HikinGuide – An iPhone App for Hong Kong Hikers

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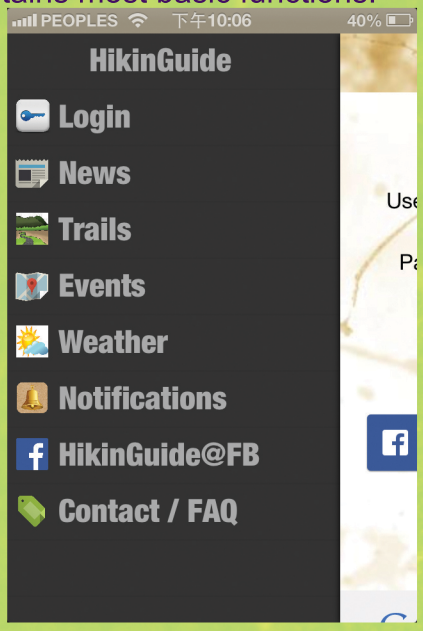
Overview

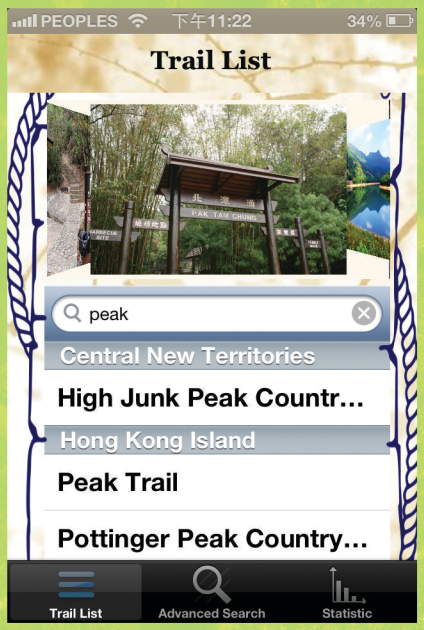
Hiking is one of the most common activities among all age groups in Hong Kong. Although several web portals have been providing hiking information, none of them is well connected with mobile apps. In order to enrich hiking experience and promote hiking, hikers need a multi-functional iPhone app which provides an all-rounded solution, from trail searching to event organizing, from personal workout management to social networking, and from weather advisory to emergency call.

Design and User Interface

The left sidebar menu contains most basic functions.

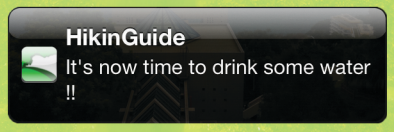


In order to create events or rate trails, hikers have to log in with their registered account on HikinGuide website, or simply with their Facebook/Google accounts.

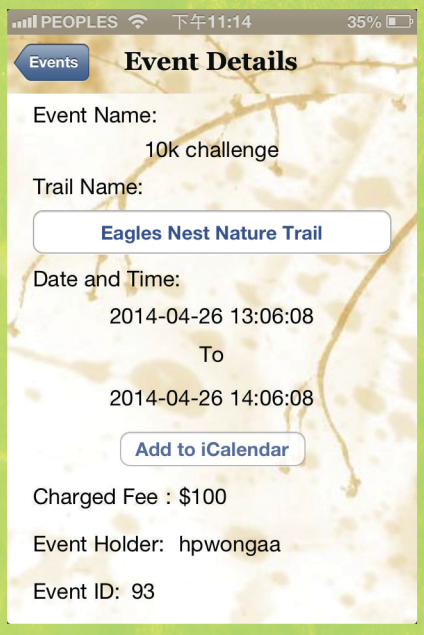


Hikers can type in simply keywords or some criteria to search for trails, and then tap on it to view its details.

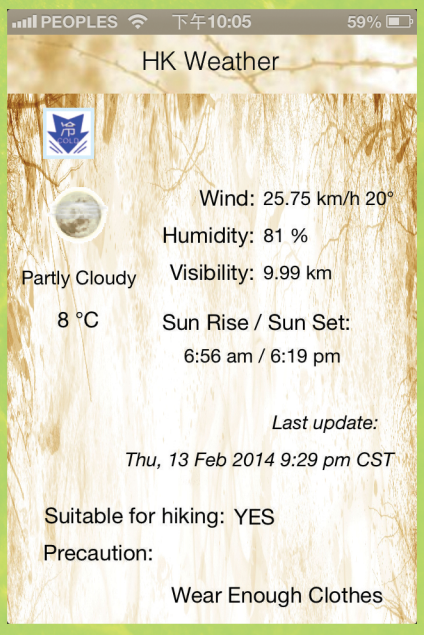
Once tapped, the trails details with a plotted route is shown.



When the weather is hot, “Drink Water” reminder pops up regularly once the hiker has started hiking.



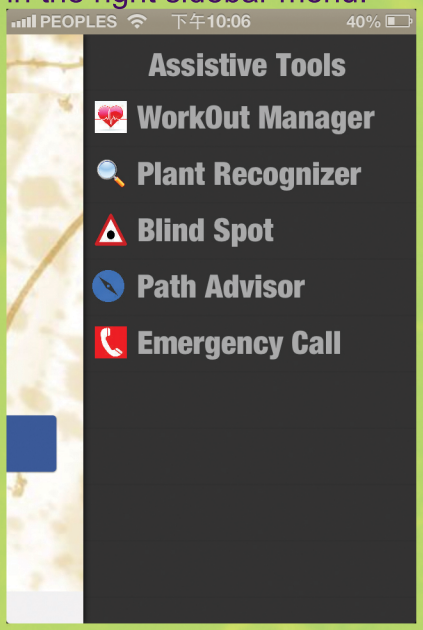
Once the event is created, its details are shown.

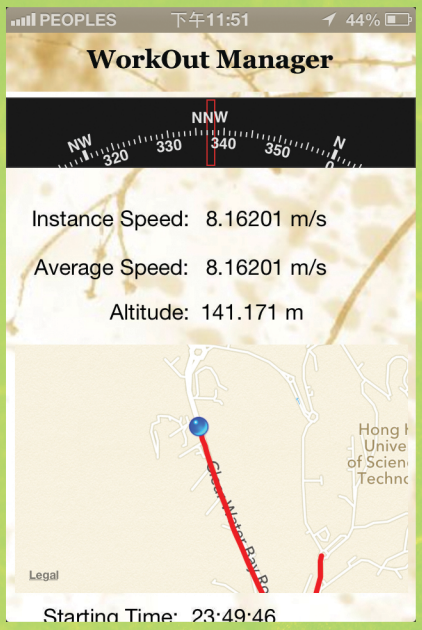


Weather information is shown to determine if hiking is suitable.

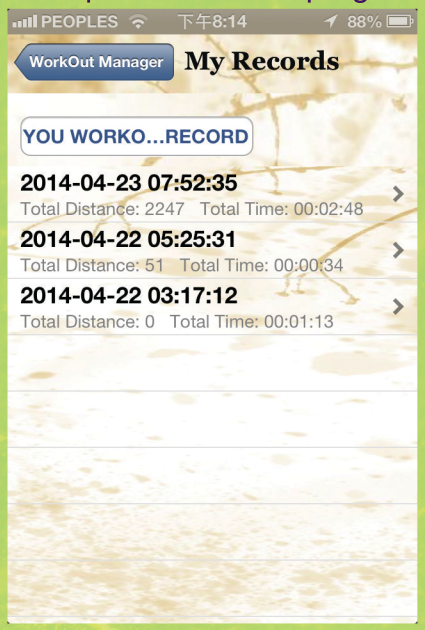
Assistive Tools

The Assistive Tools are placed in the right sidebar menu.

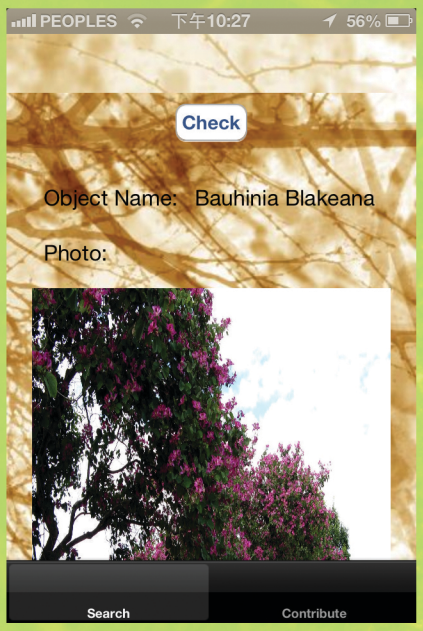




Parameters can be saved as records to help hikers keep track on their progress.



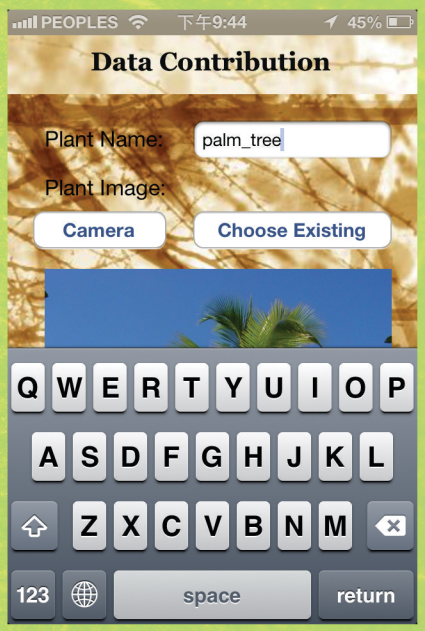
Physical parameters are highlighted to help hikers estimate their workout performance.



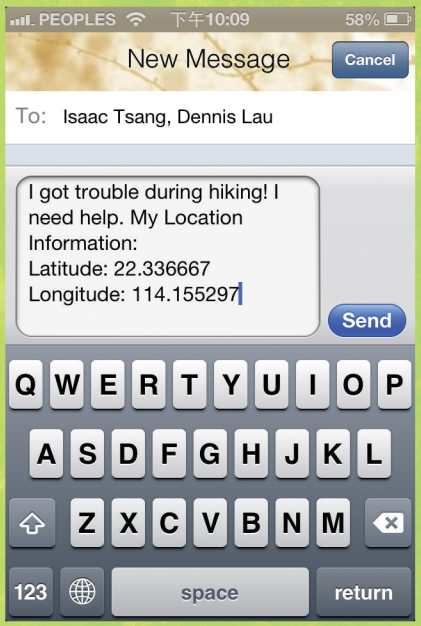
Plant species names can be checked by means query of our crowdsourcing database or the Recognize.im third party service.

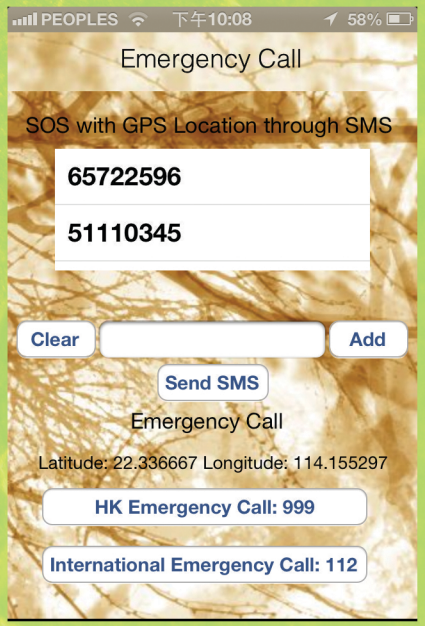
Images of plants associated with hikers' GPS locations can be uploaded to contribute to the crowdsourcing database.

The blindspot recognizer uses a similar principle with the plant recognizer



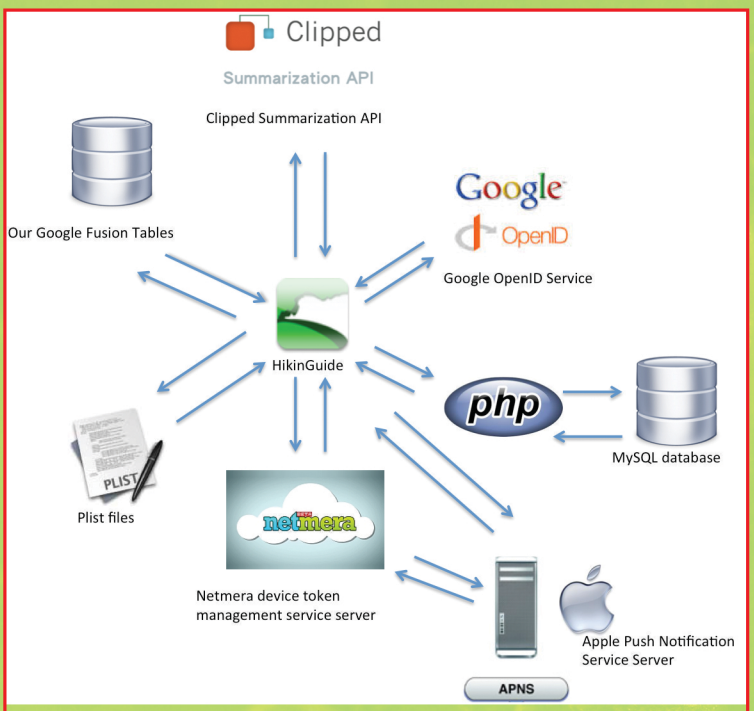
The hiker taps points on a map image according to the desired route in order to show the shortest path.





Emergency contacts can be stored for emergency SMS. Emergency lines can be dialled with only one button pressed.

Implementation

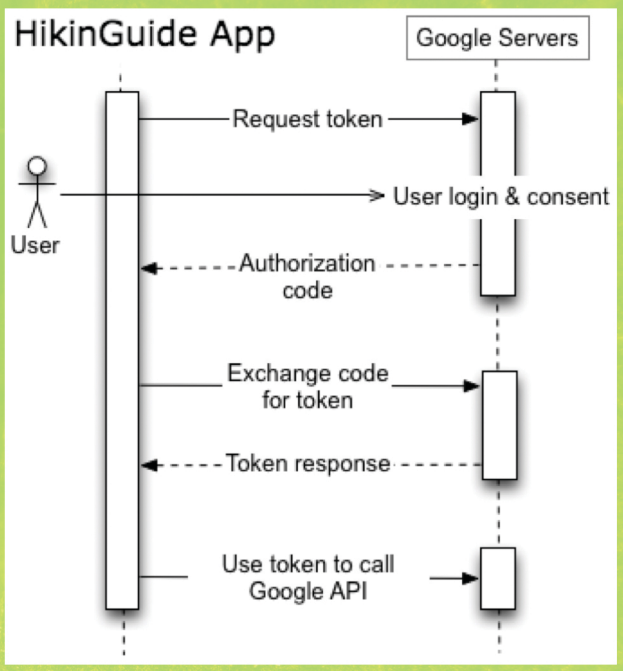


1. System Architecture

- PHP files are used to implement the RESTful Web Service in order to connect to the MySQL database to do queries.
- The local Plist files are securely accessed only by our app through the Xcode built-in API.
- With Google Fusion Table Web Service API, our app reads and writes hiking data, recognizer data, etc.
- We connect to the third party summarization API to do key point extractions.
- GPS coordinates of Hong Kong trail segments in KML format are transformed to readable format for Google Map Library with a parser we created.
- Netmera, a third-party server, manages the device token for push notification. Accepting SSL certification installation, it communicates with the Apple Push Notification Server (APNS) and delivers the message along with the device token. APNS then delivers the message to the user's device.

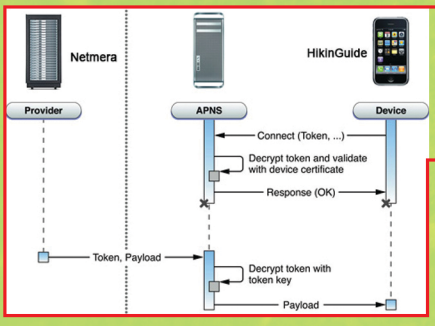
2. Login process of Oauth2.0

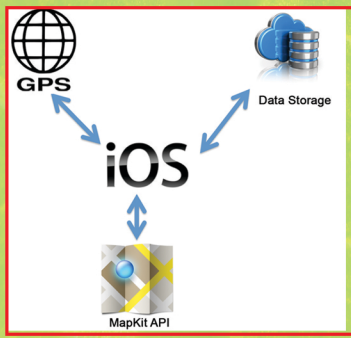
To enhance the user experience, OpenID is used to simplify both the login and registration processes. Google authorizes requests with the latest Oauth2.0 protocol, with the privacy of users protected. Attaching access tokens, we can get the user's email address, surname, given name, etc. from Google endpoints using the GET method. After receiving the email address, we query our database member table. If the user is a HikinGuide member, we skip the registration process and authorize the login process of the users. However, if the user is not a HikinGuide member, we do the registration process in the background and insert a record in our HikinGuide member table.



3. Apple Push Notification

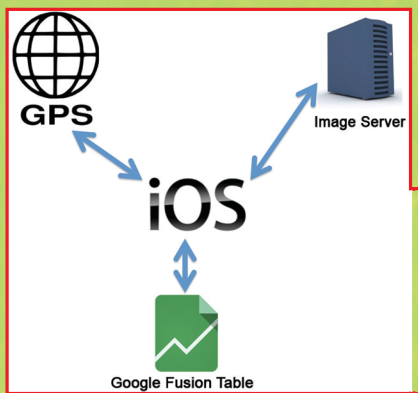
With the push notification in provision profile setting turned on and a unique SSL certificate generated, we must encrypt the message with the SSL certificate before delivering to users. When the app first launches on the hiker's iPhone, permission is asked before getting the unique device token of the iPhone. The device token is then sent to Netmera server. Our SSL certificate is also uploaded to the server for installation. We compose our message and upload it to the server. Netmera delivers the encrypted message and the list of device tokens to the Apple Push Notification Server.





4. Workout Manager

- All the data points of GPS location are stored in an internal file and plotted continuously on a map with the apple MapKit.
- Users' GPS locations are being recorded from the iPhone while they hike.
- Assisted GPS (A-GPS) may be used if users allow doing so in order to increase location precision.



5. Plant recognizer

- Similar species are found by matching between the hiker's GPS location and those in the Google Fusion Tables database.
- Both API keys and access tokens are needed to access the Google Fusion Table.
- By means of Oauth 2.0, access token is obtained from the user's permission.
- Both GET and POST methods are required to manage the database.