Walk Around The World

Gamification of Exercise

Ryan Wells - 1002253w

March 28, 2014

Contributions

- Comparison of gamification in exercise.
- “Urban Explorer” Android app.
- Two design/implementation iterations of “Urban Explorer”.
- Evaluation of our gamification techniques.

Gamification

- Using games to encourage users and change behaviour.
- Story, Achievements, Leaderboards and Social Interaction.

(a) Charity Miles

(b) WalkJogRun

(c) Fitbit

Gamification

- Play to Cure: Genes in Space.
- Foldit.
- World Without Oil.
- Chick Clique.

Defining Gamification

"The process of game-thinking and game mechanics to engage users and solve problems."

Gamification By Design
Gabe Zichermann and Christopher Cunningham

The "Elemental Tetrad" (*The Art of Game Design*, Jesse Schell):

- Story
- Mechanics
- Aesthetics
- Technology

Defining Gamification

"The process of game-thinking and game mechanics to engage users and solve problems."

Problem - View that there is a "lack of time to take exercise".

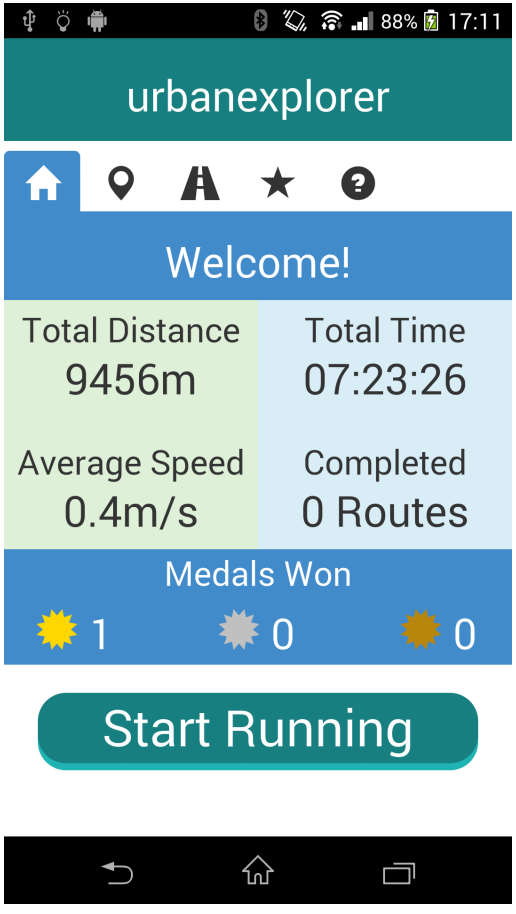
Users - Do not exercise frequently but who have time in their daily routine that has potential to be converted to exercise.

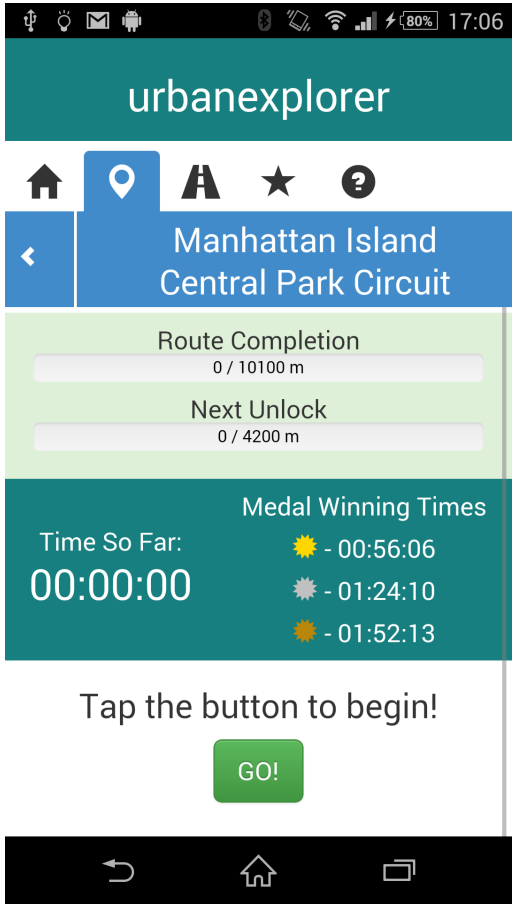
Game Mechanics - Exercising outdoors to receive awards.

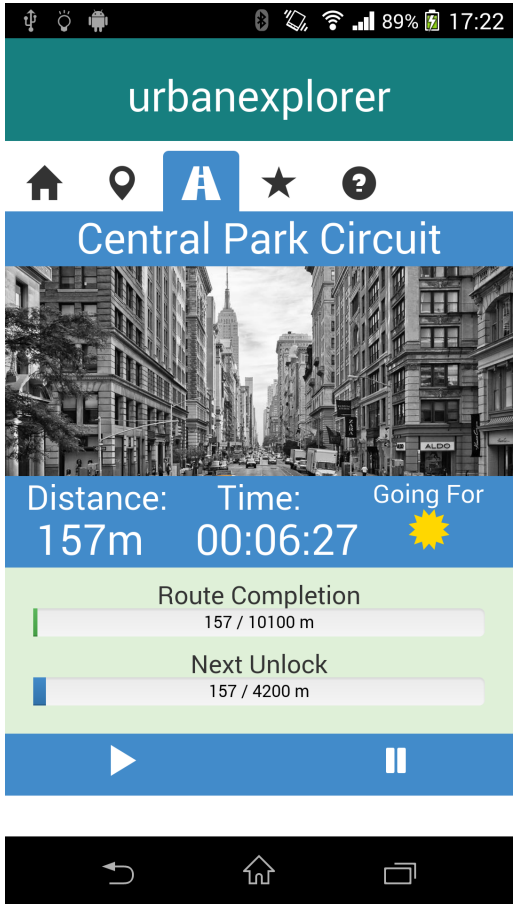
Game Thinking - User wants success. Walking an extra five minutes could grant this success.

Urban Explorer

Run Around the World!

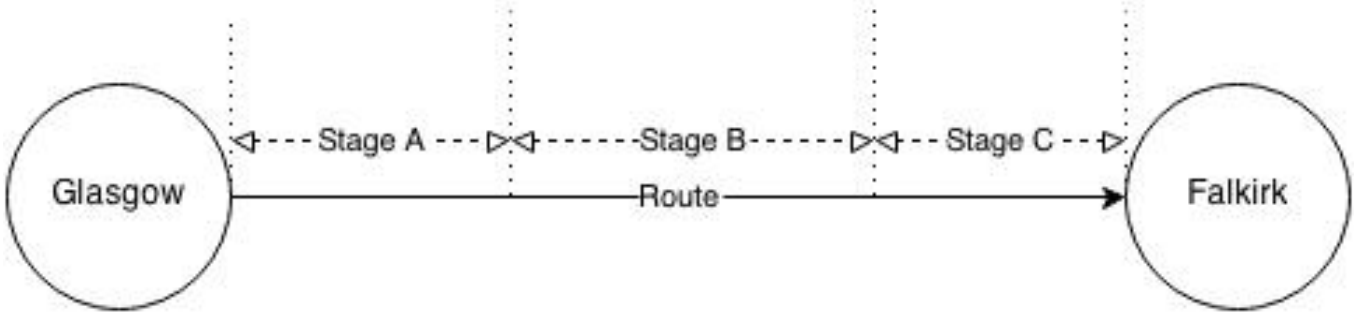






Urban Explorer

- User picks a route they wish to run along.
- User runs outdoors where distance is tracked via GPS.
- The distance travelled is added to their chosen route.
- May be physically running around Kelvin Park but they are running around Central Park inside the app.
- Receive a medal for completing the route in a given time.
- Unlock pictures as you travel along the route.



Design Goals

Reduce *cost* for the user:

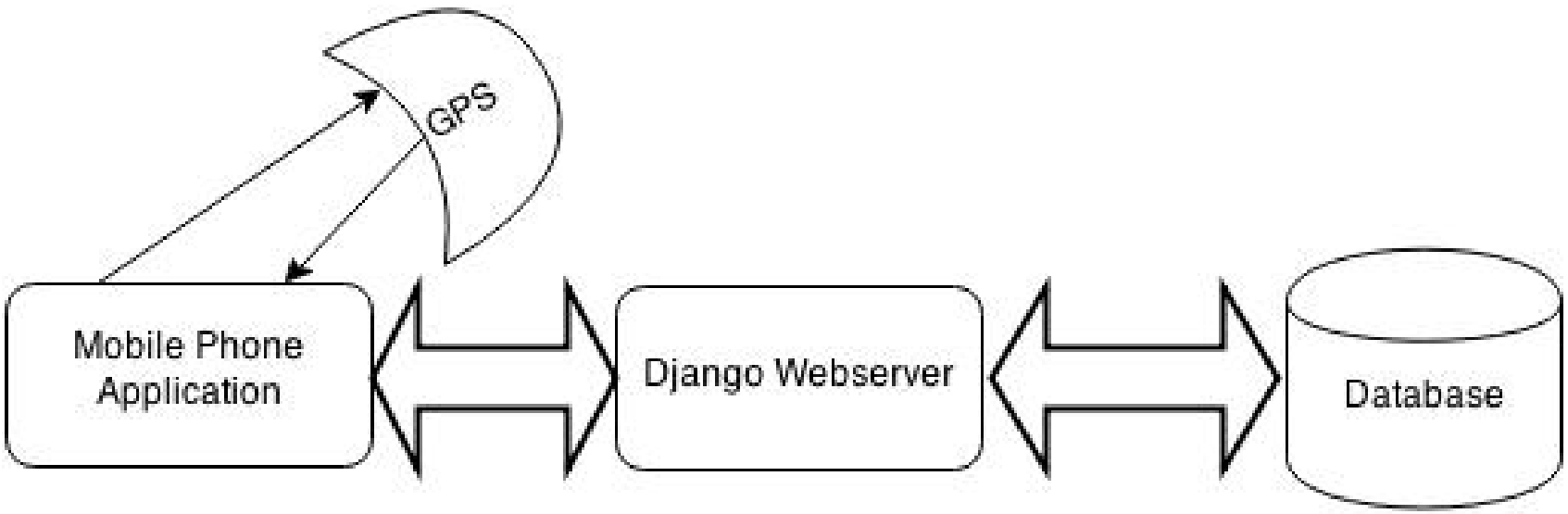
1. Time - Loading time, navigation time
2. Data - Monetary charges incurred to the user through network transfer.

Make a gamified experience that encourages the user to exercise.

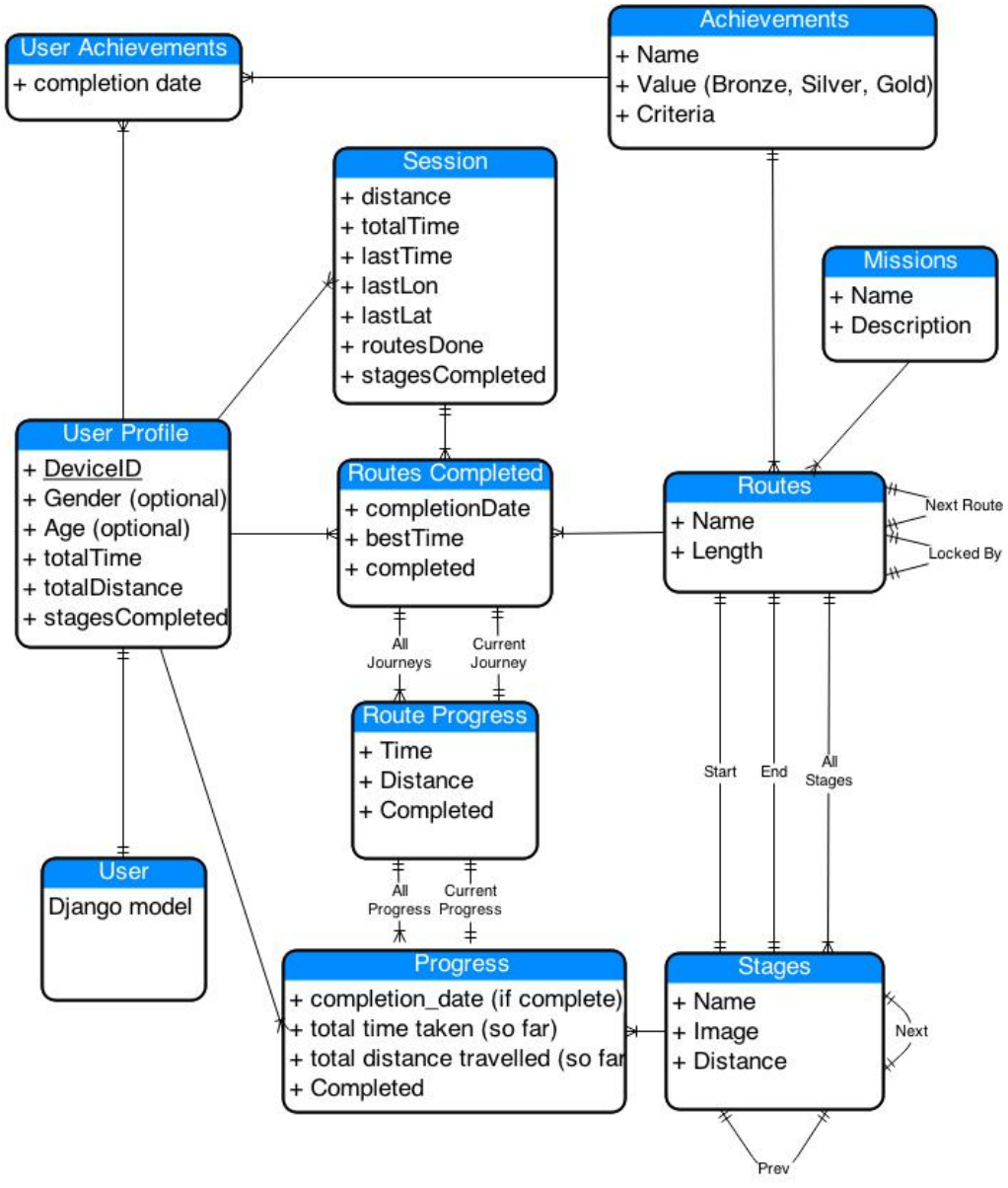
Platforms

- PhoneGap (app only released on Android)
- AngularJS JavaScript Framework
- Twitter Bootstrap CSS3 Framework
- Django middleware with built-in ORM
- Django-Tastypie for REST API generation

N-Tier Diagram



Entity Relation Diagram



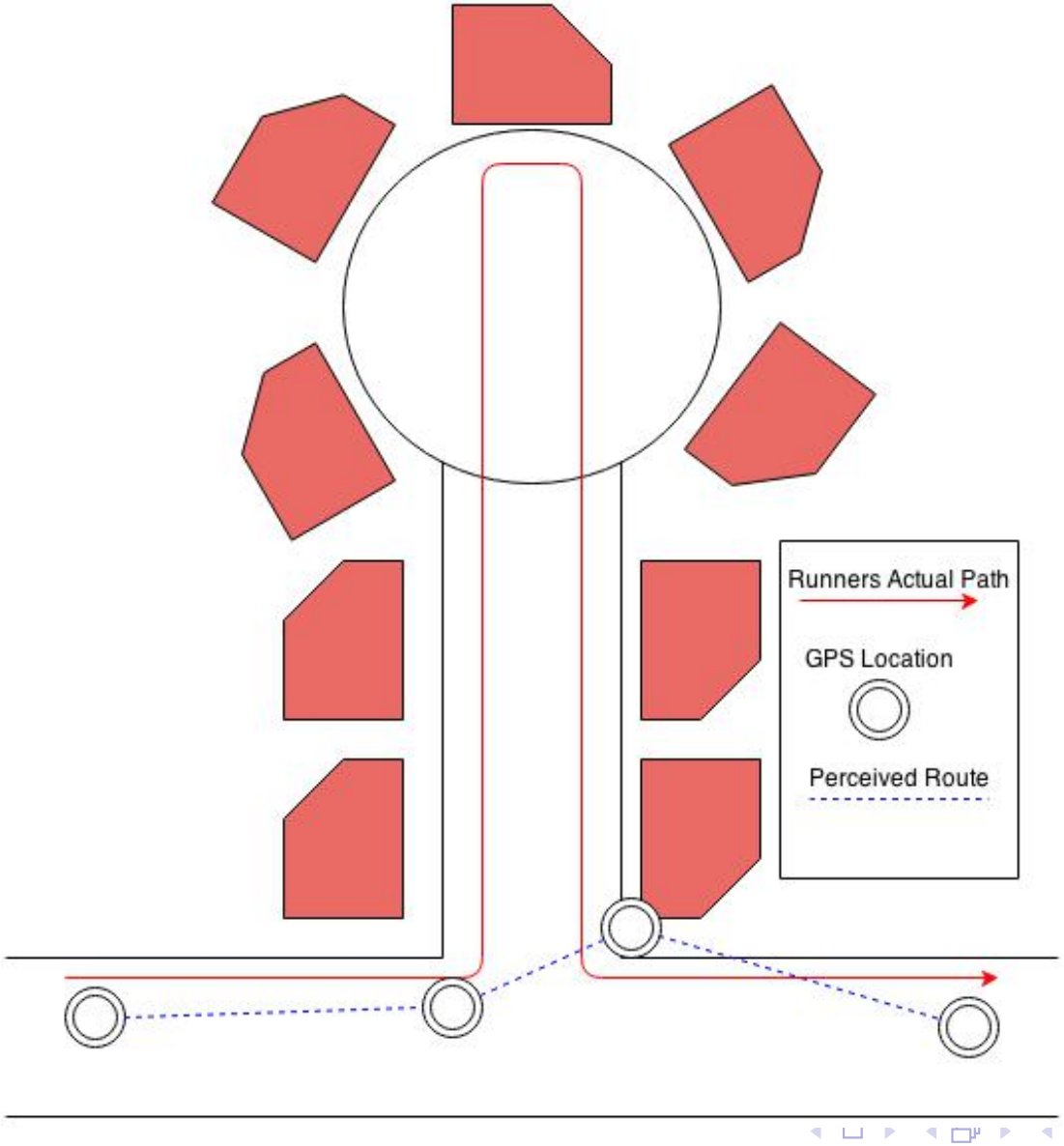
Notable Design Decisions

- Explicit Caching
- Promise Based Module Interfaces
- Exercise Session Management
- Location Management
- Distance Verification

Location Management

- How often should we request location information?
- Location information is costly: 50-200mA. Almost as costly as a 3G message.
- Chose once a minute based on measuring round-trip-time of entire process.
- Cul-de-sac effect. Similar to aliasing in signal analysis.
- Can me mitigated by getting location information more frequently.

Cul-de-sac effect



Distance Verification

- Haversine Function.
- Try to hamper cheating attempts.
- Device uploads coordinates to the server where distance is calculated.
- Maximum speed that a user can travel is $6m/s$.
- Worst case inaccuracy due to the "Cul-de-sac" effect is $360m$ when requesting location information at one minute intervals.

Evaluation

- Two main design and evaluation iterations.
- Initial design was distributed to a small group.
- Final design was openly distributed. Over 40 total downloads and 9 actual engagements.
- From these 9 users, three completed a route and two were awarded medals.
- Survey was circulated asking for feedback about the platform and gamification. Received 8 responses.

Evaluation

ID	Time (hh:mm:ss)	Distance (m)	Stages	Routes	Exercise Sessions	Medals
e4...ee	09:40:46	20027	11	4	1	-
94...70	03:17:51	11805	5	1	2	Silver
5e...8f	02:16:10	4038	0	0	1	-
2a...42	01:54:42	15141	39	2	3	Gold
56...b4	00:02:02	2	0	0	2	-
7e...69	00:01:21	74	0	0	2	-
d3...ba	00:01:10	103	0	0	1	-
36...da	00:00:20	23	0	0	2	-
46...05	00:00:01	0	0	0	1	-

Table: Active users of "Urban Explorer" ranked by time invested.

Evaluation

Points from survey responses:

- Responses indicated a positive experience with the app.
- Medals were rated very encouraging (4.14/5 avg.)
- Picture unlocks were less encouraging (3.43 avg.)
- However viewing these pictures as you exercise was met with a better response (3.57 avg.)
- Standard statistics are still important to users for encouragement (3.71 avg.)

Evaluation

Points from survey responses:

- Responses indicated dissatisfaction with how often the distance was updated (2.83 avg.) and users were not convinced that the distance reported was accurate (3/5 avg.).
- Goals were clear (4.33/5 avg.) and encouraging (3.5/5 avg.).

Future Work

Technology:

- Implement as a native Android app, do not use PhoneGap for production quality applications.
- Determine the best solution to mitigate the “Cul-de-sac” effect while preserving battery life.
- Google Play Location Services for location information.

Future Work

Gamification:

- Better onboarding techniques required
- Emphasise short-term goals
- Reminders to exercise
- Local Leaderboards of achievement
- Social interaction
  - Create a team of peers to work towards longer goals
  - Global routes that every player contributes too.
- Expand story to include a *discovery* element.

Walk Around The World

Thank You to Leif Azzopardi and David Maxwell.
Questions?