

學 期 壹

term one

(1331) (2601) (1105)

Exhibition Navigation with iBeacon

lyu1403.

映 像 使 用 書 體 MS P 明 朝

Typeface used MS PMincho

NG Ping Him

ID #1155029312

Slide number two

YEUNG Tak Wing

ID #1155009050

Slide number three

background

Slide number four

introduction to ble

Bluetooth Low Energy

Latest Bluetooth 4.0 standard

iOS 7.0+

Android 4.3+

what is an iBeacon?



Beacon

TxPower Major Minor
-60 dB 6666 7777
UUID
cd5fd...f31



Beacon

TxPower Major Minor
-59 dB 1234 5678
UUID
cd5fd...f31



Phone



Beacon

TxPower Major Minor
-48 dB 3943 6000
UUID
cd5fd...f31

TxPower

Transmission power

Power level of the beacon measured at 1 metre

RSSI

Received Signal Strength Indication

Measured power of a signal

case study

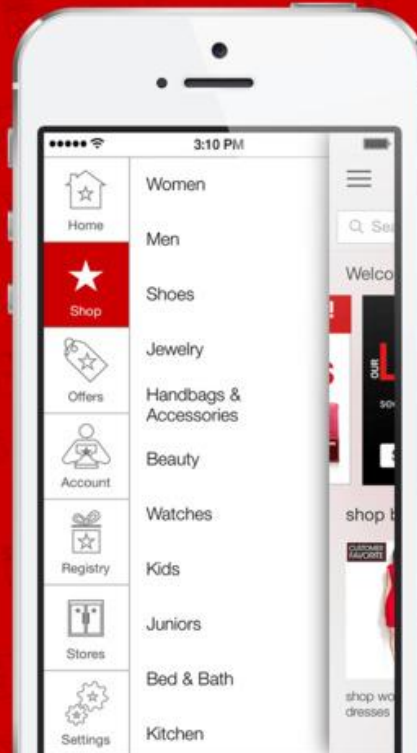
Slide number eleven

macy's

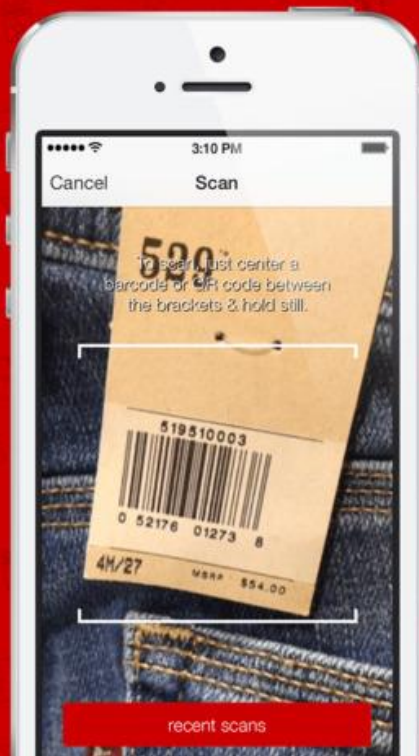
Read reviews & see what
other shoppers are saying.



Find what you need faster!



Scan the barcode for product
details, pricing & reviews.



expected

HOW DO YOU HIGHLIGHT A STORE THE SIZE OF A CITY BLOCK?

YOU GEOFENCE IT AND GIVE IT INDOOR MAPPING.

Macy's, Inc. approached Raizlabs to create an extraordinary mobile app to highlight the experience of their flagship store, Macy's Herald Square in New York City.

GETTING RESULTS

Raizlabs created a custom content management system, allowing Macy's to increase customer engagement. We also brought their timeless Santaland tradition into the new century with a reservation system for holiday visitors.



reality



Store

Mac

iPhone

iTunes Preview

Macy's

By Macys Inc

Open iTunes to buy and download apps



[View in iTunes](#)

Free

Category: [Lifestyle](#)

Updated: Nov 17, 2014

Version: 4.1.0

Size: 18.8 MB

Languages: English, Danish,
Portuguese, Russian, Spanish,
Swedish

Seller: Macys Inc

© 2014 Macy's, Inc.

[Rated 4+](#)

Compatibility: Requires iOS 7.0
or later. Compatible with
iPhone, iPad, and iPod touch.
This app is optimized for
iPhone 5.

Customer Ratings

Current Version:

★★★ 18 Ratings

All Versions:

★★★ 7184 Ratings

Descrip

It's faster
ultimate m
access you

Macys Inc

What's

- We've m
- My Wall
your Star

iPhone

Fin



Customer Ratings

Current Version:

★★★ 18 Ratings

All Versions:

★★★ 7184 Ratings



line maps for indoor



LINE Maps for Indoor

LINE Corporation

UNINSTALL

OPEN



Downloads



70



Travel & Local



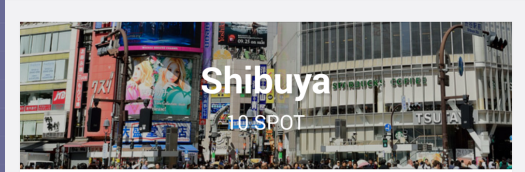
Similar

No more wandering around confusing indoor areas.

[READ MORE](#)



Shibuya ▼



Bunkamura
Complex Cultural Facility
Hours 10:00 - 22:30



LUMINE MAN SHIBUYA
Shopping Mall
Hours 11:00 - 21:00



SHIBUYA109
Shopping Mall
Hours 10:00 - 21:00



Shibuya Hikarie
Shopping Mall
Hours 10:00 - 23:30



Satei Zenkashoin
5F | Teahouse



Route



From LAWSON

To Satei Zenkashoin

65m, 4Min.

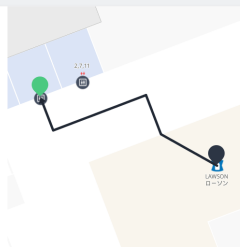
Go 6 floors

[Start Guide](#)

11F

Go to Floor 7 using an Express Elevator

1m, 1Min.



Go using an Express Elevator

7F

到着 Satei Zenkashoin



Shibuya
Hikarie

Information

Floor Guide

Shibuya Hikarie

Shibuya, Shibuya-ku, Tokyo
2-21-1

Phone Number

03-5468-5892



Hours

[ShinQs](#)

Every day 10:00 ~ 23:30

city gallery

Welcome to City Gallery



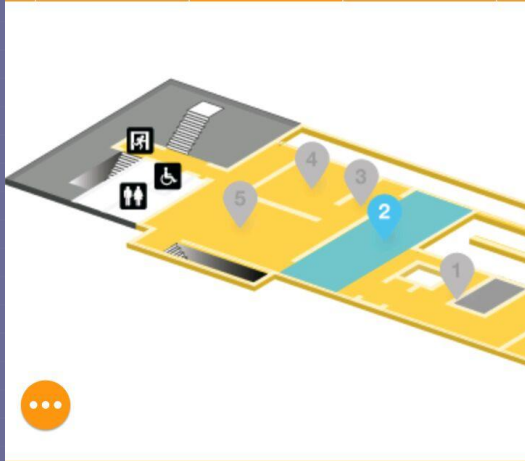
Get connected to our interactive exhibits
by checking-in your QR code card



[Check-in](#)

[Account List](#)

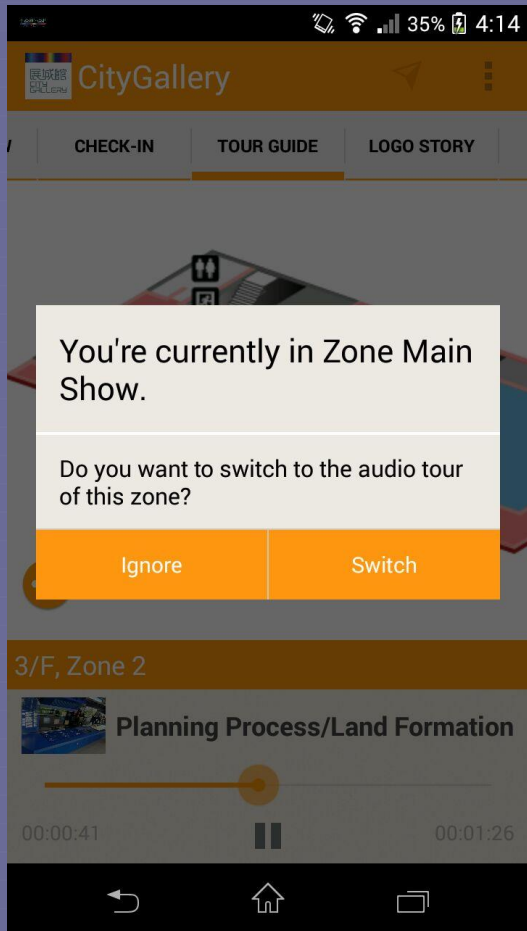
Do not show this again



1/F, Zone 2

 Living Environment

00:00:09  00:01:47



CityGallery

CHECK-IN TOUR GUIDE LOGO STORY

You're currently in Zone Main Show.

Do you want to switch to the audio tour of this zone?

Ignore

Switch

3/F, Zone 2



Planning Process/Land Formation

00:00:41



00:01:26



requirement analysis

Slide number thirty three

stepwise refinement



Step 1

Download venue information from database



Step 2

Scan for beacons nearby



Step 3

Identify closest exhibit



Step 4

Present exhibit details from web

extra requirements

Server side

Easy deployment of beacons

Easy update of exhibit details

Simple user identification

Client side

Support for different languages

Audio / video playback

Floor plan

technical considerations

Slide number forty six

beacon deployment schemes

traditional: one beacon, one exhibit

Deployment schemes

Traditional: one beacon, one exhibit

Exhibit identified by scanned beacon ID only

Beacon



Beacon



a step further: use compass too

Deployment schemes

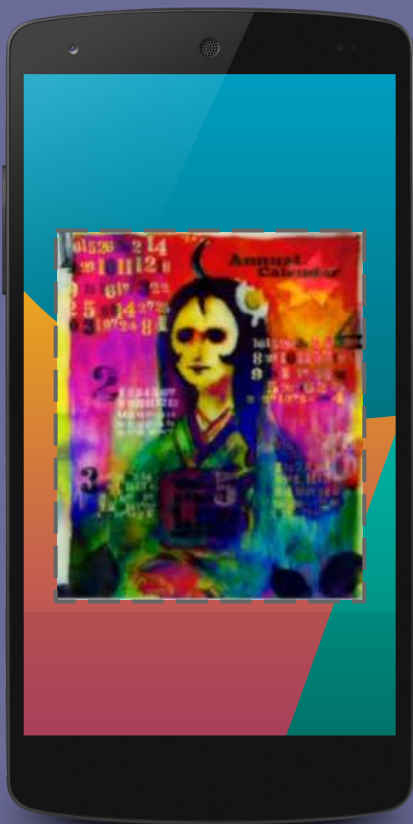
A step further: distinguish user heading with compass

Exhibit identified by beacon ID and direction



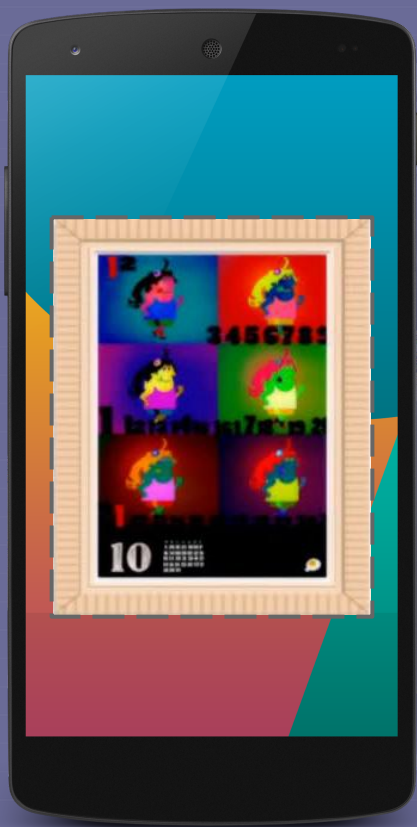
Beacon







Beacon



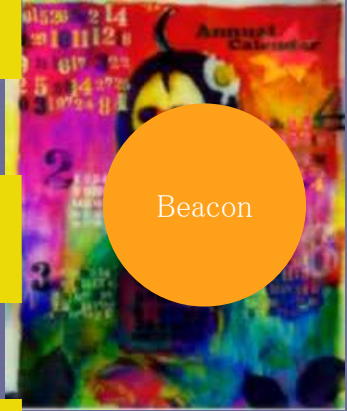
easy modification: fixed grid of beacons

Deployment schemes

Support easy modification: fixed grid of beacons

Deploy beacons to cover the entire indoor area

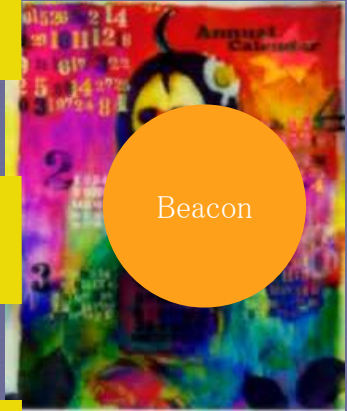
Exhibit identified by beacon and exhibit locations



best in practice: combine all

Deployment schemes

Best in practice: combine all deployment methods





紅屋時期及香港的兒童讀物



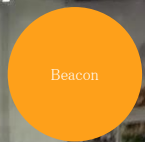
Beacon



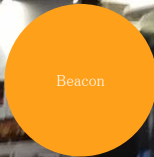
Beacon



Beacon



Beacon



Beacon



Beacon

全人教育

Whole-person Education—Goals and Practices

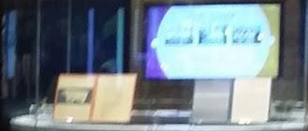


全人教育

Beacon



Beacon



微

Explore and Inspire



experiment / calibration

How far should beacons be apart?

Minimize deployment cost

Maintain quality of distance estimation

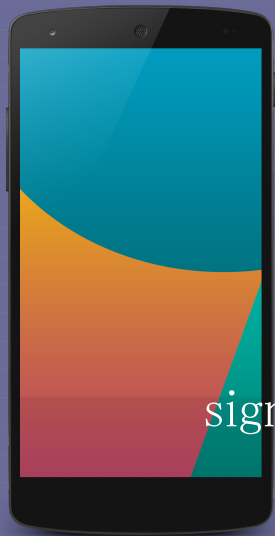
The experiment / calibration

A beacon affixed to a wall

A phone measuring RSSI at various distances

Beacon calibrated using the phone at 1m (TxPower)

100 continuous samples; first and last 20 discarded



signals

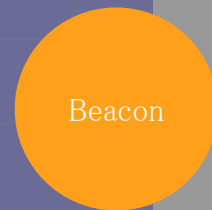
signals

1 metre



signals

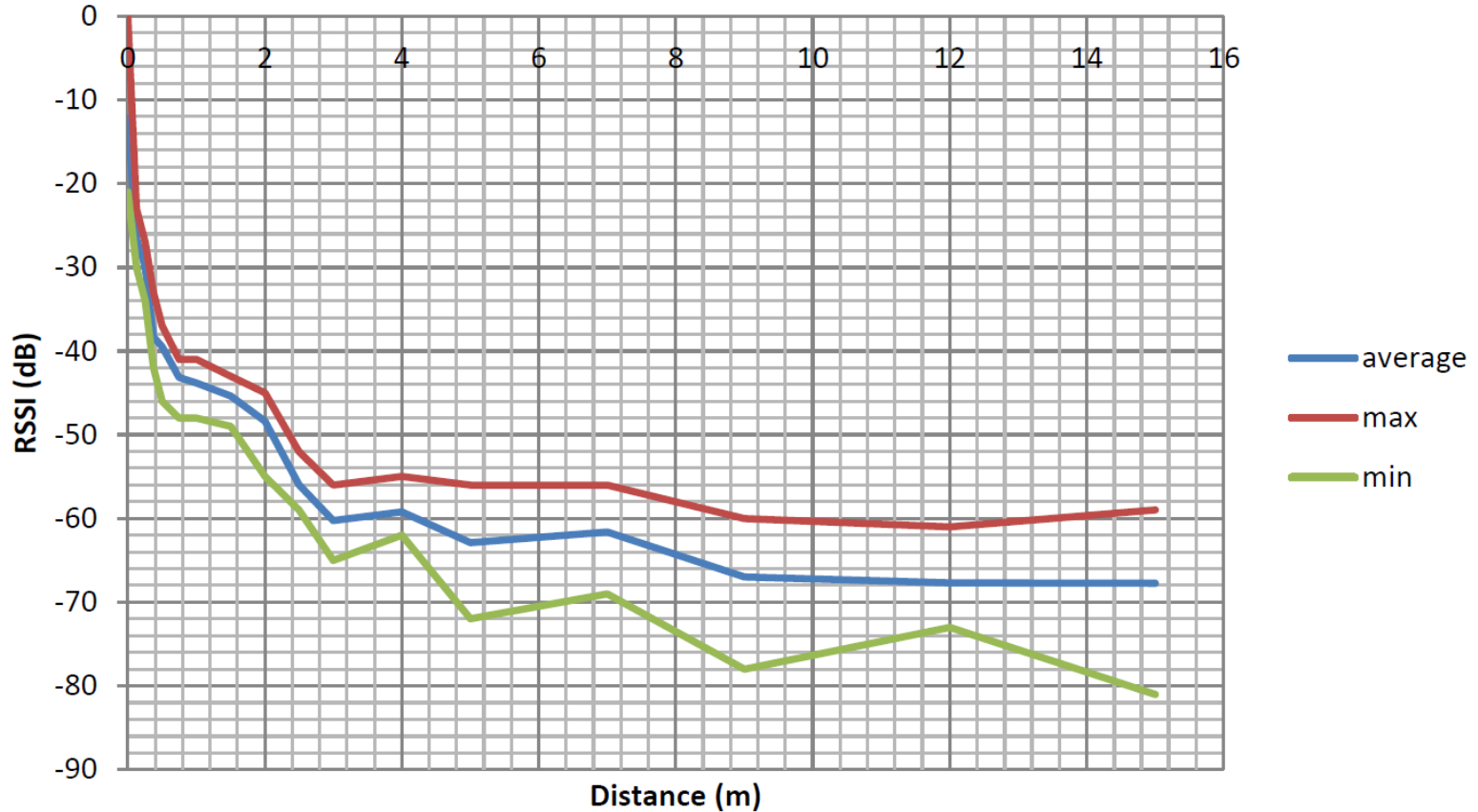
signals



Beacon

Wall

Range of RSSI against Distance of Beacon #1



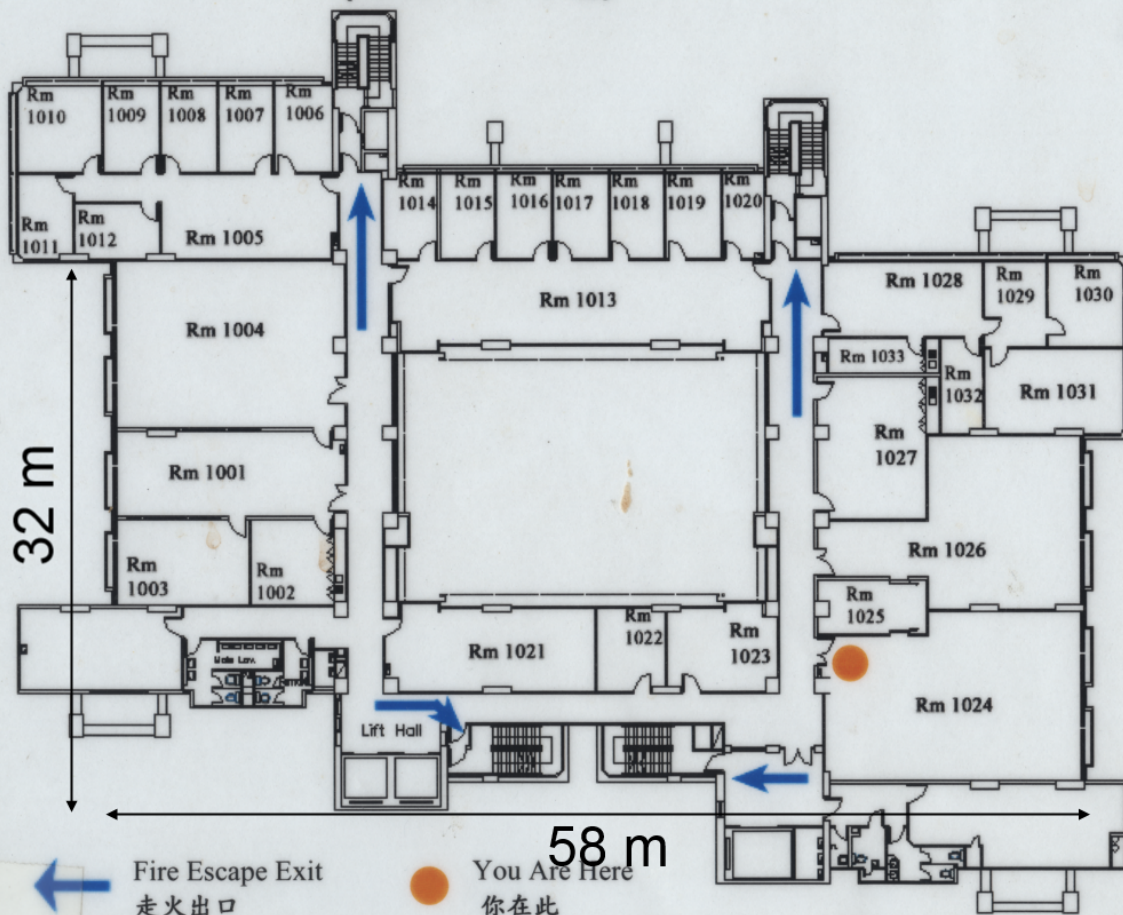
Implications

Reliable range: 0 ~ 2 meters

Beacon deployment distance: 2m

FIRE ESCAPE PLAN 走火出口圖

(Level 10 十樓)



mobile application

Slide number seventy two

radar

Beacon Details

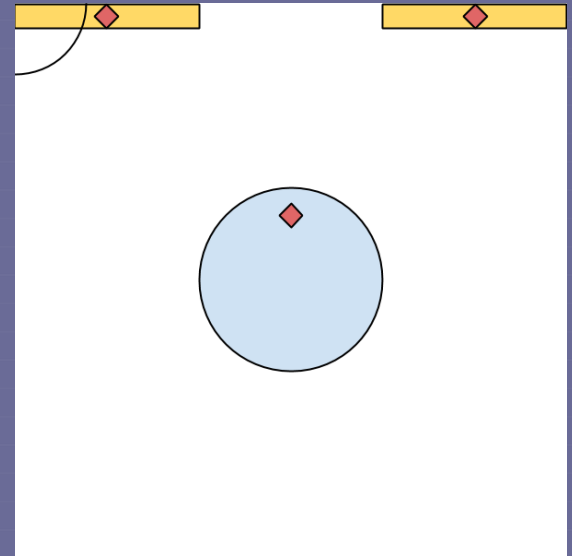
The Chung Chi College
Elisabeth Luce Moore
Library



beacon details

Scenario 1

3 beacons = 3 exhibits



Features

Language selection in menu

Simple floor plan

Multimedia

User rating

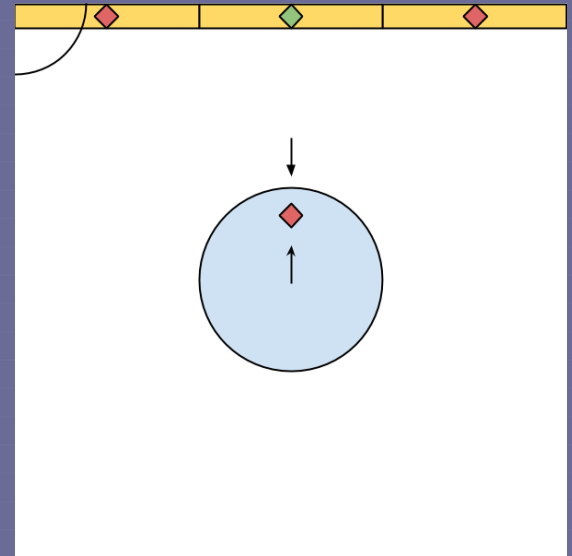
Sharing

Scenario 2

3 beacons = 5 exhibits

Distinguish wall area with distance

Distinguish heading with compass



web

Slide number neunundsiebzig

database

cms

<http://appsrv.cse.cuhk.edu.hk/~phng2/fyp/>

dashboard

Beacon info

All beacons						
ID	UUID	MAJOR	MINOR	LONGITUDE	LATITUDE	DESCRIPTION
1	B9407F30F5F8466EAF925556B57FE6D	3344	5566	114.2073102	22.4179243	SHB
2	B9407F30F5F8466EAF925556B57FE6D	2	102	115 9 E	23 18 3 N	
3	B9407F30F5F8466EAF925556B57FE6D	3	103	116 9 E	23 17 2 N	Hello World!
5	B9407F30F5F8466EAF925556B57FE6D	5	105	118 9 E	24 17 2 N	
8	B9407F30F5F8466EAF925556B57FE6D	8	108	121 9 E	26 18 3 N	
10		10	110	123 9 E	27 18 3 N	
11		11	111	124 9 E	27 17 2 N	
15		15	115	128 9 E	29 17 2 N	
17		17	117	130 9 E	30 17 2 N	
18		18	118	131 9 E	31 18 3 N	
19		19	119	132 9 E	31 17 2 N	
20		20	120	133 9 E	32 18 3 N	Some more
21		21	121	134 9 E	32 17 2 N	
22		22	122	135 9 E	33 18 3 N	
23		23	123	136 9 E	33 17 2 N	
24		24	124	137 9 E	34 18 3 N	
25		25	125	138 9 E	34 17 2 N	Last one!
137		1234	5678	hñfjr	hñdnr	hello world
139		1020	3040	long	lat	Was ist das?
172	B9407F30F5F8466EAF925556B57FE6D	5555	6666	-74.044581	40.6896698	english 中文 עברית עברית русский 日本語
173	B9407F30F5F8466EAF925556B57FE6D	6666	7777	11.582154	48.152359	<script>alert('xss');</script>
186	E2C56DB5DFFB48D2B060D0F5A71096E0	1	2	2.25	3	Bag
187	E2C56DB5DFFB48D2B060D0F5A71096E0	1	2	2.25	3	MATSUSHO retract
188	E2C56DB5DFFB48D2B060D0F5A71096E1	4095	65535	1	1	EVEREADY
189	E2C56DB5DFFB48D2B060D0F5A71096E1	1	1	3.5	1	extend
191	B9407F30F5F8466EAF925556B57FE6D	7776	8887	lonna	latna	des
194	inputUuid	1212	3434	lo	la	des
196	uuid again	1	3	l	ll	de
198	E2C56DB5DFFB48D2B060D0F5A71096E0	1	3			

add

Add a beacon

OWNER**UUID****MAJOR****MINOR****LONGITUDE****LATITUDE****DESCRIPTION**

Edit a beacon

OWNER**ID****UUID****MAJOR****MINOR****LATITUDE****LONGITUDE****DESCRIPTION****PUBLIC DESCRIPTION****PUBLIC TITLE****PUBLIC SUBTITLE**[EDIT](#)[DELETE](#)[CANCEL](#)

remove

Remove a beacon

ID

preview

Preview a card

OWNER**UUID****MAJOR****MINOR**

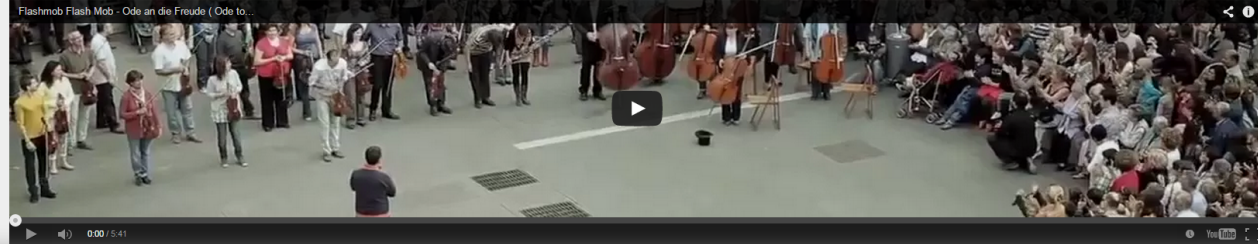
The Chung Chi College Elisabeth Luce Moore Library



Monday - Friday 8:20 a.m. - 10:00 p.m.
Saturday 8:20 a.m. - 7:00 p.m.
Sunday 1:00 p.m. - 7:00 p.m.

Description

The Chung Chi College Library was first established in 1951. The present library building was built with the generous support of the Henry Luce Foundation through the United Presbyterian Church in the United States of America and was officially dedicated on October 23, 1971 by Mr. Henry Luce's sister, Mrs. Elisabeth Luce Moore, after whom the Library was named.



api

json

JSON

Cross-platform

Supported by many languages

Objective-c, Swift, Java, Python, Perl, Ruby...

JSON

```
{"status": "OK", "data": {"latitude": "22.4179243", "longitude": "114.2073102"}}
```

JSON

```
{"status": "OK", "data": {"latitude": "22.4179243", "longitude": "114.2073102"}}
```

status: OK

data:

latitude: 22.4179243

longitude: 114.2073102

documentation

<http://appsrv.cse.cuhk.edu.hk/~phng2/fyp/api/docs/>

RADAR REST API DOCUMENTATION

Important notes

GET notes

GET API key

Methods

GET getDescription

GET getLocationById

GET getLocationByUuidMajorMinor

GET getQuota

GET setDescription

GET setLocation

About

GET ourDetails

POST comments

Important notes

GET notes

HTTP request method

Unless specified, all API calls use **GET**.

Redirection to HTTPS

The API automatically redirects you to the encrypted HTTPS channel if you are using the unencrypted HTTP.

Return type

Unless specified, all API calls return **JSON** objects.

Return format

The format of the returned data is similar to the JSON format specified by JSend.

Please read [JSend's page](#) for details.

Format

```
{"status":status_of_call,"data":{returned_data}}
```

Example

```
{"status":"OK","data":{"latitude":"22.4179243","longitude":"114.2073102"}}
```

GET API key

Request an API key

New Use this demo key: 97d9e7b3f06ef1234e15613ebb6663eb

Methods

GET getDescription

Description

Returns the description of a beacon.

Parameters

API Documentation

Description

Parameters

Examples

Requests

Results (successful + failed)

Example result

Successful result

```
{"status": "OK", "data": [{"latitude": "22.4179243", "longitude": "114.2073102"}]}
```

Unsuccessful result

```
{"status": "warning", "data": {"error_message": "No quota left"}}
```

GET getLocationByUuidMajorMinor

Description

Returns latitude and longitude of a beacon.

Parameters

key	Your API key. It looks like this: 97d9e7b3f06ef1234e15613ebb6663eb
request	Use getLocationByUuidMajorMinor to use this API call.
uuid	The UUID of your beacon, without hyphens. It looks like this: B9407F30F5F8466EAF925556B57FE6D
major	The major of your beacon. It looks like this: 3344
minor	The minor of your beacon. It looks like this: 5566

Example request

GET

```
https://appsrv.cse.cuhk.edu.hk/~phng2/fyp/api/?key=97d9e7b3f06ef1234e15613ebb6663eb&request=getLocationByUuidMajorMinor&uuid=B9407F30F5F8466EAF925556B57FE6D&major=3344&minor=5566
```

Example result

Successful result

```
{"status": "OK", "data": [{"latitude": "22.4179243", "longitude": "114.2073102"}]}
```

Unsuccessful result

```
{"status": "warning", "data": {"error_message": "No quota left"}}
```

GET getQuota

Description

Returns the quota of calls left of a user.

dev center

<http://appsrv.cse.cuhk.edu.hk/~phng2/fyp/dev/>

Dev Center

General

Bugs

Suggestions

[Home](#)

Recent Discussions

getDistance

4 views · 1 comment · Most recent by admin · 4:47PM [Suggestions](#)

beacons are PROXIMITY, NOT FOR EXACT COORDINATES

3 views · 1 comment · Most recent by benny · 4:44PM [General](#)

getDescription doesnt work!!!!!!!!!!!!!!

2 views · 0 comments · Started by benny · 4:32PM [Bugs](#)

Howdy, Stranger!

It looks like you're new here. If you want to get involved, click one of these buttons!

[Sign In](#)[Register](#)[Categories](#)[Recent Discussions](#)[Activity](#)

Categories

[All Categories](#)

3

[Suggestions](#)

1

[Bugs](#)

1

[General](#)

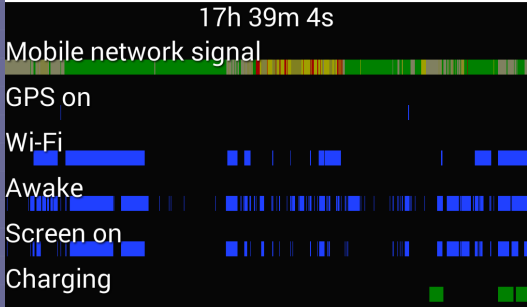
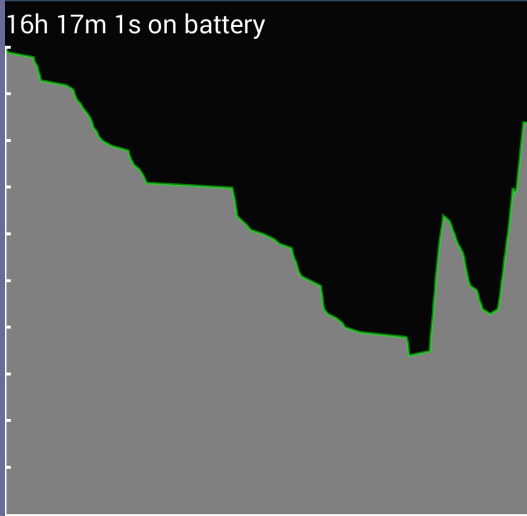
1

limitations

Slide number one hundred and eight

background scans, battery drain

< History details





not on ceiling, nor floor

ceiling



Ceiling

Ceiling reflects beacon signals

⇒ Beacon signals are amplified

floor







Floor

Floor absorbs beacon signals

⇒ Beacon signals are weakened

not too close, nor too far

too close

Too close

Interferences

too far

Too far

Affected by noises

different scanning devices



Carrier 9:09 PM

Comments Link

The Great App.net Mistake

wired.com 17 points by sylenus 1 hour ago · 3 comments

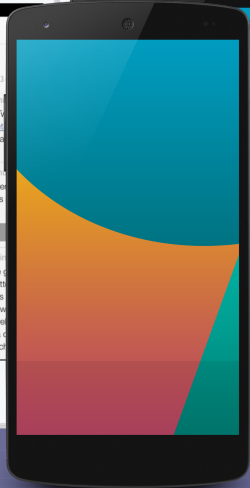
nmuro 50 minutes ago
In other words, normal people that use Twitter or Instagram still have no clue what [App.net](#) is and the early adopters of [App.net](#) will eventually get tired of it.

TruthSHIFT 4 minutes ago
I read the whole article and never discovered the mistake. Did I miss something? It sounds like [App.net](#) is doing fine.

Hide 1 reply

zalew 1 minute ago

"Alpha was the first product out of the gate, launched in reaction to something Twitter did. Subsequently, much development was in building Twitter-like things. So its little wonder that people associate [App.net](#) with, well, Twitter. And once people form an idea of what a product is, it becomes very hard to change that idea."



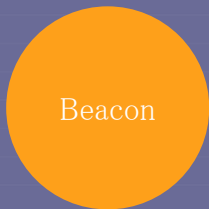
security



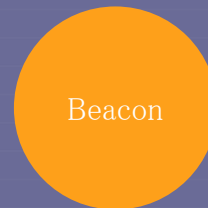
TxPower	Major	Minor
-60 dB	6666	7777
	UUID	
	cd5fd...f31	



TxPower Major Minor
-60 dB 6666 7777
UUID
cd5fd...f31



TxPower Major Minor
-60 dB 6666 7777
UUID
cd5fd...f31



TxPower Major Minor
-60 dB 6666 7777
UUID
cd5fd...f31

Term
2

Next

▲
2015
IBEA CON

preview

Term 2

multi-user cms

CMS



I B E A C O N

Term 2

deployment tools



signals



signals

signals

signals



I B E A C O N

Term 2

user navigation history

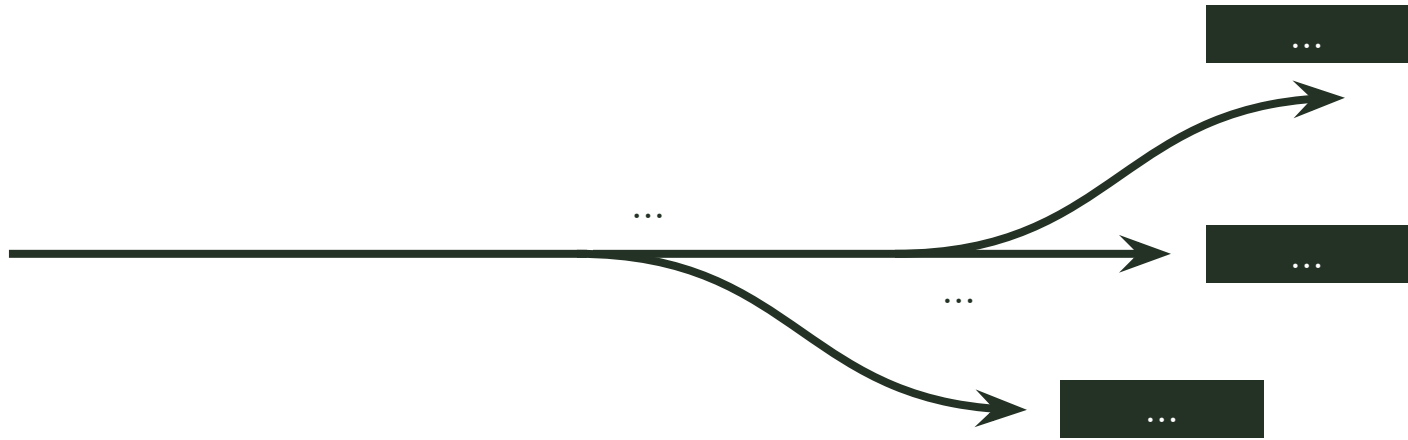
History



I B E A C O N

Term 2

customized recommendations



I B E A C O N

?

Slide number one hundred thirty eight

Thank you

lyu1403.