Unleash Power of Mobile Location in Your Apps

Amber Case & Aaron Parecki
Esri R&D Center Portland
Self-Portrait of Steve Mann with Wearable Computing Apparatus

1981.
Remember the Milk
Contextual Notification Systems

Virtual Post-It Notes with Image Processing
1995
The location

Problem

Battery

Drain
Location services for consumer devices at scale

All-day use without the battery drain
Geotrigger
An Invisible Button
Geotrigger Use Cases
Calm Technology
What is an ambient application?
What is an ambient application?

- Processes occur in the background
- Data is pushed to the user
- User input can come in many forms, not just through keyboard input
Information should be pushed to you

- A robot working for you behind the scenes.
- The more it knows about you the more it can do for you.
Real-world Examples

Water-main Break

• Time critical turnaround
• Geonotes with contextual information for teams
Geotrigger Technology

SDKs APIs
Geotriggers
Sample Code
For Mobile Phones and Web
Use ArcGIS iPhone and Android SDKs

```
[[AGSGeotriggerManager alloc] initWithClientID:@"clientID"
  andProfile:AGSTrackingProfileAdaptive];
```

```
GeotriggerService.init(this, "{{client_id}}", "{{gcm_sender_id}}",
  GeotriggerService.TRACKING_PROFILE_ADAPTIVE)
```
iOS Location Services

- App registers for location updates from the operating system
- iOS delivers location events to a delegate object in the app when it’s running
- iOS may terminate your app due to high memory conditions, etc.
- If terminated, iOS will re-launch the app in the background when a location event is received
- Less control over when the data is received, but less code to manage
Android Location Services

• App creates a background service which runs persistently
• The app’s service requests location data from the OS
• The OS delivers location data to the service
• More control available on Android, but also requires more code to manage
Geotrigger Components

- **Condition** (area) Polygon
- **Action** (can be a message or a callback URL)
- **Tags** (to group content)
  - Example: Wikipedia article data
  - Tags for Buildings, History
  - Can allow users to subscribe to a subset of the data
Creating a Geotrigger Rule

```json
// POST https://geotriggers.arcgis.com/trigger/create

{
    "condition": {
        "direction": "enter",
        "geo": {
            "type": "Feature",
            "geometry": {
                "type": "Polygon",
                "coordinates": [
                    [[-122.65, 45.55], [-122.65, 45.50], [-122.62, 45.50],
                     [-122.62, 45.55], [-122.65, 45.55]]
            }
        }
    },
    "action": {
        "message": "Welcome to Portland",
        "callbackUrl": "http://example.com/welcome"
    },
    "tags": [
        "city"
    ]
}
```
Setting a Geotrigger rule for a date range

```json
{
    "condition": {
        "direction": "enter",
        "geo": {
            "latitude": 45.5165,
            "longitude": -122.6764,
            "distance": 500
        },
        "dateFrom": "2013-03-21T11:00:00-0700",
        "dateTo": "2013-03-21T15:00:00-0700"
    },
    "action": {
        "message": "Welcome to Esri Portland"
    },
    "tags": [
        "office"
    ]
}
```
500 Meters from a Point

Message

About 500 meters from the hotel.

Create Geonote
Distance from a Point

```json
POST /trigger/create
{
    "app_id": "XXXXX",
    "app_secret": "XXXXX",
    "condition": {
        "direction": "enter",
        "geo": {
            "point": {
                "latitude": 52.5107,
                "longitude": 13.3757,
                "distance": 500
            }
        }
    },
    "action": {
        "message": "About 500 meters from the hotel."
    }
}
```
When a user enters the Lincoln Memorial send them a link to en.wikipedia.org/wiki/Lincoln_Memorial
Geocoding

- Find Places, Look-up Address locations, Reverse look-up from coordinates, and bulk requests

- Make unlimited requests when performing look-ups or leverage credits when storing results for future use

http://geocode.arcgis.com
Geocoding

Battery Conservation for Persistent Location
Geotrigger Tracking Profiles

Adaptive mode
• Optimized for Geotrigger™ events
• Will use less power when farther away from triggers and content

Rough mode
• Only gathers approximate location data
• Good for determining if a device is in a given city or neighborhood
• The most battery efficient
Data collected by one person in rough mode.
Geotrigger Tracking Profiles

Real-time mode
• Sends accurate location as fast as possible
• Least battery efficient

Logging
• Tracks location data in areas of low connectivity
• Sends to the server later, or when a connection re-occurs
Data collected by one person in real-time mode
2.5 million points since 2008
Using Tracking Profiles

```
{
    "condition": {
        "direction": "enter",
        "geo": {
            "type": "Feature",
            "geometry": {
                "type": "Polygon",
                "coordinates": [
                    [ [-122.65, 45.55], [-122.65, 45.50], [-122.62, 45.50],
                      [-122.62, 45.55], [-122.65, 45.55] ]
                ]
            },
        }
    },
    "dateFrom": "2013-03-14T00:00:00-0700",
    "dateTo": "2013-03-21T00:00:00-0700"
},
"action": {
    "trackingProfile": "realtime"
},
"tags": [
    "city"
]
```
Home Automation

When you get home, your lights turn on!

When you leave the house, your lights turn off!
Bringing Wikipedia to Life

Geoloqi: Buckman is a neighborhood in the Southeast section (and tiny portion of the Northeast section) of Portland, Oregon... [Link]

Geoloqi: The Weatherly Building in Portland, Oregon is a 12-story commercial office building... [Link]

Geoloqi: Oregon Ballet Theatre (OBT) is a ballet company in Portland, Oregon. [Link]
Real-time location-based gaming
MAP ATTACK!
25 Players at Stanford University

RED : 2900
- ewedistrict: 970
- fekaylius: 810
- 0EWSzk1fGjgf: 480
- stighackvan: 410
- 220
- chachasikes: 10
- 0

BLUE : 560
- caseorganic: 160
- aaronpk: 140
- paulmison: 50
- marcostong: 0

Credits: Aaron Parecki // Amber Case // Kyle Drake // Patrick Art
MapAttack is a real-time location-based GPS game powered by the Geolqb platform.

mapattack.org
Geotrigger ArcGIS Integration
Available through
• developers.arcgis.com
• ArcGIS Online

Summer 2013
Mobile Privacy:
8 Practices for App Developers
Part 1: General Recommendations
1. Get a privacy policy

- Privacy policies are regret-management tools.
- Only 30% of mobile app developers have one.
- Legislation coming down the pipeline will require it.
2. Simplify and consolidate

Privacy policies should be easy to understand.

- Separate disclosures into two sections – Plain English and Legalese
- Share new data use policies before implementing them.
- Show revisions to the privacy policy and track changes so that users can the differences in the privacy policies.
3. Allow users to access their own data

• Users will be able to migrate if your service closes.

• Bonus: If you give people data they’ll do interesting things with it.

• If you have an API, people will make better versions of your site for your users (Twitter).
4. Practice privacy by design vs. privacy by disaster

• Act now or be forced to act later.

• Privacy consideration should be incorporated into every aspect of an app’s lifecycle.

• Web, legal, user experience, messaging, marketing and development.
Part 2: The User Experience of Privacy
The operation couldn’t be completed. (api.geoloqi.co...)

Everyday City runs in the background and automatically

“EverydayCity” Would Like to Use Your Current Location

Don’t Allow  OK

Automatic Updating

Off  On

Powered by Geoloqi
5. Consolidate and simplify settings and permissions

- Give users empowerment.
- On/off switches, simple settings.
- Make controls easy to access.
6. Present privacy controls at the point of content creation.

- Instagram, Facebook, Foursquare do this well.
- Expose privacy controls with every piece of content that can be created or shared in a given system.
7. No one is perfect

- Hosting user data is a **privilege**, not a right.

- Apologize **immediately** when you screw up, and fix the problem immediately.

- Always give users **something in return** for giving up their data.
8. Transparency **builds trust**

- Let users know what they’re opting into when they use your software.

- Notify users of proposed changes to privacy policies.

- Keep abreast of the current industry and it’s regulations. Fight for your users and they will fight for you.
Geotrigger ArcGIS Integration

Available through
• developers.arcgis.com
• ArcGIS Online
Please fill out your surveys!

Thank you!

Aaron Parecki
CTO, Esri R&D Center Portland
aparecki@esri.com

Amber Case
Director, Esri R&D Center Portland
acase@esri.com