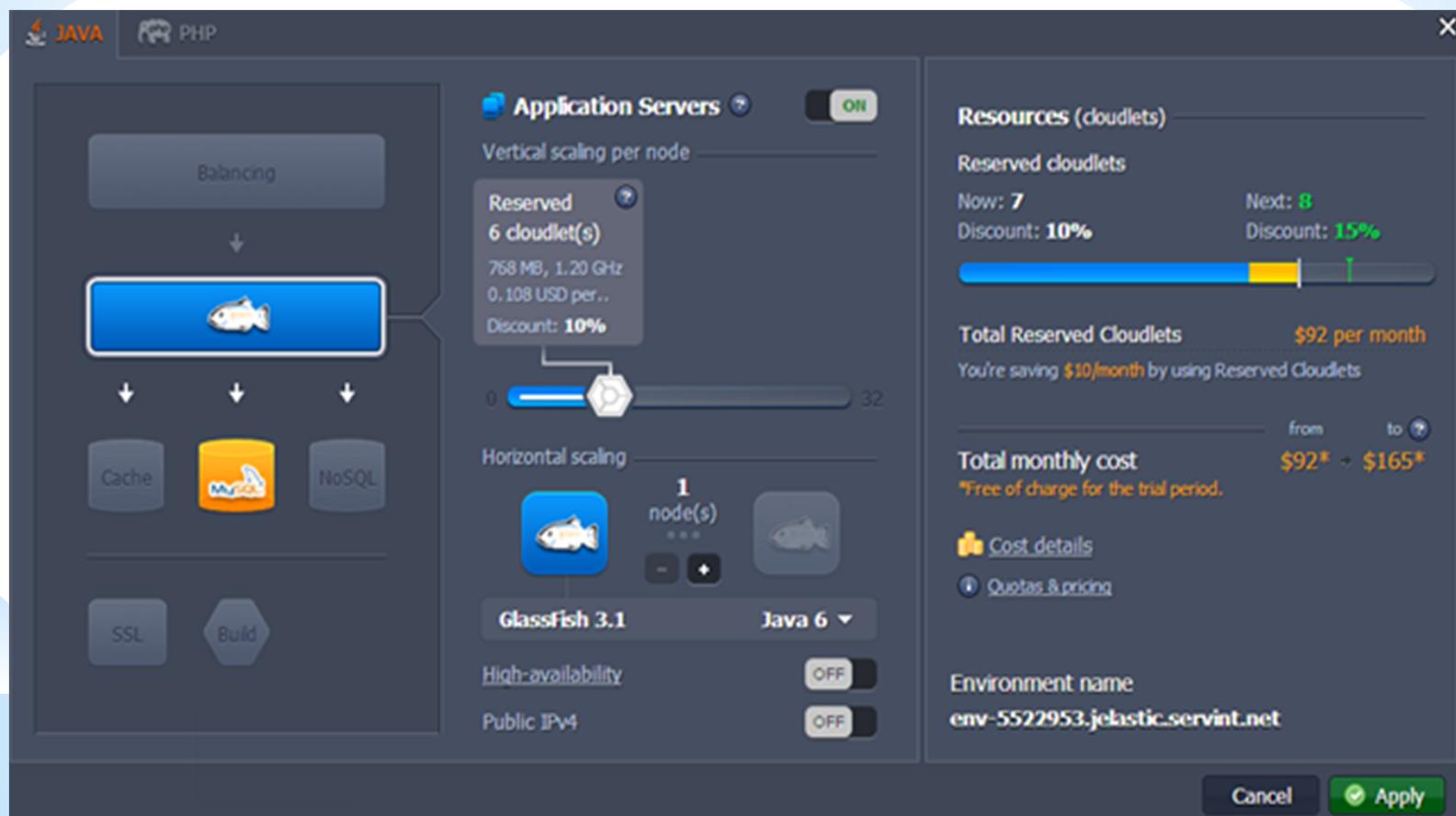
Cloud Selection

- * Server part is built as Java web application. It is pushed to a Java Cloud Platform cloud to serve the client.
- * One example of Java Cloud Platforms is
<http://jelastic.com/>



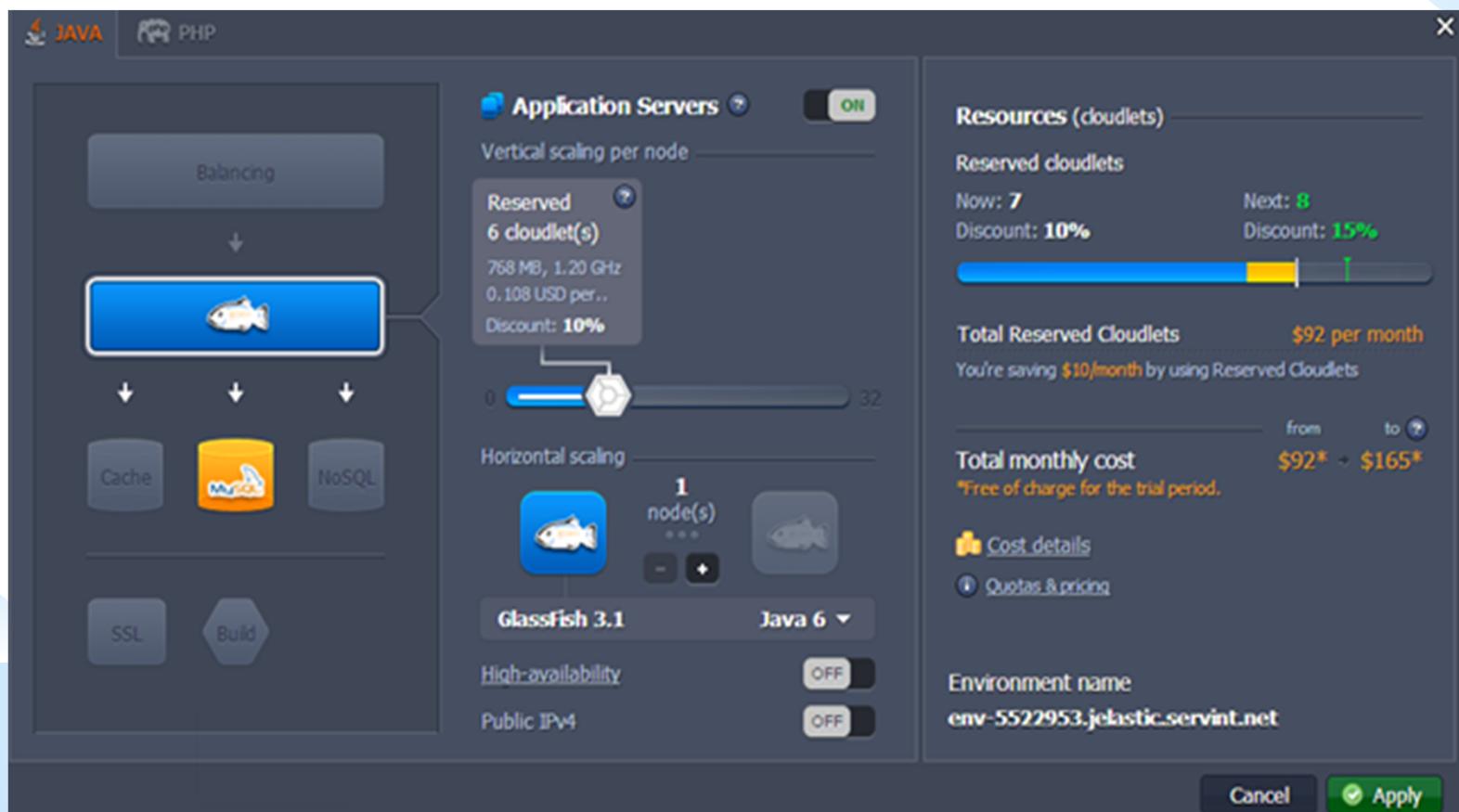
Cloud Selection

- * The cloud gives users Application Server such as GlassFish, and database server such as MySQL.
- * Users can upload their applications to those servers and run them.



Cloud Selection

- * The application server must support Java EE 7 which supports WebSocket.
- * In the figure, the application server GlassFish version 3.1 supports Java EE 5 and 6.
- * To solve this problem, users should contact the cloud support department, or try other Java Cloud Platform clouds.



Cloud Selection

- * Another option to push the server part the cloud is by using IaaS. With the above PaaS solution, the provider supports only two application servers: Tomcat and GlassFish.
- * For example: If the users don't want Tomcat and Glassfish, they want Oracle WebLogic Server. They can use IaaS to setup whatever applications and database servers they want.

Cloud Selection

- * IaaS: Amazon EC2

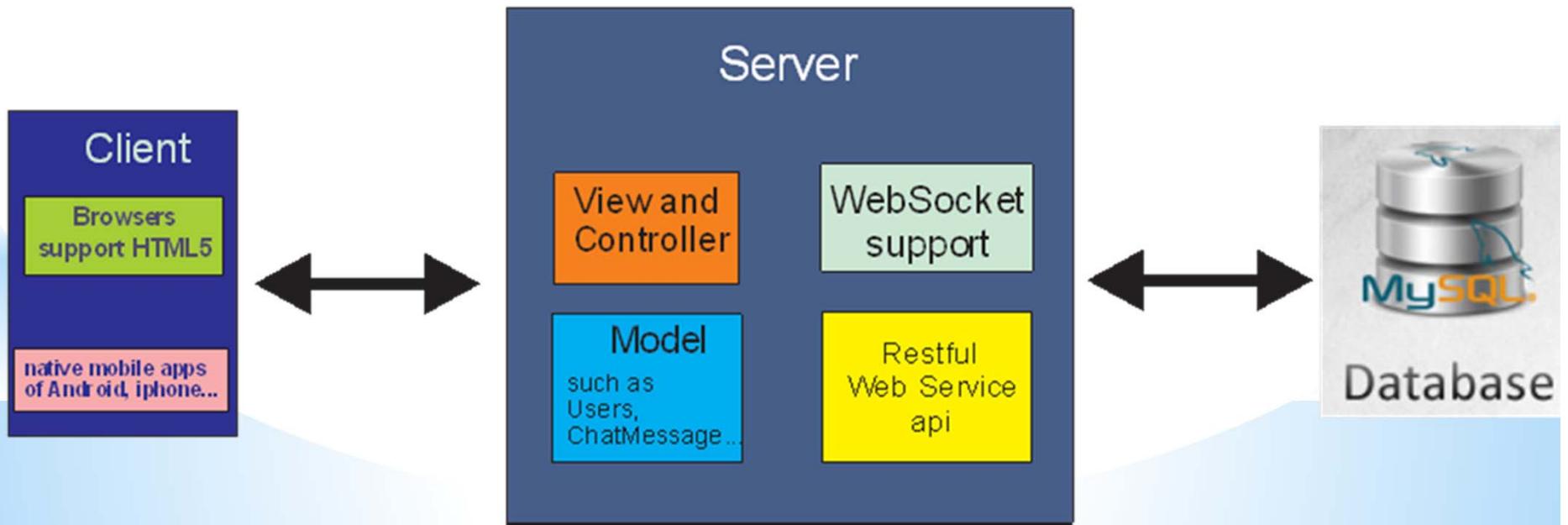
The screenshot shows the Amazon EC2 console interface. At the top, there are buttons for "Launch Instance", "Connect", and "Actions". Below that is a search bar with filters for "All instances" and "All instance types", and a "Search Instances" input field. The main table lists one instance: i-8cd078b8, which is an m1.medium type in us-west-2b, currently stopped. The instance status is shown with a red circle icon. Below the table, there are tabs for "Linux", "RHEL", "SLES", "Windows" (which is selected), and "Windows with SQL Standard". A large blue box highlights the instance details:

Hostname	:	WIN-DS5AV3G9KMI
Instance ID	:	i-8cd078b8
Public IP Address	:	54.200.184.210
Private IP Address	:	172.31.33.201
Availability Zone	:	us-west-2b
Instance Size	:	m1.medium
Architecture	:	AMD64
Total Memory	:	3.75 GB
Processing Power	:	2 ECU
I/O Performance	:	Moderate

On the left, a sidebar titled "Light Utilization Reserved Instances" shows reserved instance pricing for the US West (Oregon) region. It includes tables for Standard Reserved Instances, Second Generation Standard Reserved Instances, Micro Reserved Instances, and High-Memory Reserved Instances. The "Windows" tab is selected.

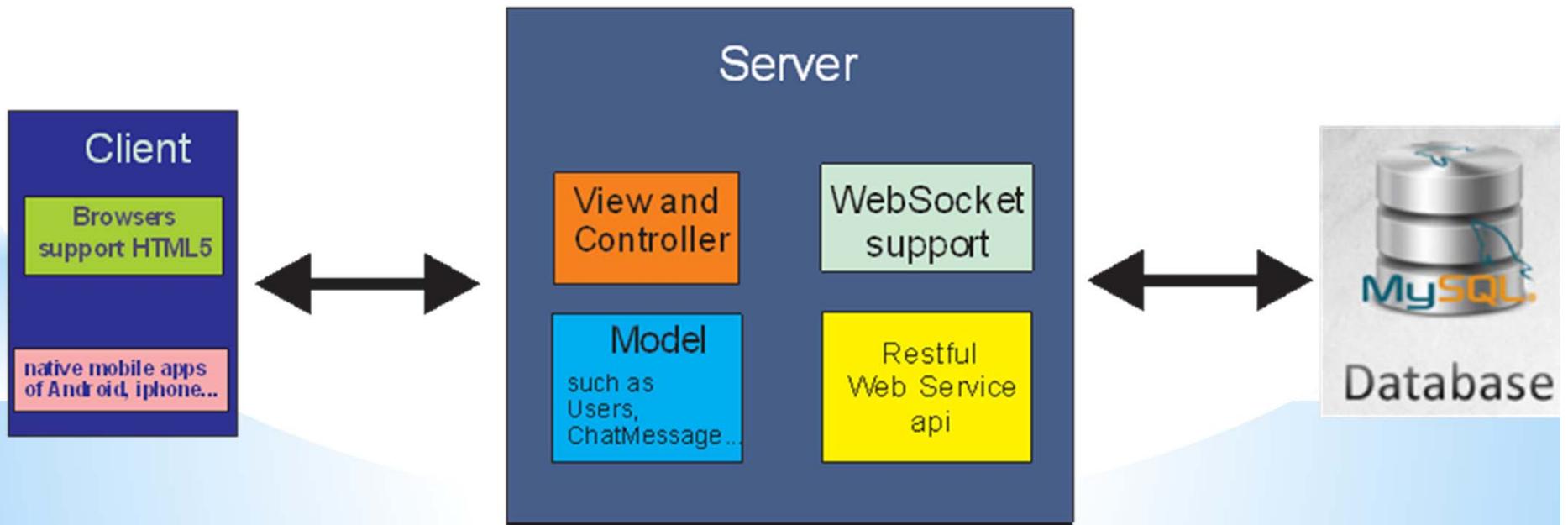
HTML5 Browser

- * To connect and use all of features provided by the server part, users have to use browsers support html5 (which supports WebSocket).
- * Browsers get the code from “View and Controller” module of the server part.



Native Mobile Application

- * Besides browsers, users can use the client mobile application to communicate with the server part.
- * The client mobile application supports multiple mobile platforms such as Android, iPhone, Windows and so on.



Cross Mobile Platform

- * With the growing number of mobile platforms, mobile application development for multiple platforms becomes more complex and consumes more time and more money for labors.
- * To relieve this scenario, cross mobile platform solution emerges as a good solution.

Cross Mobile Platform

The cross mobile platform solution helps to:

- * Reduce cost of application development
- * Shorten time to develop applications
- * Deliver consistent user interface experience to customers
(Unified UI Across All Mobile Platforms)
- * Also, code maintainability and test takes less time because one source code is taken care of instead of each source code dealing with each platform.

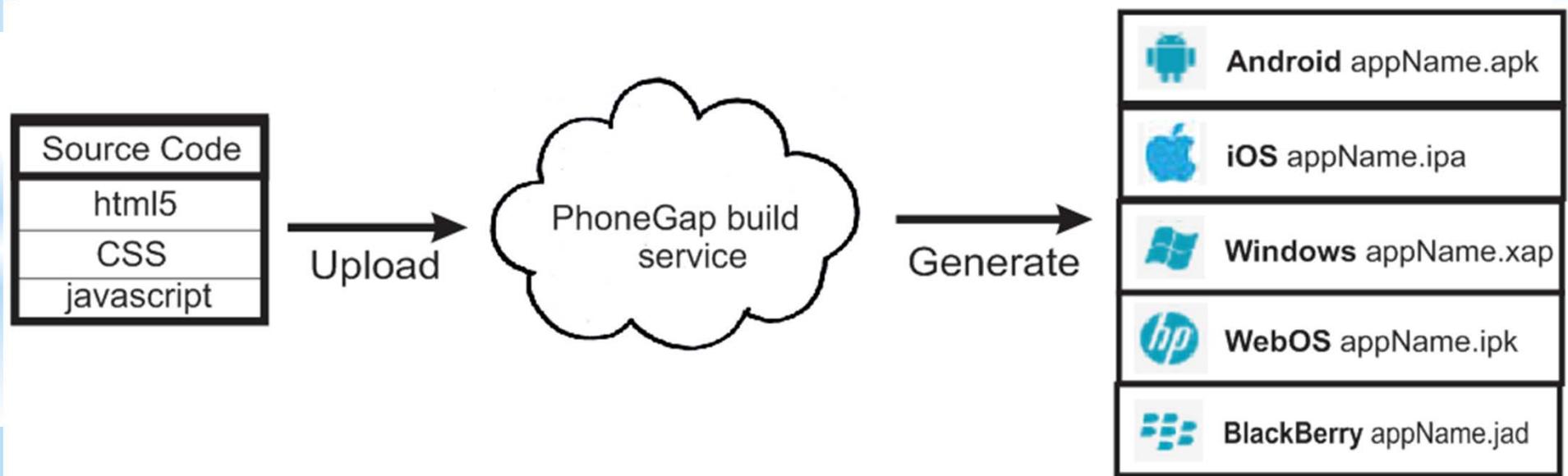
Cross Mobile Platform

- * Contribute to the cross mobile platform solution is the multiple phone web-based application frameworks such as Apache Cordova (PhoneGap), Appspresso, AppFurnace, Appcelerator Titanium, QuickConnectFamily, and so on.

Feature	Apache Cordova	Appspresso	AppFurnace	Application Craft	iUI	NS Basic/App Studio	WorkLight
Open Source License	Apache Public License v2	closed source freeware	No	No	MIT	No	No
Free?	Yes	Yes	No ^[2]	No ^[3]	Yes	No	No
Development languages	HTML, JavaScript and CSS	HTML, JavaScript and CSS	JavaScript	JavaScript, HTML and CSS	JavaScript, HTML and CSS	BASIC, JavaScript, HTML and CSS	JavaScript, HTML and CSS, Native code or a combination of both
Platforms							
iOS support	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Android support	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Windows Phone support	Yes	On roadmap	No	Yes	Yes	Yes, via Cordova	Yes
BlackBerry support	Yes	No	No	Yes	Limited models	Yes	Yes
Symbian support	Yes	No	No	Yes	?	Yes, via Cordova	For web apps

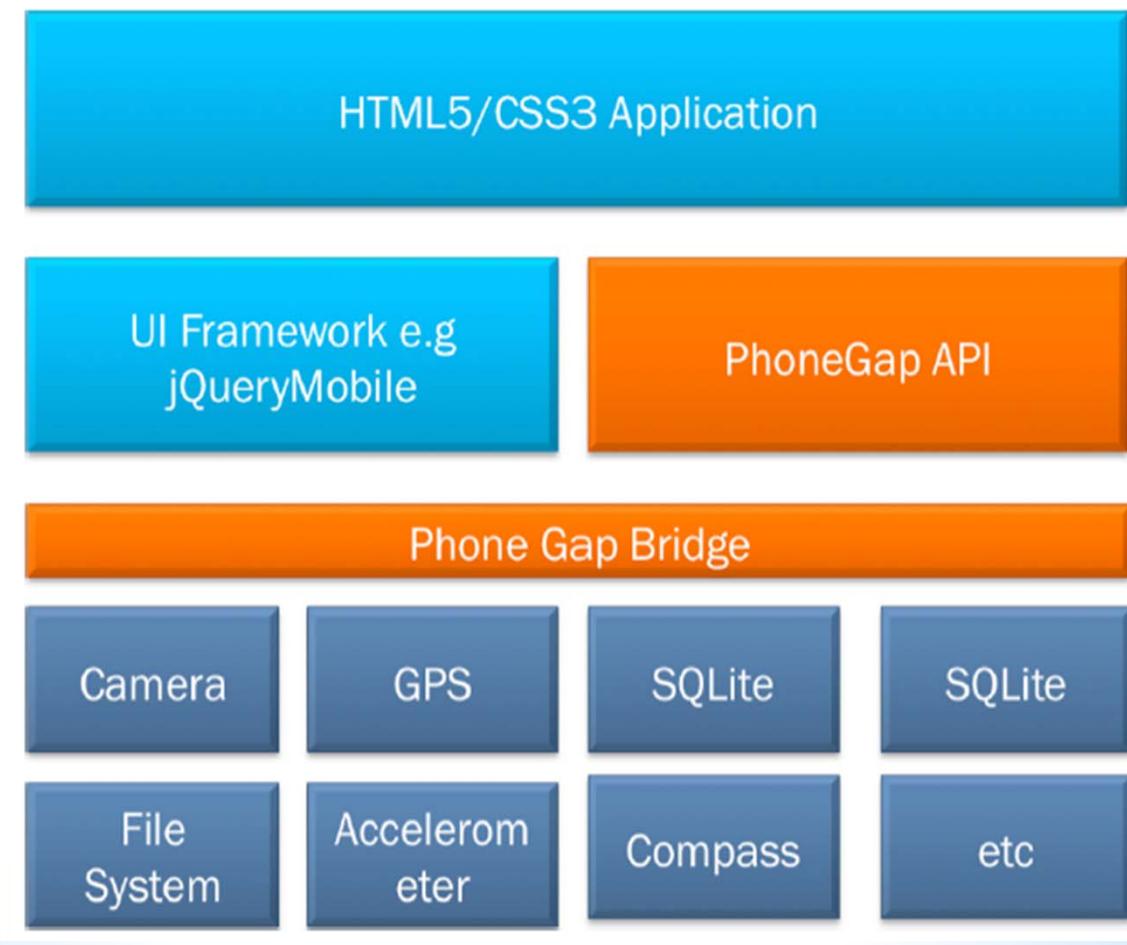
Phonegap

- * Use Phonegap framework in this project because it is popular, open source, good documentation, and provides PhoneGap Build Service.
- * PhoneGap Build Service helps developers save time of compiling HTML5, CSS, and JavaScript code into applications for other mobile platforms.



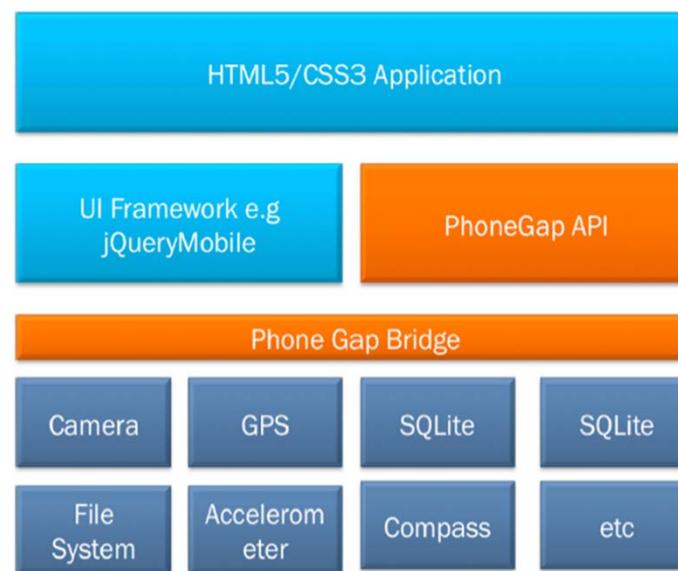
Phonegap

- * PhoneGap Architecture. Two parts.



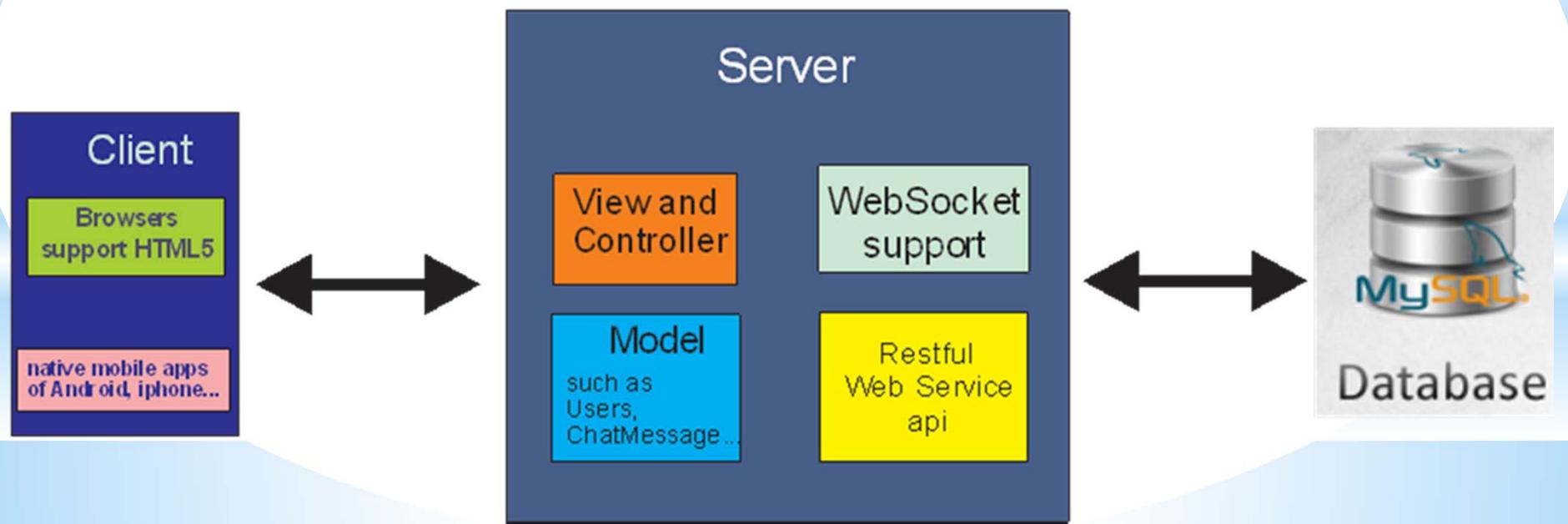
Phonegap

- * The first part is UI and functional part. For the UI, developers can build the entire UI by using HTML, JavaScript, and CSS, or they can use available frameworks such as jQuery Mobile to build our application easily and quickly .
- * The second part is independent PhoneGap API which allows developers to interact with the important native parts of mobile devices, such as the camera, compass, network, storage and so on.



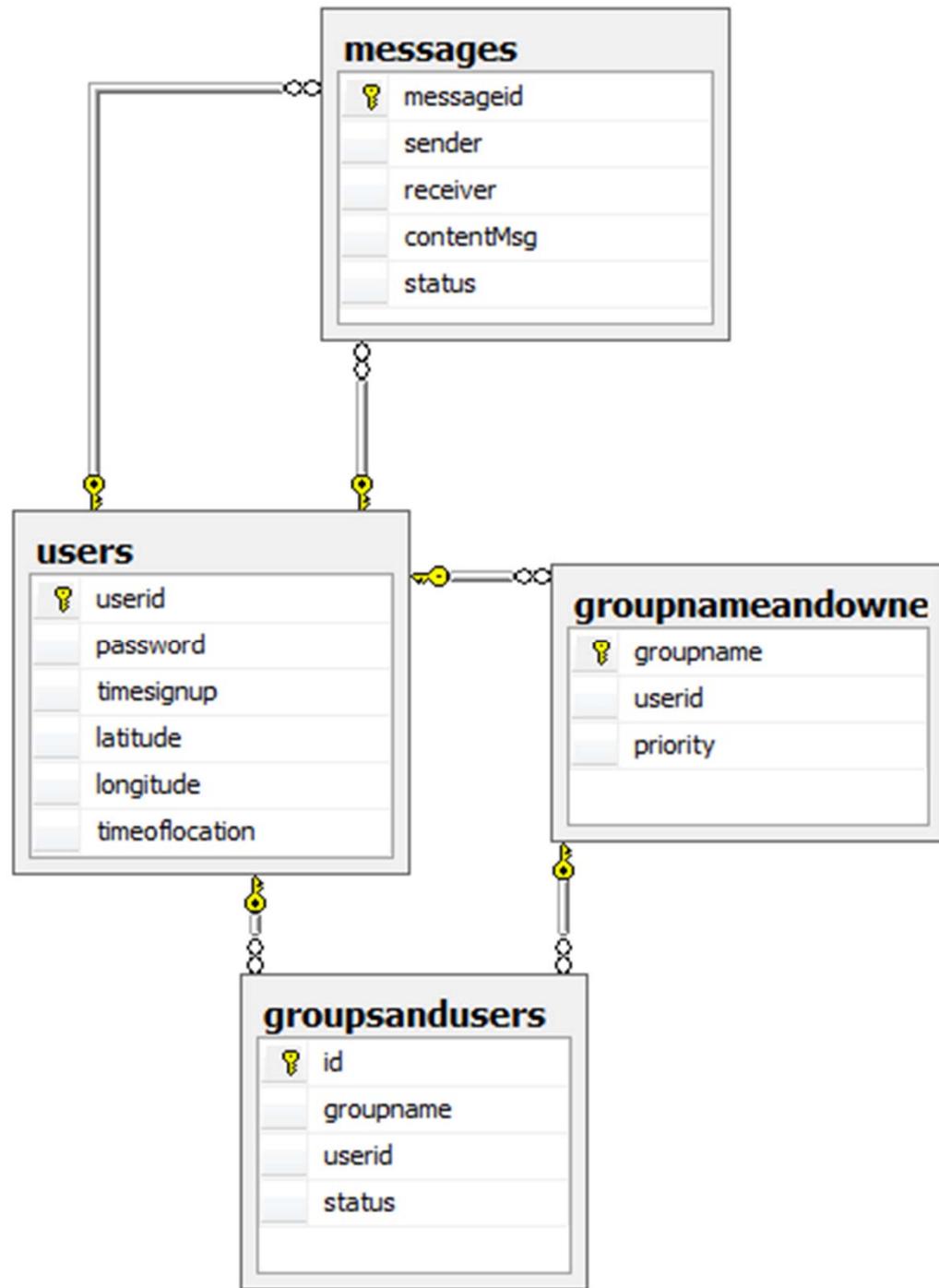
Phonegap

- * All of View codes in “View and Controller” module are compiled into the native mobile applications, such as Android, by PhoneGap framework . So, I don't need to write other specific codes for other specific mobile platforms.



Database Design

- * Four tables as the figure.



Group Features

- * Only members, in a same group, can chat, share, and track each other 's locations.
- * Each user has one “Friends” group. After a user successfully makes friends to other users, the other users will be put in “Friends” group.
- * Each user can create groups and becomes groups' owner.
- * Users can join many different groups. To join a group, a user sends a request to the group owner. At that time, the user is added to table with status value “waiting accepted”.

Group Features

- * If the group owner accepts the request, the status value is changed to “accepted”
- * If the group owner denies the request, the user is removed out of table.
- * The group owner is able to delete a user from his or her group even he or she accepted the joining request before.
- * The group owner is able to delete his or her own group.

groupsandusers	
	 id
	groupname
	userid
	status

Accomplishment

- * The server module has been deployed on cloud amazon EC2.
- * The clients can use browsers or a client Android application to communicate each other via the server module.
- * The server module supports core features such as Group management, Chat, Tracking Location, and extended features such as Python Fun, Car Tracking, Earthquake Info.

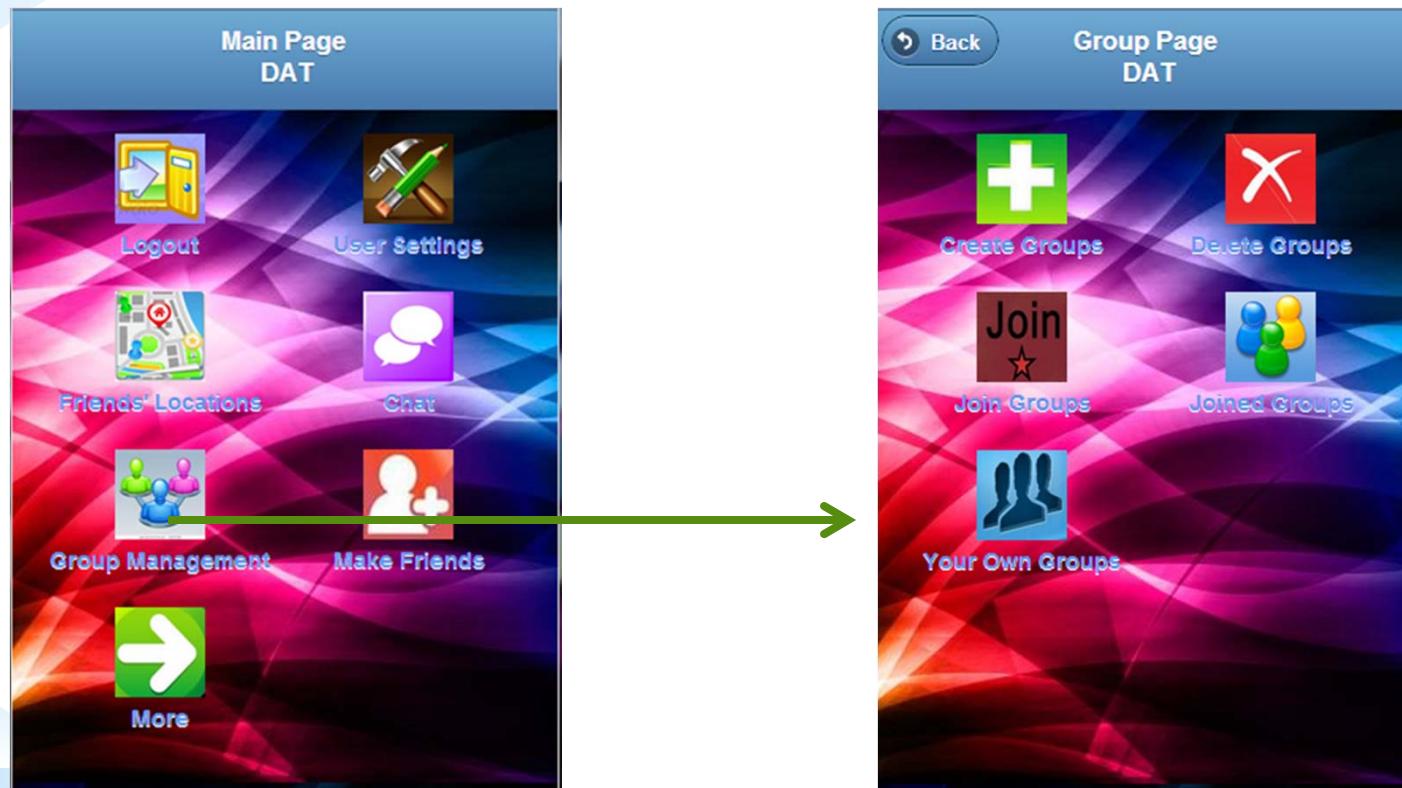
Main Page

- * After log in successfully, the logged-in user has some icons to interact such as Group Management, Chat, Friends Locations, User Settings, Make Friends.
- * Clicking More icon, users can go to next page of features.



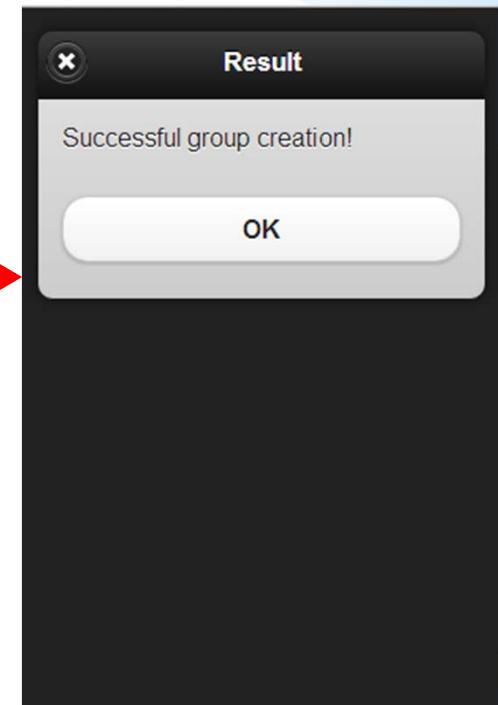
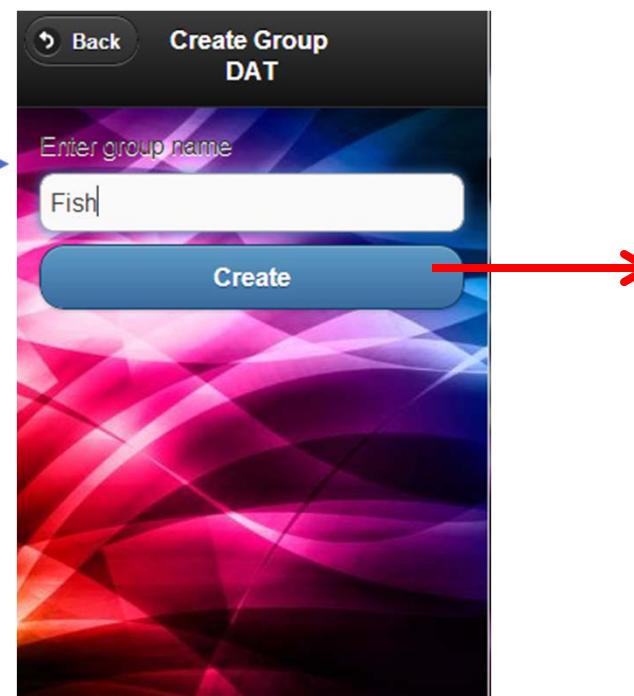
Group Management

- * The Group Management option has 5 icons: Create Groups, Delete Groups, Join Groups, Joined Groups, Your Own Groups.



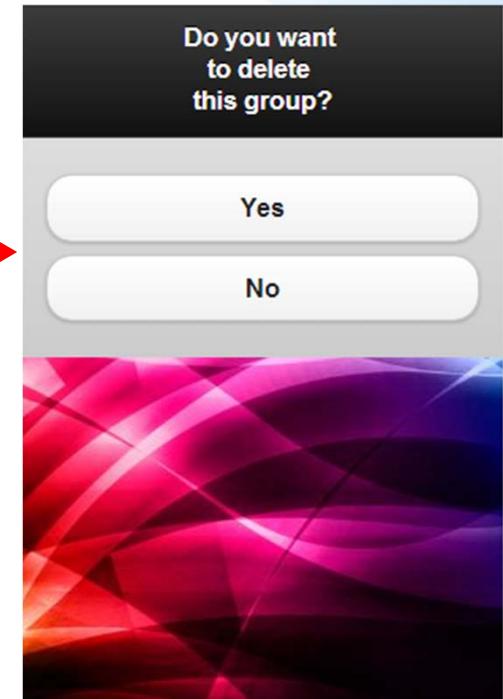
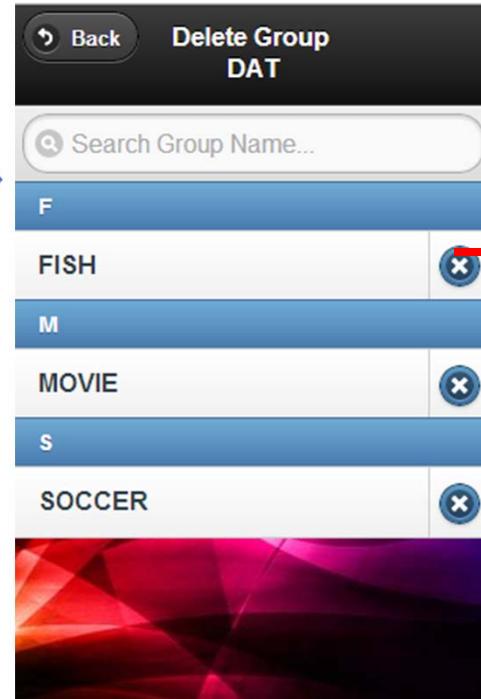
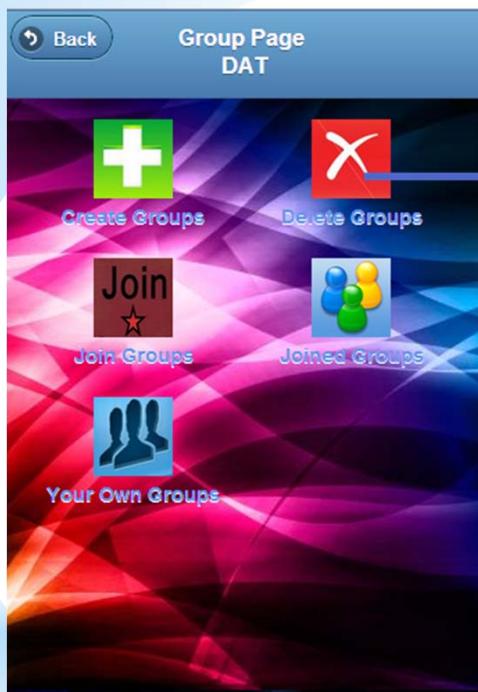
Create Groups

- * Users can create groups by clicking Create Groups icon



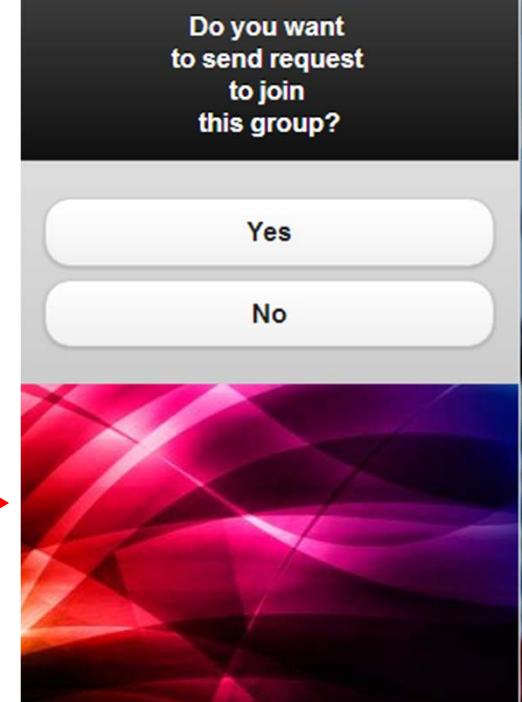
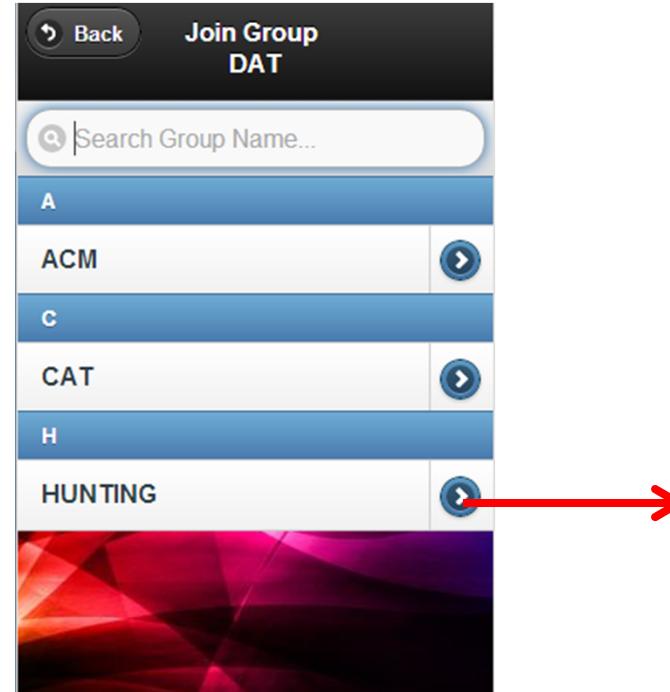
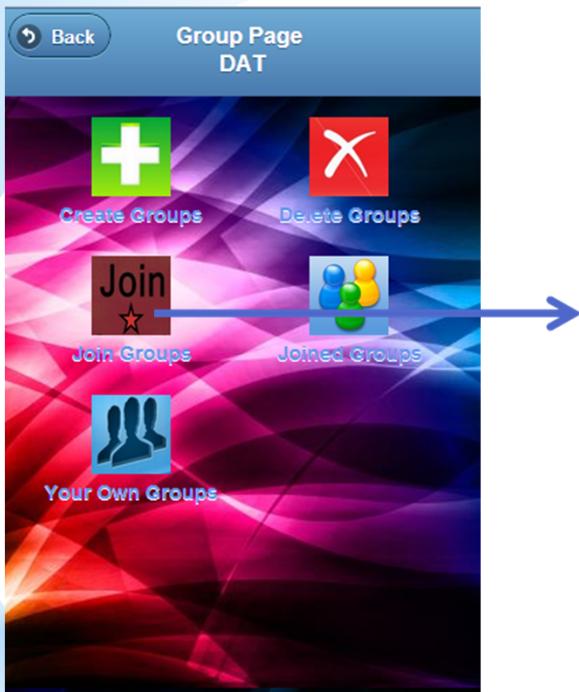
Delete Groups

- * Users can delete groups by clicking Delete Groups icon



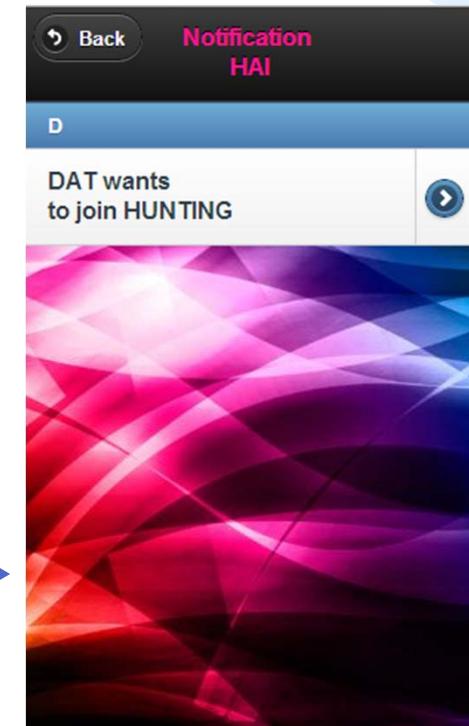
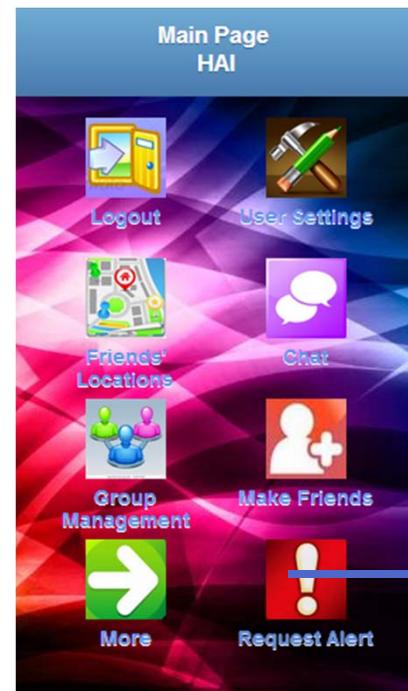
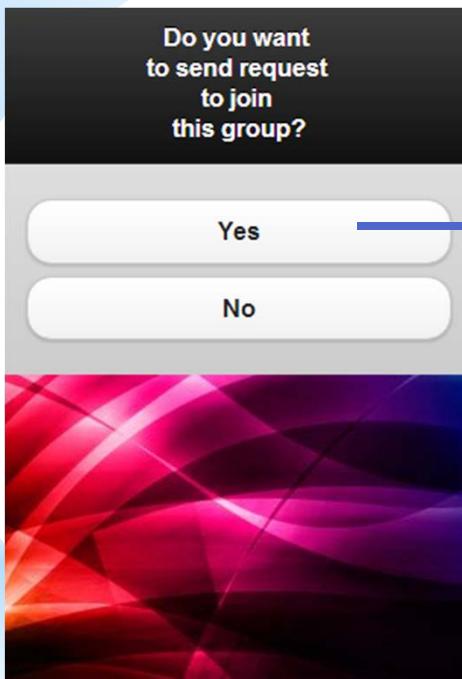
Join Groups

- * Users can join groups by clicking Join Groups icon



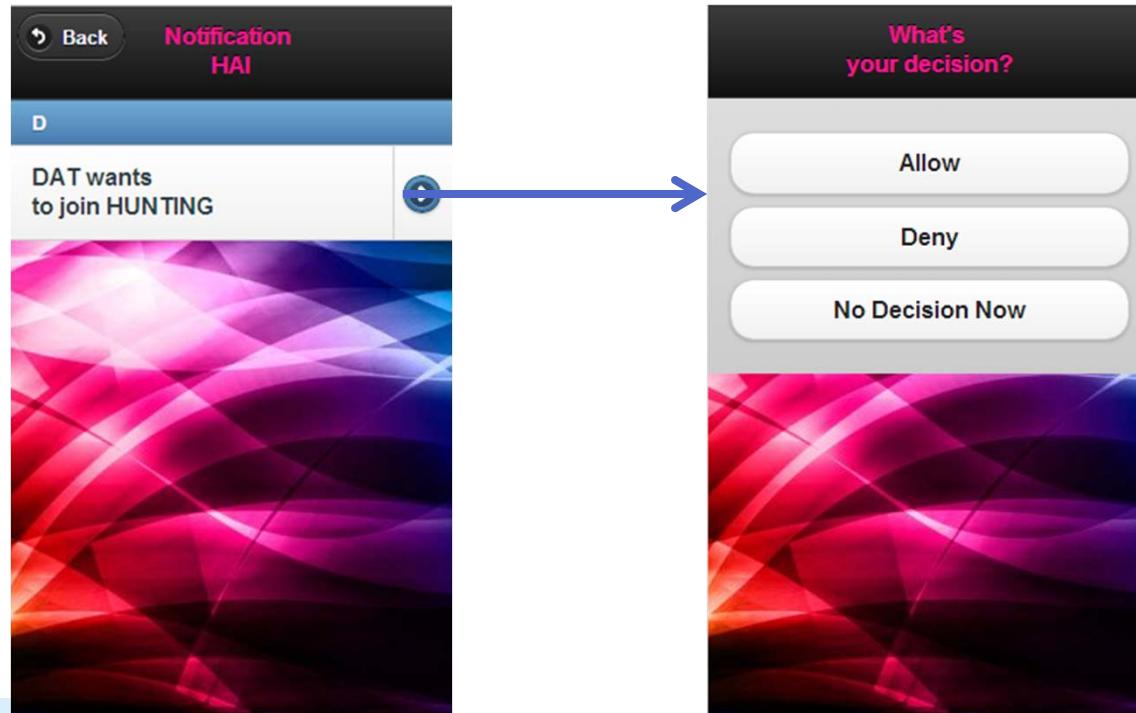
Join Groups

- * After a user clicks Yes, the request goes to Request Alert box of the group owner.



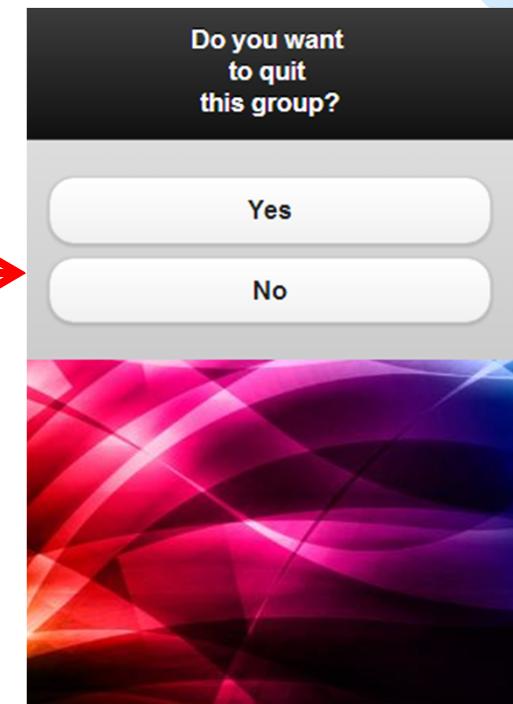
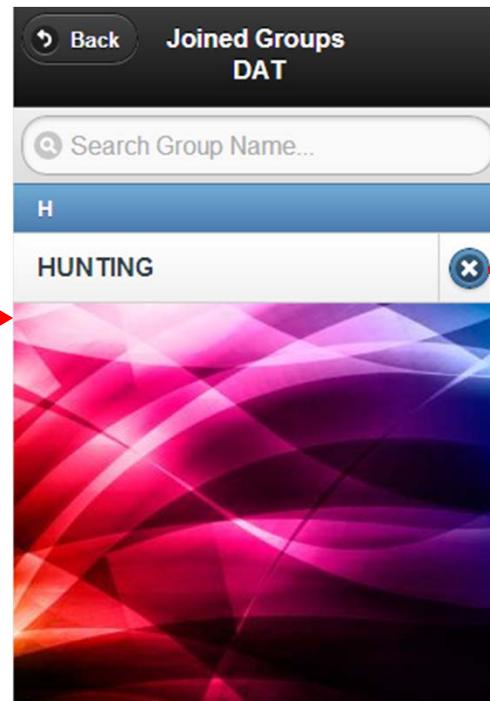
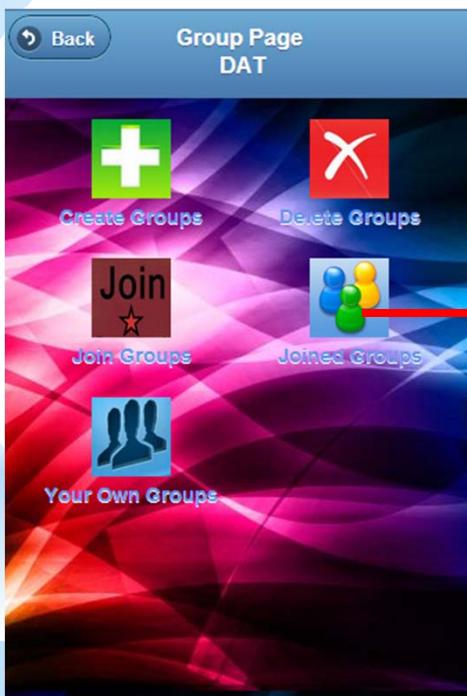
Join Groups

- * The group owner can accept, or deny, or decide later.



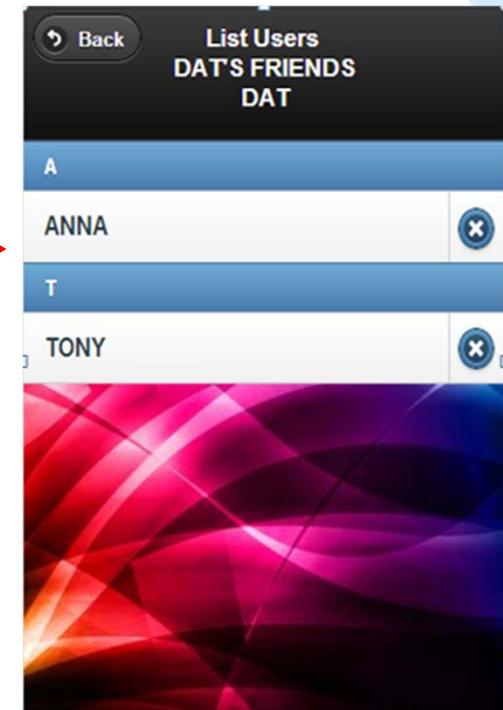
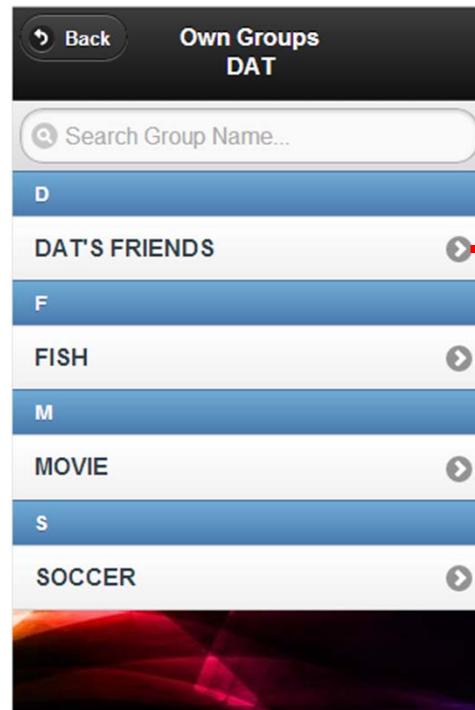
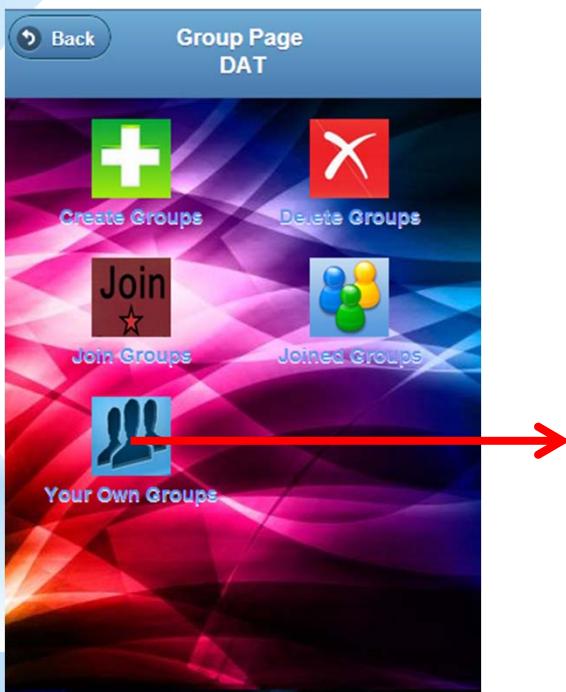
Joined Groups

- * Users can see groups, which they did join, by clicking Joined Groups icon. Also, users can quit groups which they did join



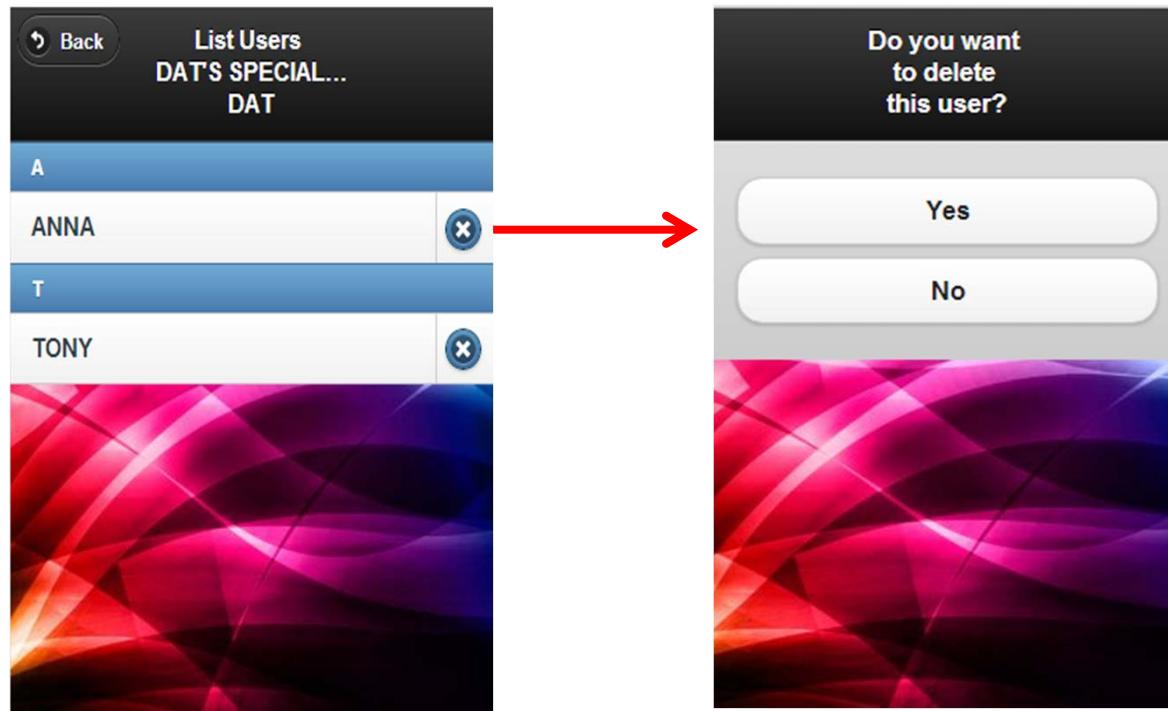
Your Own Groups

- * Users can see all of their own groups by clicking Your Own Groups icon. Users can also see all of members in a group.
- * The group



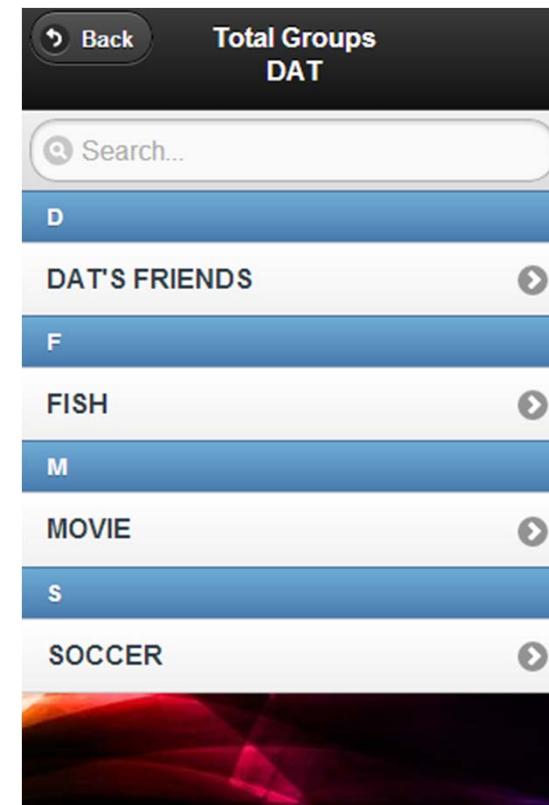
Your Own Groups

- * The group owner is able to delete a member out of the group.



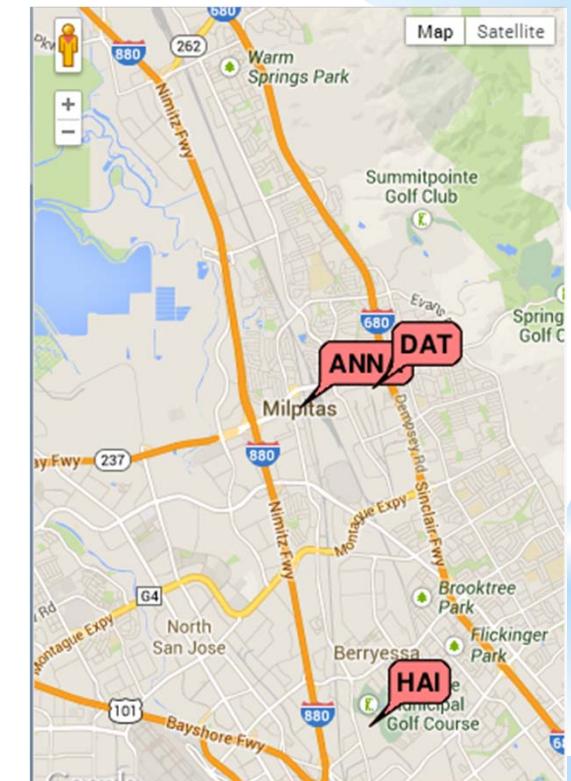
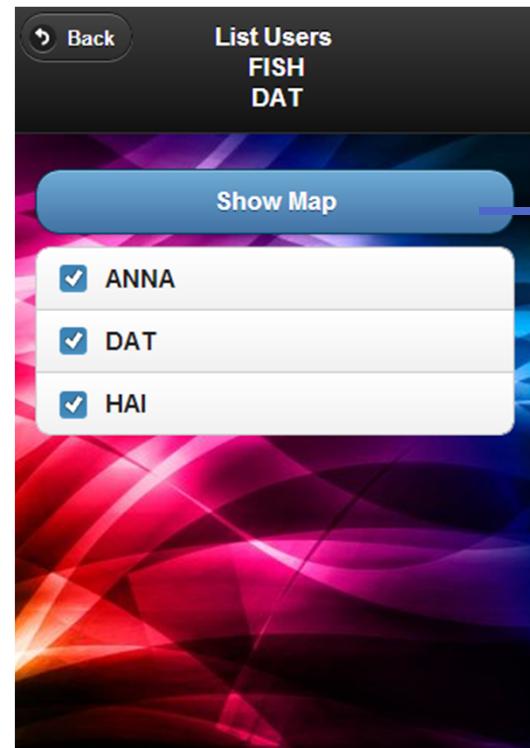
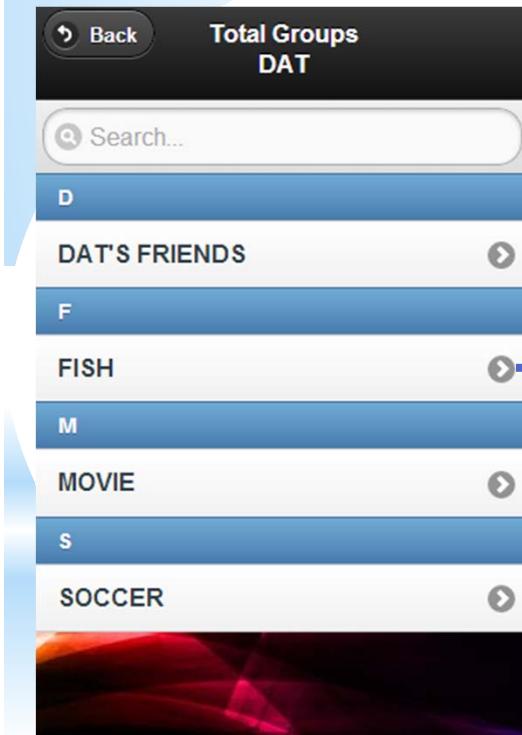
Friends Locations

- * The Friends Locations option provides a list of all groups which the logged-in user owns and joined.



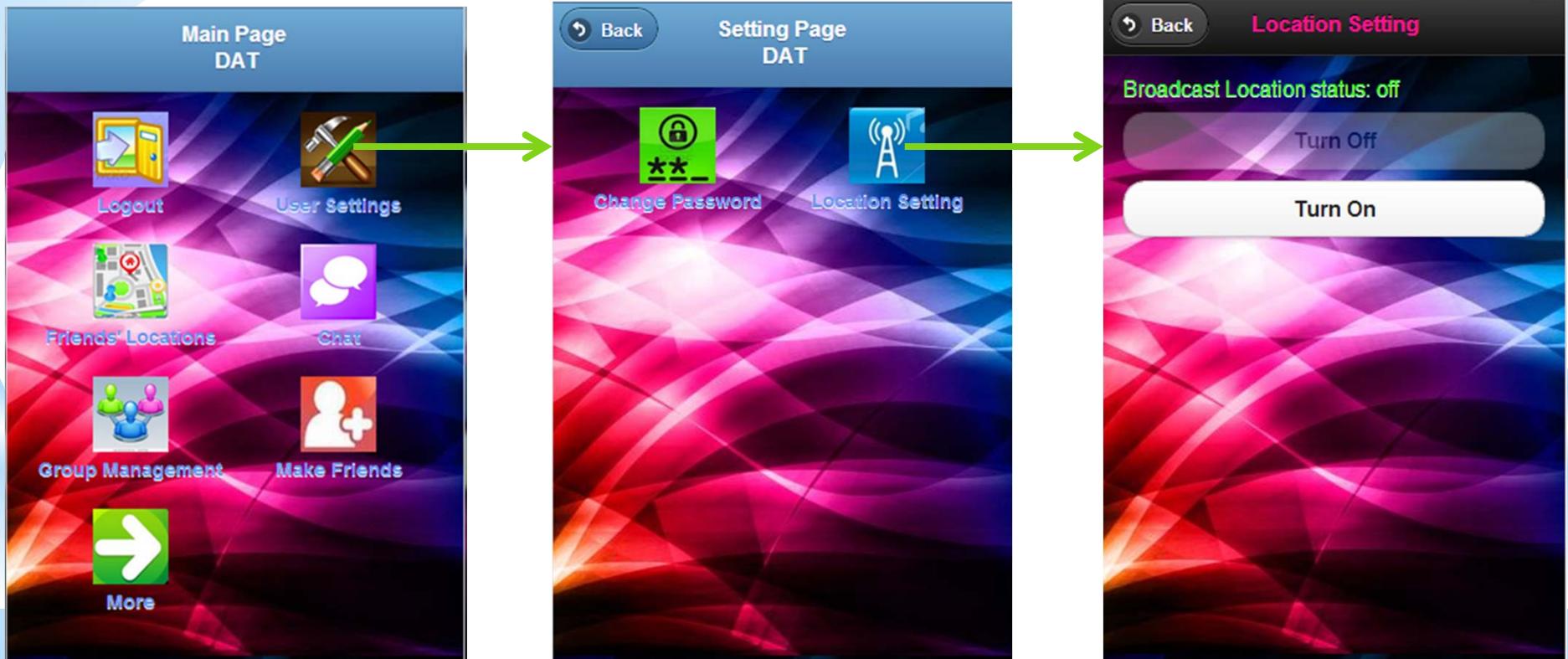
Friends Locations

*The logged-in user can get all users of a group and track its members' locations.



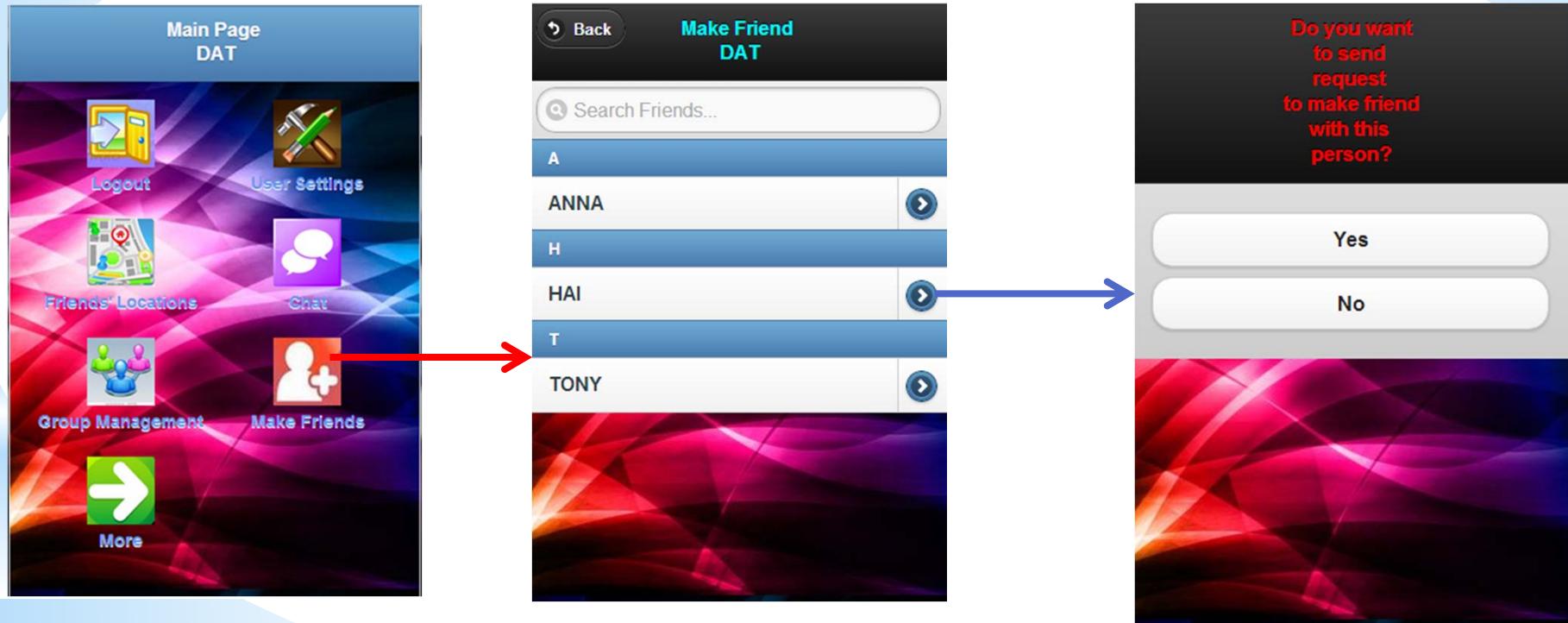
User Setting

- * The User Setting menu has 2 icons: Change Password and Location Setting. With the Location Setting option, a user can turn on or off broadcasting his or her location.



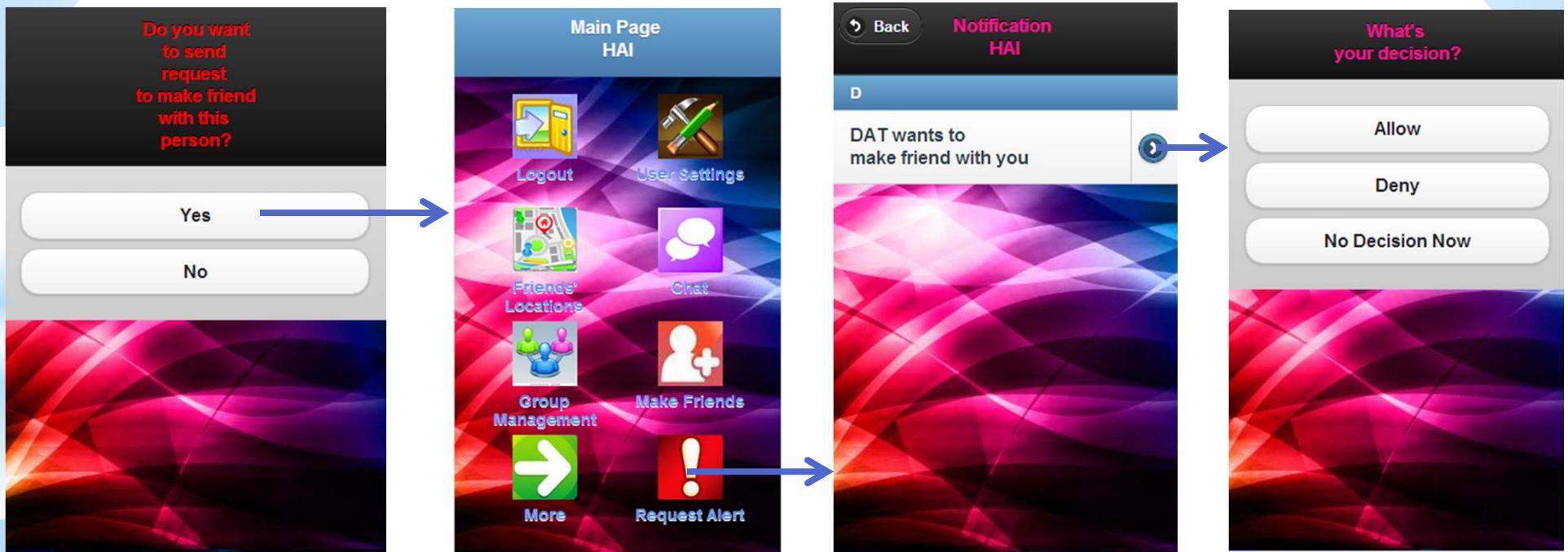
Make Friends

- * The Make Friends provides the logged-in user a list of all users who registered to use the server. From here, the logged-in user can make friends with other users.



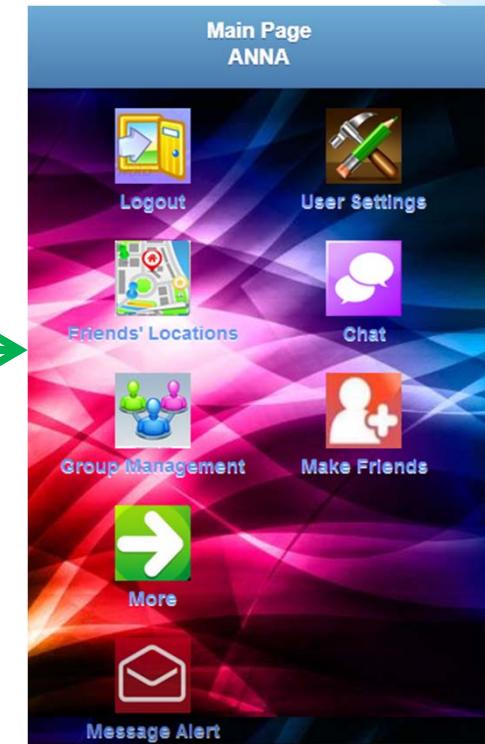
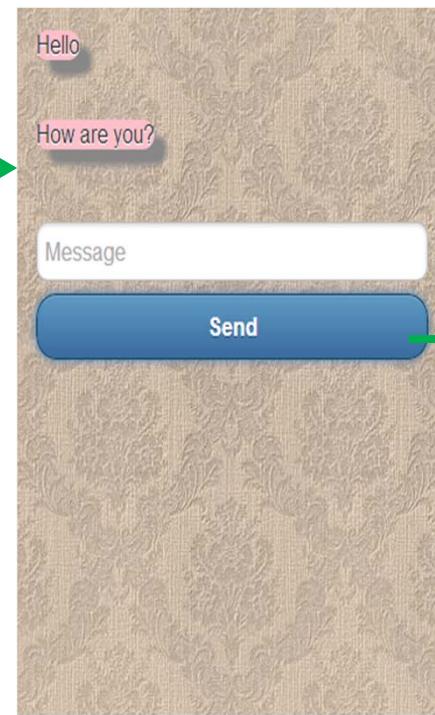
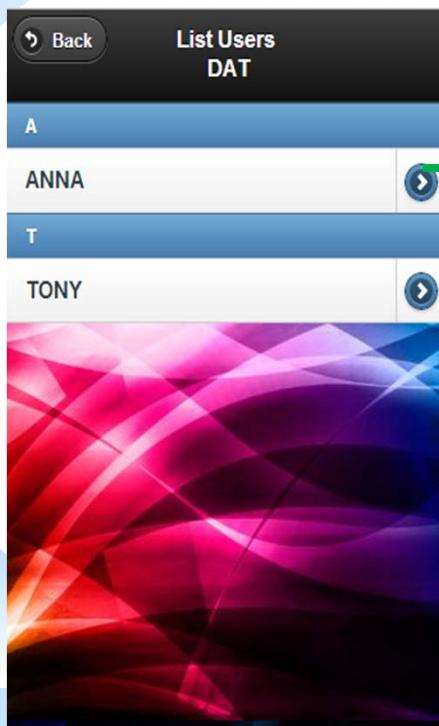
Make Friends

- * After Yes is clicked, the request goes to Resquest Alert box of the requested user. The requested user can accept, or deny, or decide later.



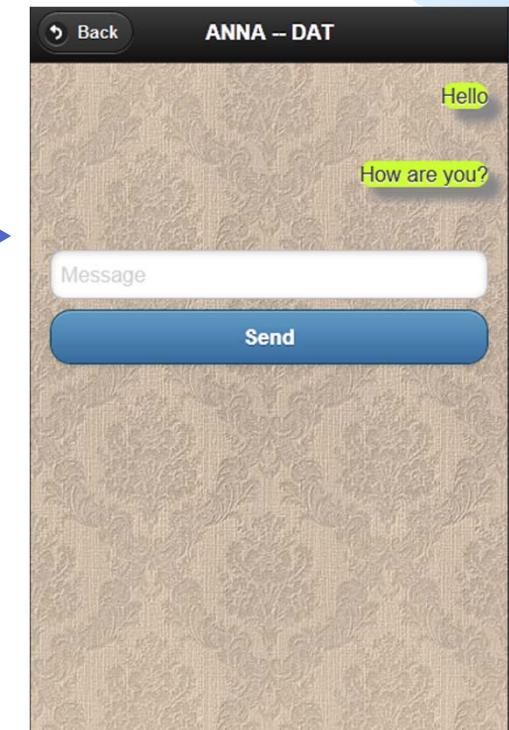
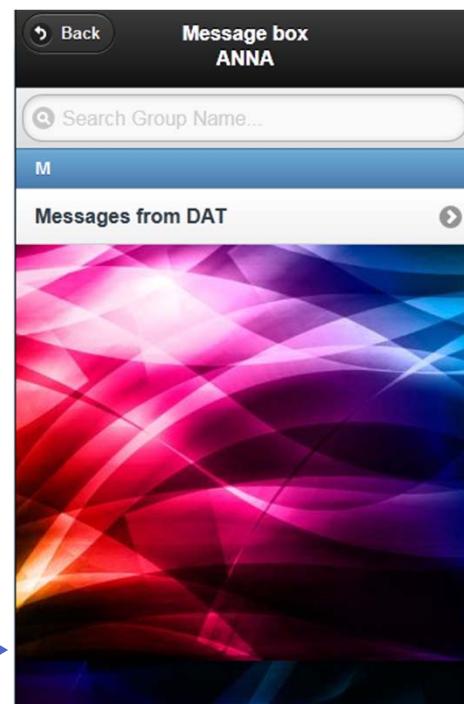
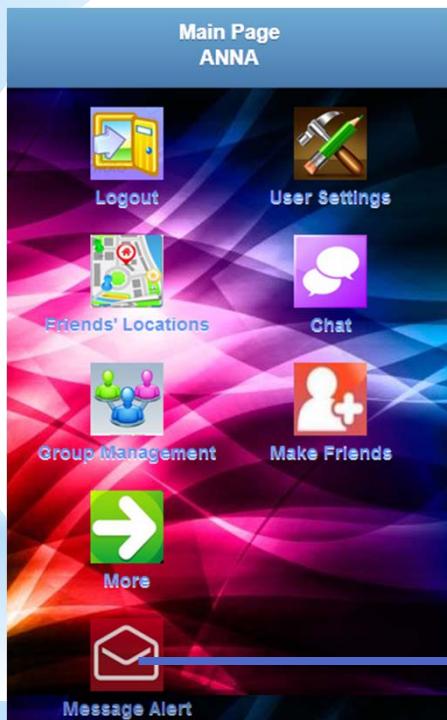
Chat

- * The logged-in user can send messages or chat with other users.



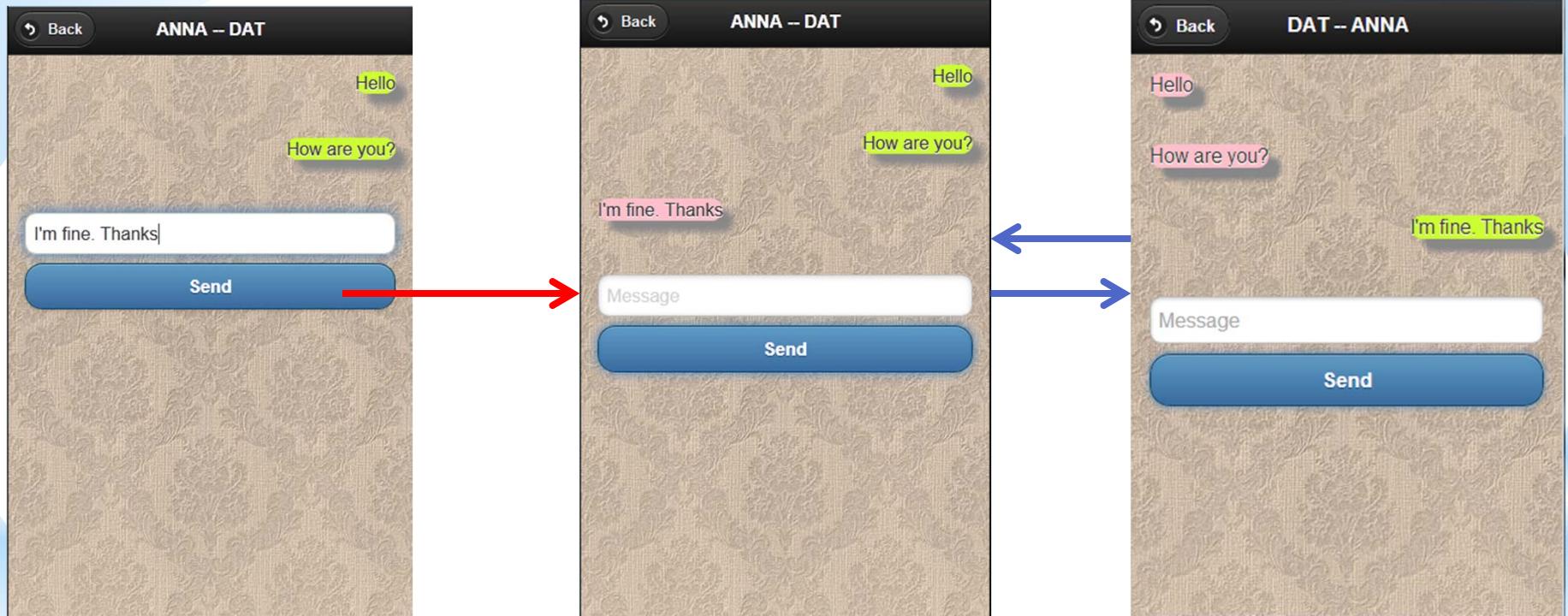
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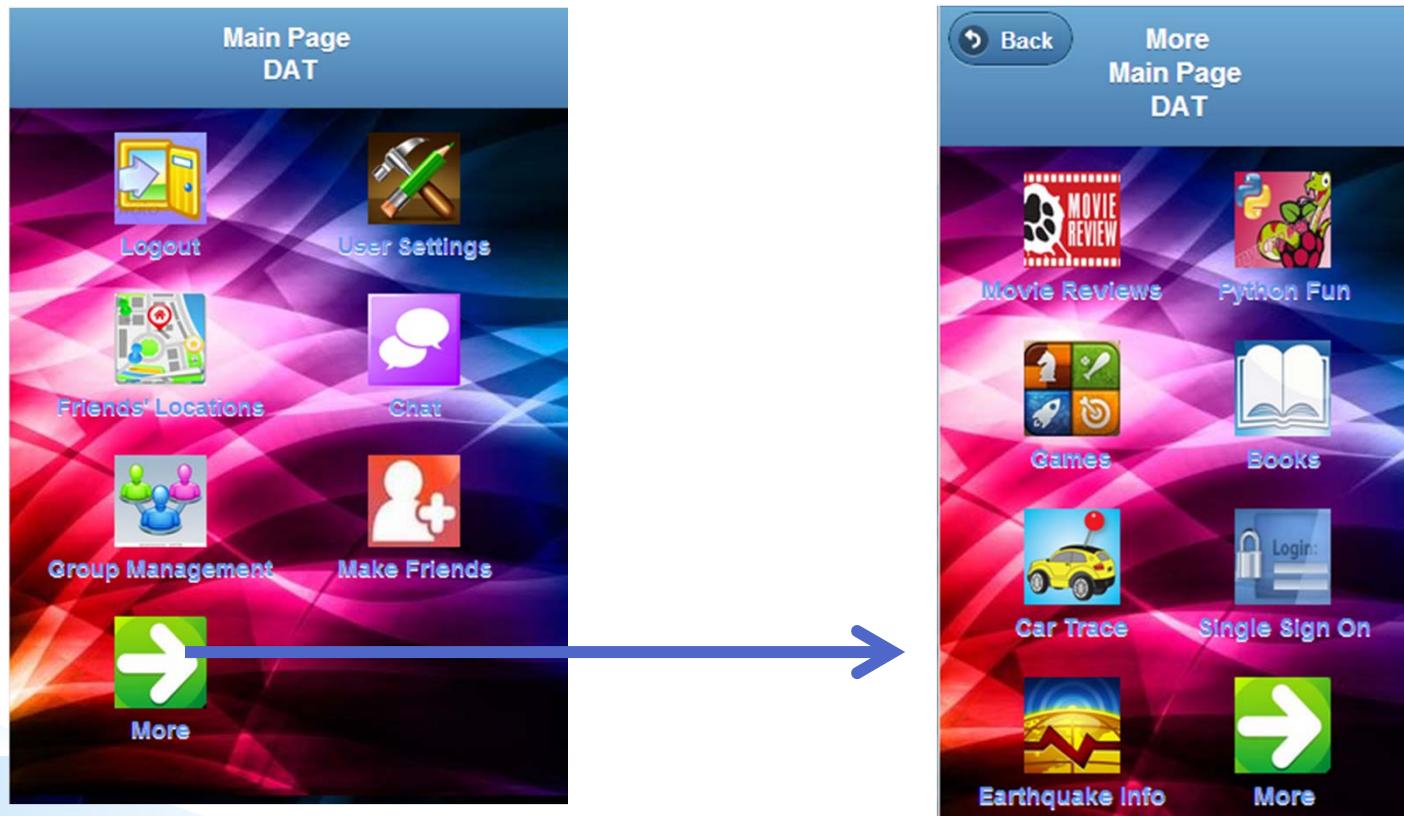
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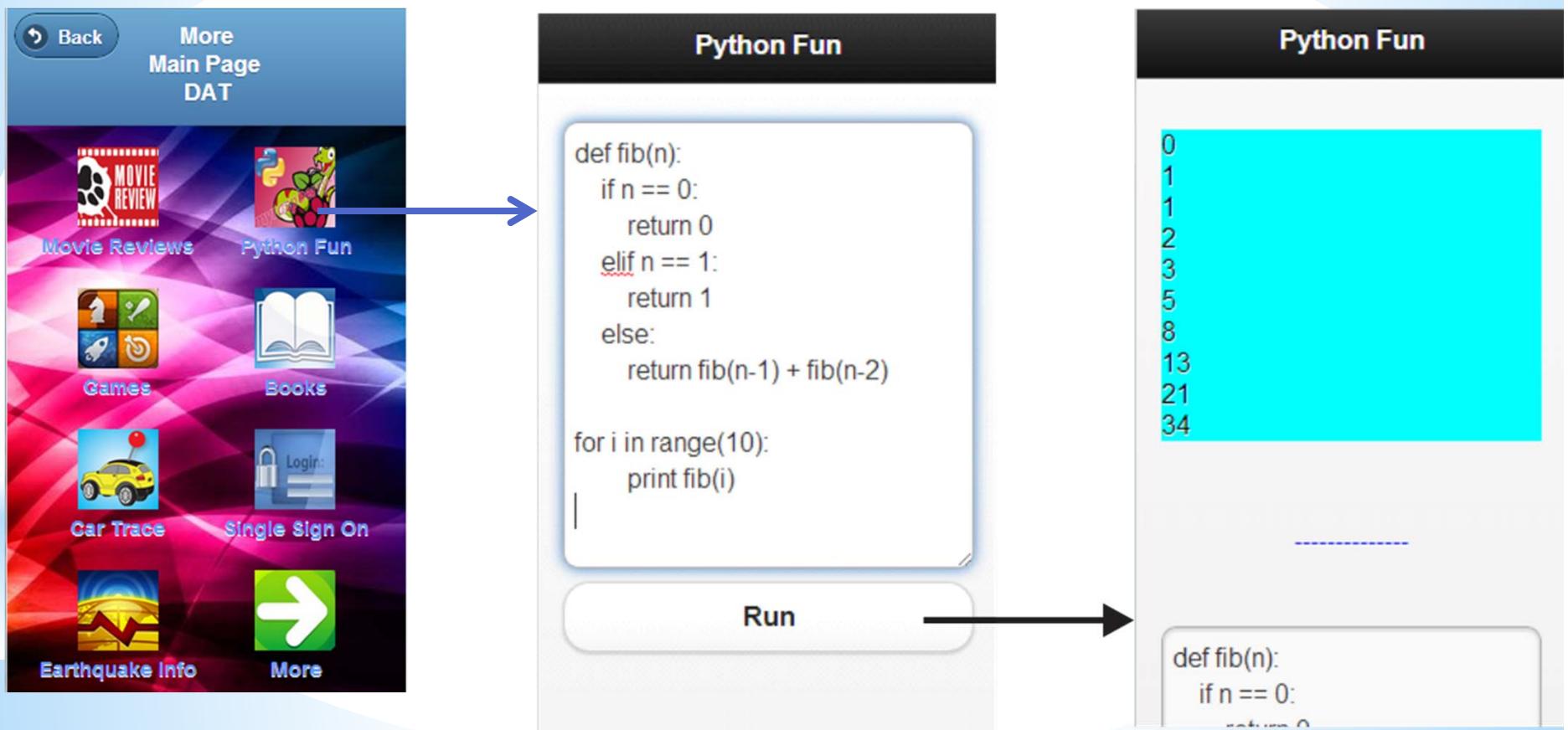
Extended Features

- * The application is able to be extended to support additional features. Three implemented features are added to the application: Python Fun, Car Trace, and Earthquake Info.



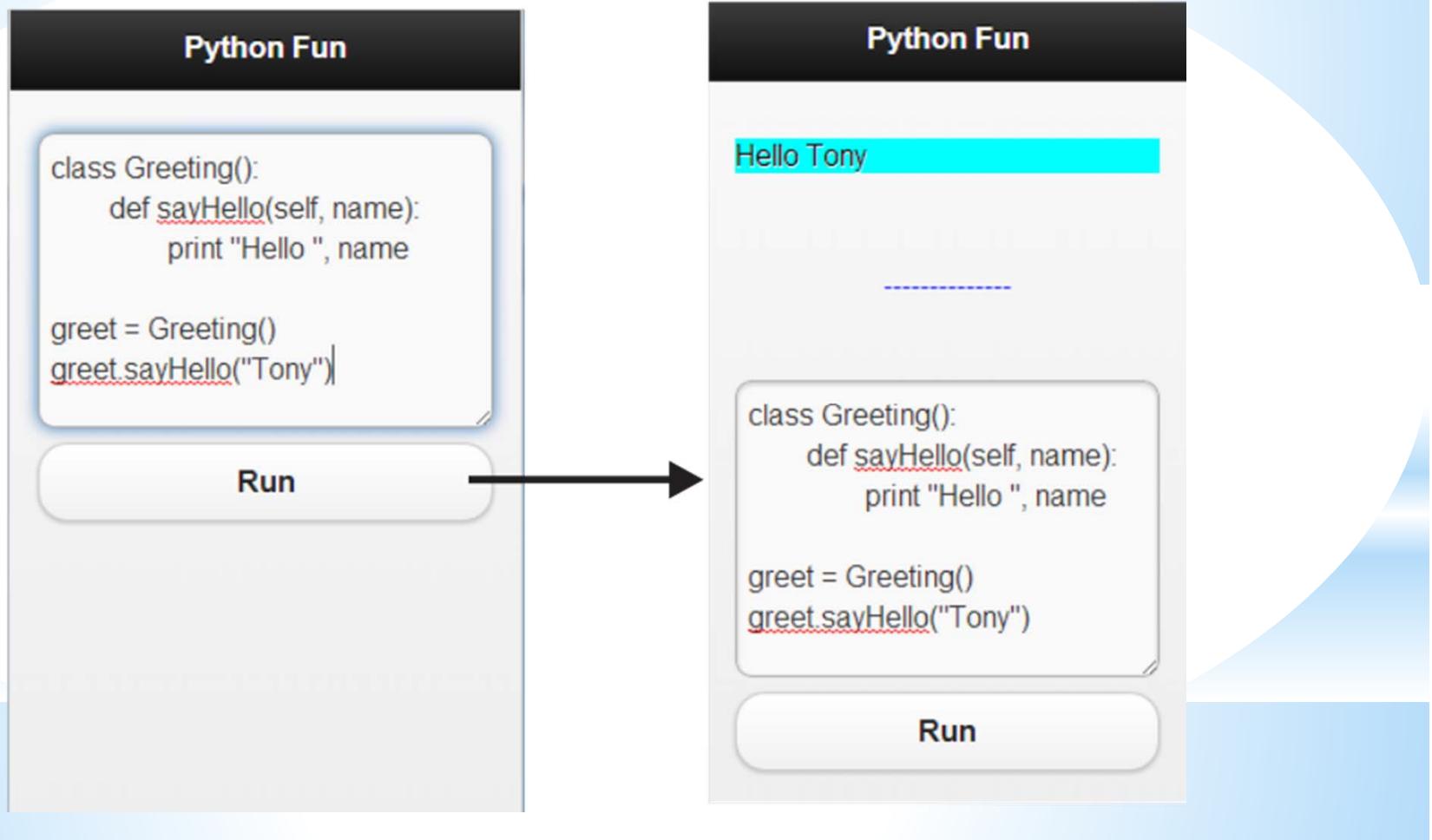
Python Fun

- * The “Python Fun” feature is useful for users who want to practice python by using their smartphones.



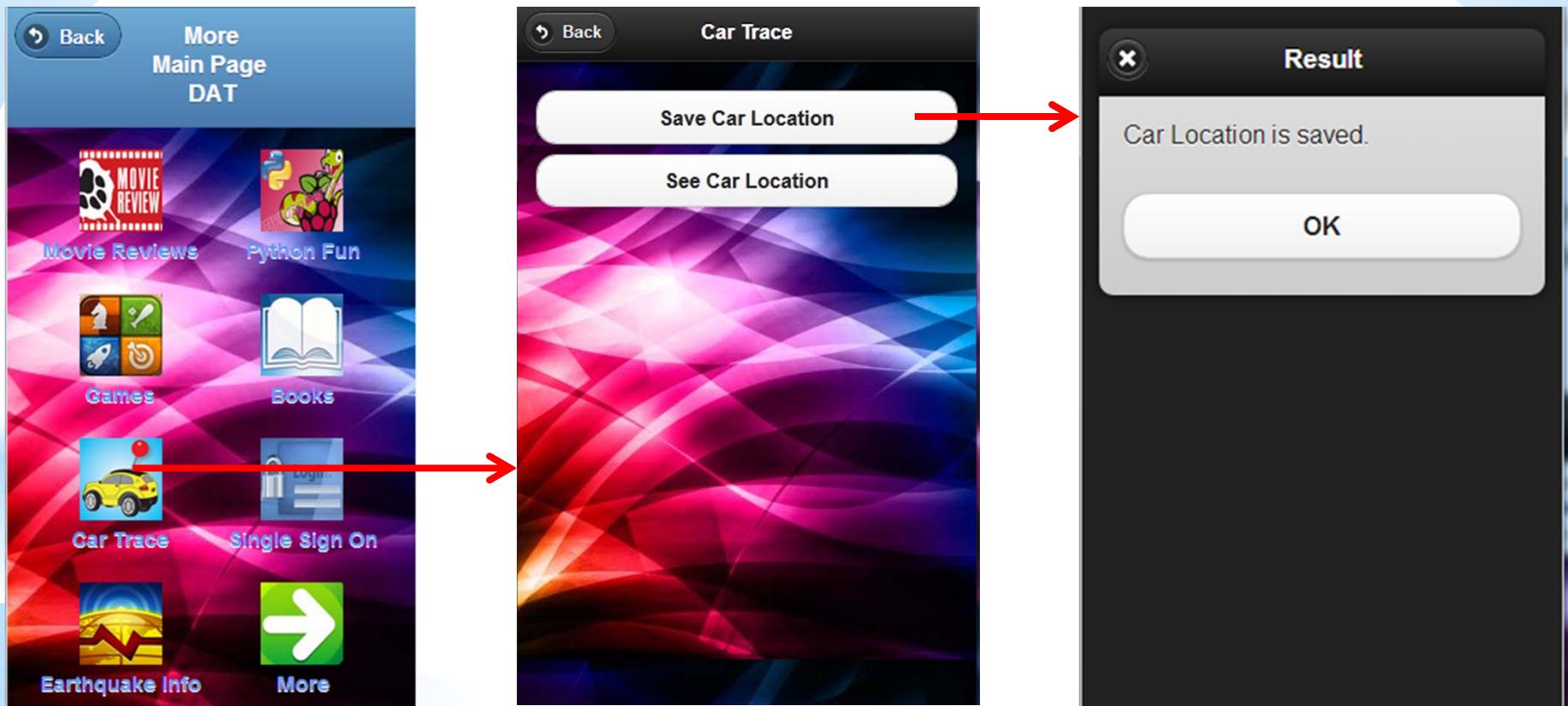
Python Fun

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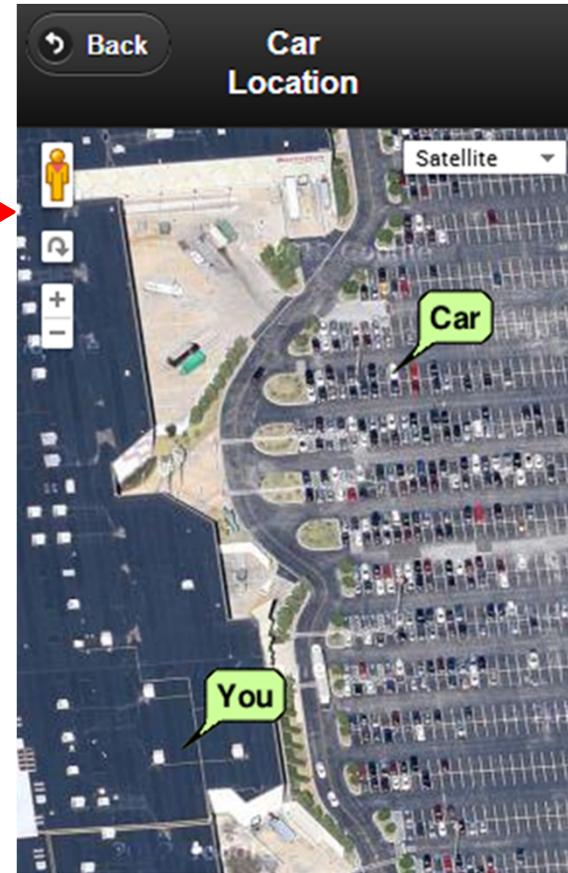
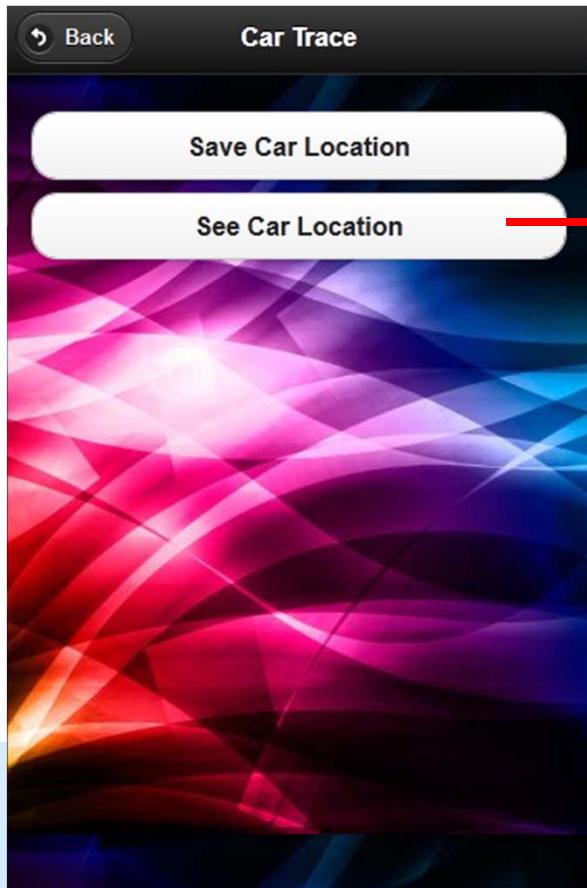
Car Trace

- Car Trace feature can remember the logged-in user's car location. This feature is useful when the logged-in user goes to the huge unfamiliar shopping mall. It is easy to forget the car parking position.
- After parking the car, the logged-in user can save his or her location by clicking the button "Save Car Location".



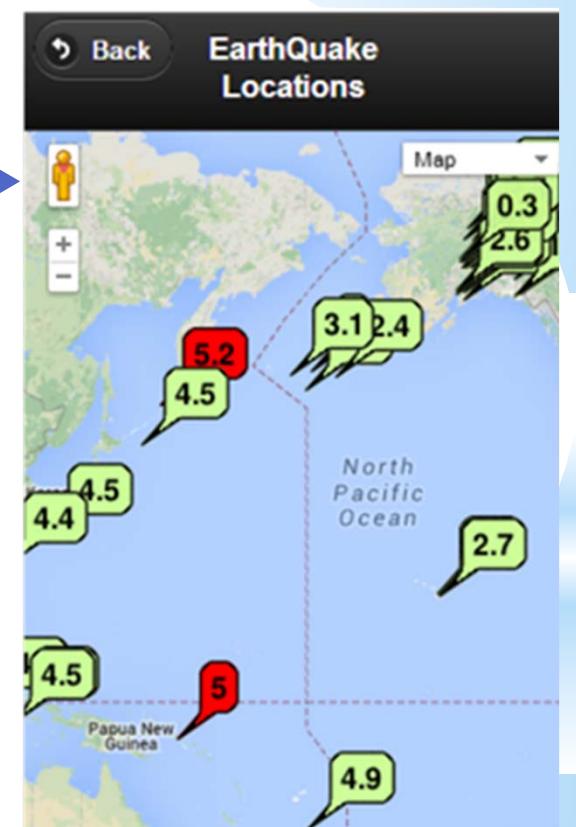
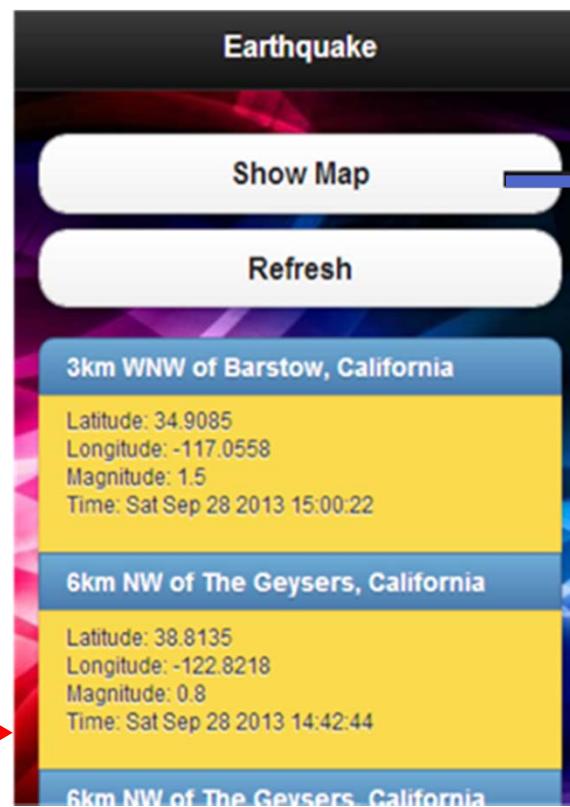
Car Trace

- * After shopping, the logged-in user can track his or her car location by clicking “See Car Location” button and walk to his or her car.



Earthquake Info

- * The “Earthquake Info” feature tells users the most updated information of earthquakes such locations of earthquakes, magnitudes of earthquakes, and so on.



Future Research

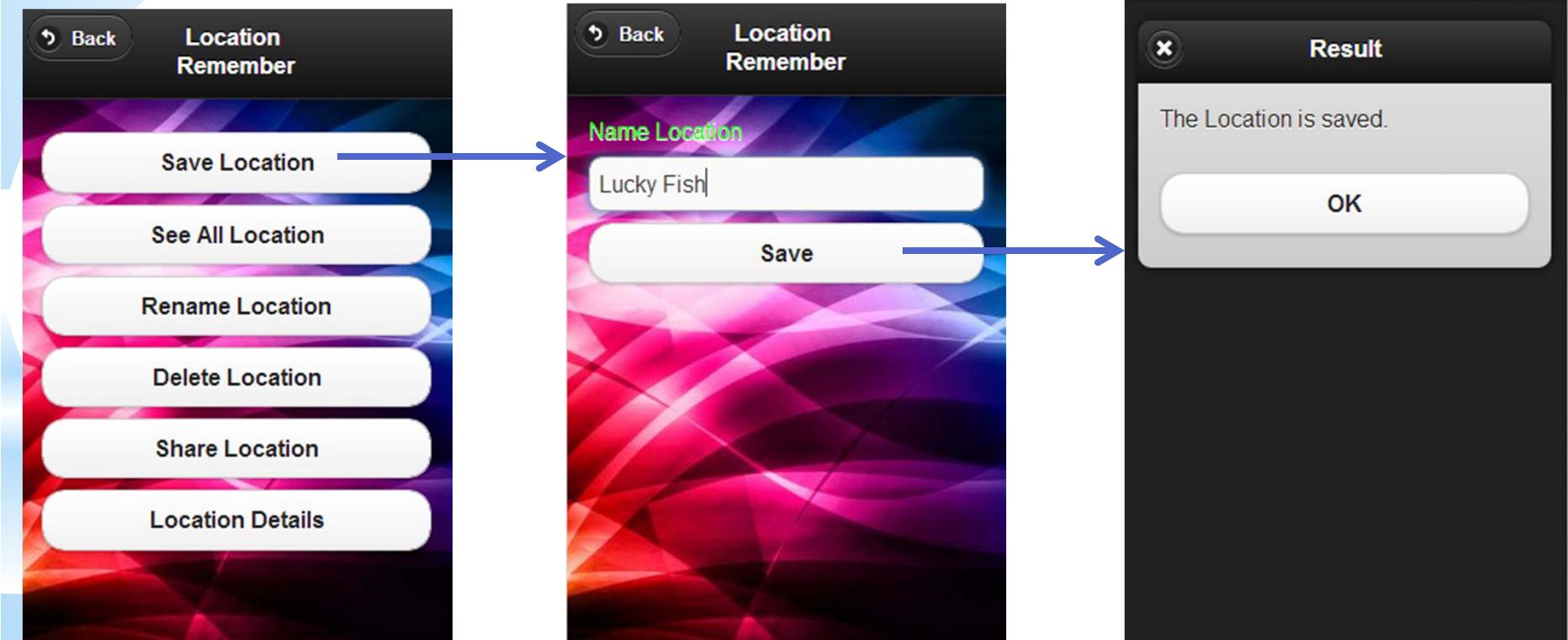
- The voice chat feature is not new idea. However, if we can create cross-platform codes which support this feature, it will be very useful because it saves a lot of time to develop this feature for many platform mobile devices.
- Movies, restaurant reviews or reviews of other topics feature provides users helpful information to decide what services they should use. This feature gives users many choices of reviews. Users can see an evaluation and comments from public, or from their friends, or from other evaluation services.

Future Research

- Fall alarm feature detects accidental fall of the logged-in user. When the logged-in user falls, Fall alarm feature calls a alert to Rest Web Service. The service will send messages, which include the logged-in user's location, to all his or her friends. More than that, the logged-in user can set up email addresses or phone numbers such as his or her nurse's phone number and tell the Web Service send alert to them.
- Location Remember feature allows the logged-in user to save any location at anywhere. This feature is suitable for users who travel, go fishing, go hiking, relocation to new place, and so on.

Future Research

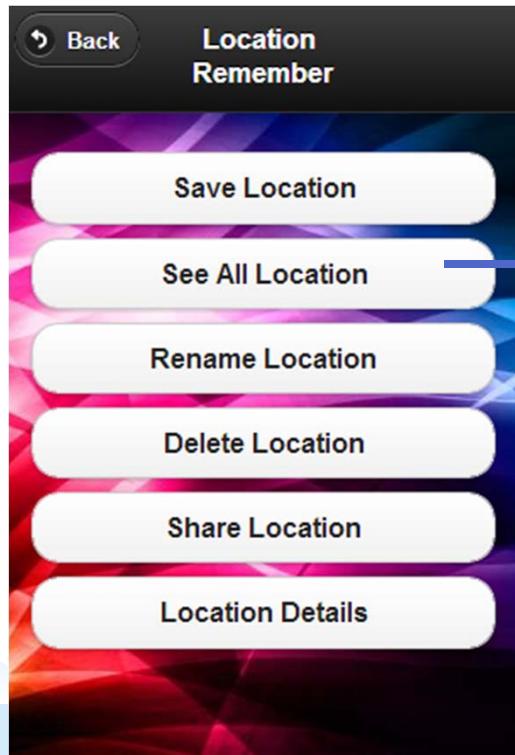
- For example, a user goes fishing. After trying some location in the river, he or she finds out a location which he or she can catch fish easily and wants to save it.



Future Research

- Location Remember Feature

After saving a location, users can rename, delete, share, and see it on a map.



Question and Answer

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Thank you