



Introduction to Field Data Collection

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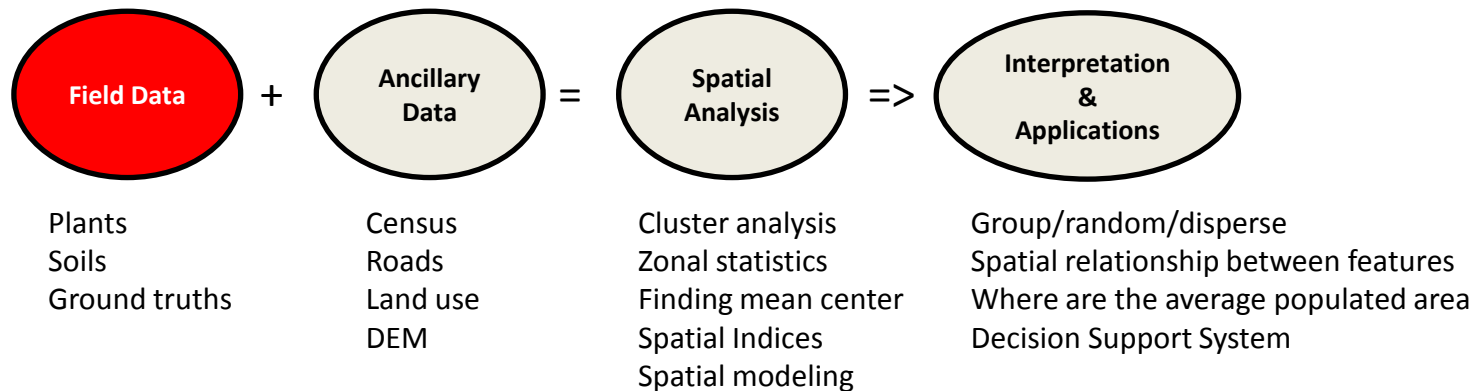
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Who Need Field Data?

Any spatial information users who want to know about spatial distribution patterns and characteristics of geographical attributes

- Human Geographers
- Geologists
- Ecologists
- Climatologists
- First step requirement
- Foundation of any GIS research/analysis



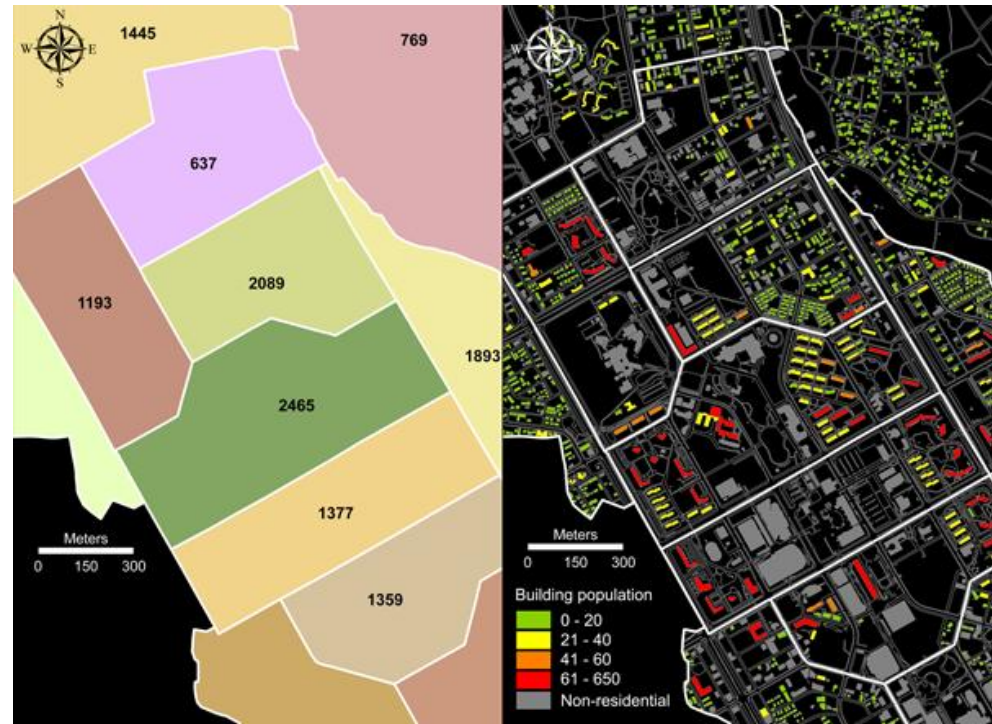
Non Spatial Data Vs. Spatial Data

Non-spatial data

Index	Census Tract Name	Population	Household	Household %
1	Hanamuro 1 Chome	1240	667	54
2	Tennodai 3 Chome	0	0	0
3	Tennodai 2 Chome	1921	197	10
4	Tennodai 1 Chome	0	0	0
5	Amakubo 3 Chome	1430	1298	91
6	Kasuga 4 Chome	2245	2103	94
7	Amakubo 4 Chome	669	549	82
8	Kasuga 3 Chome	1801	1507	84
9	Amakubo 2 Chome	1445	1237	86
10	Saiki	769	272	35
11	Kasuga 2 Chome	2342	1458	62
12	Kasuga 1 Chome	1193	821	69
13	Amakubo 1 Chome	637	466	73
14	Azuma 3 Chome	2089	948	45
15	Azuma 2 Chome	2465	944	38
16	Azuma 1 Chome	1377	781	57
17	Azuma 4 Chome	1893	807	43
18	Higashi Arai	1352	670	50
19	Takezono 1 Chome	1359	591	43
20	Takezono 2 Chome	1201	481	40
21	Takezono 3 Chome	2098	710	34
22	Ninomiya 3 Chome	1009	489	48
23	Ninomiya 1 Chome	1682	787	47
24	Sengen 1 Chome	1228	558	45
25	Kurakake	1020	351	34
26	Ninomiya 4 Chome	2699	950	35
27	Ninomiya 2 Chome	1230	600	49
28	Sengen 2 Chome	700	313	45
29	Namiki 1 Chome	0	0	0



Spatial Data

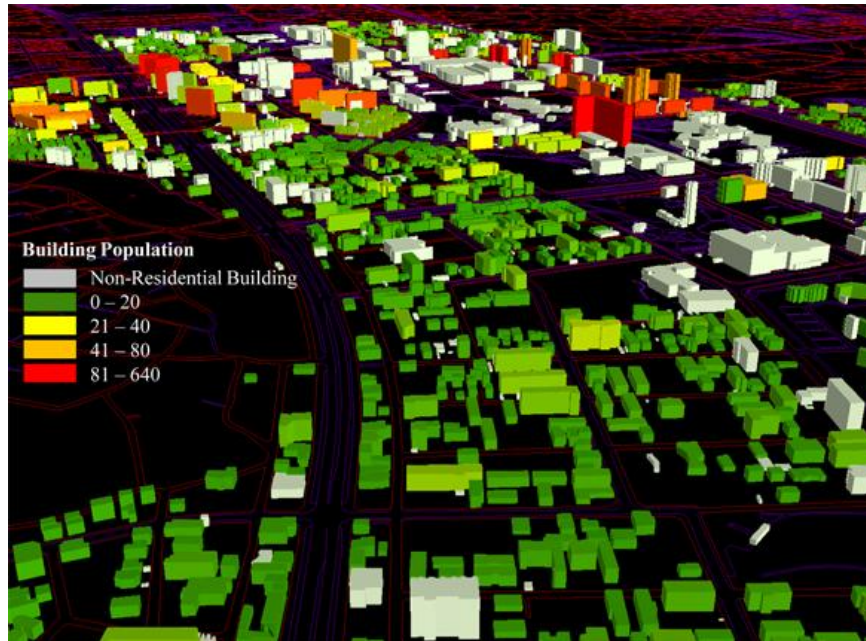


Didn't say anything about where and how they distributed?

Show spatial distribution patterns and enable more spatial analytical functions

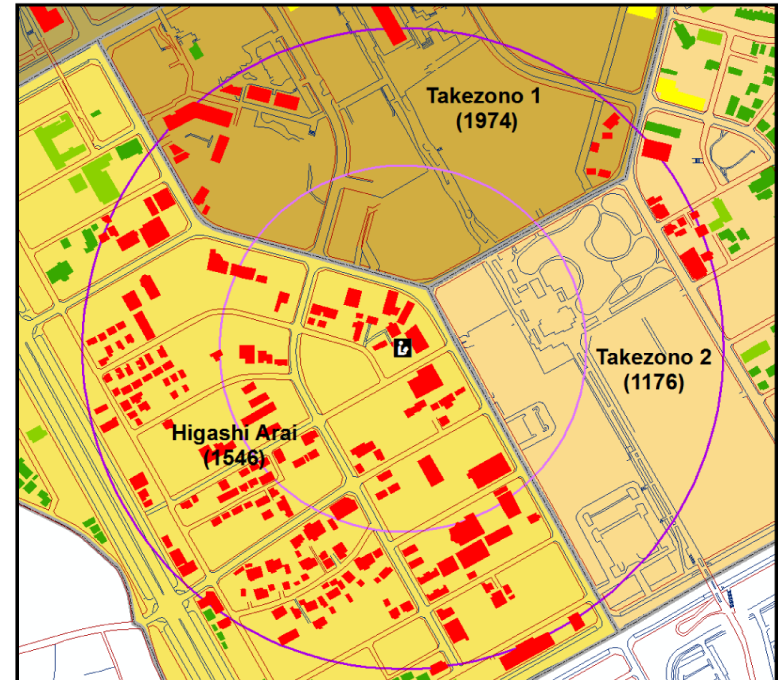
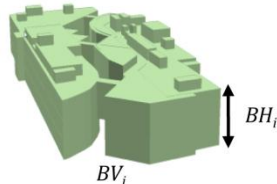
Non Spatial Data Vs. Spatial Data

Perform more spatial analytical functions



3D Visualization of building population data

DVM (Digital Volume Model)



Total population inside 200m : 393

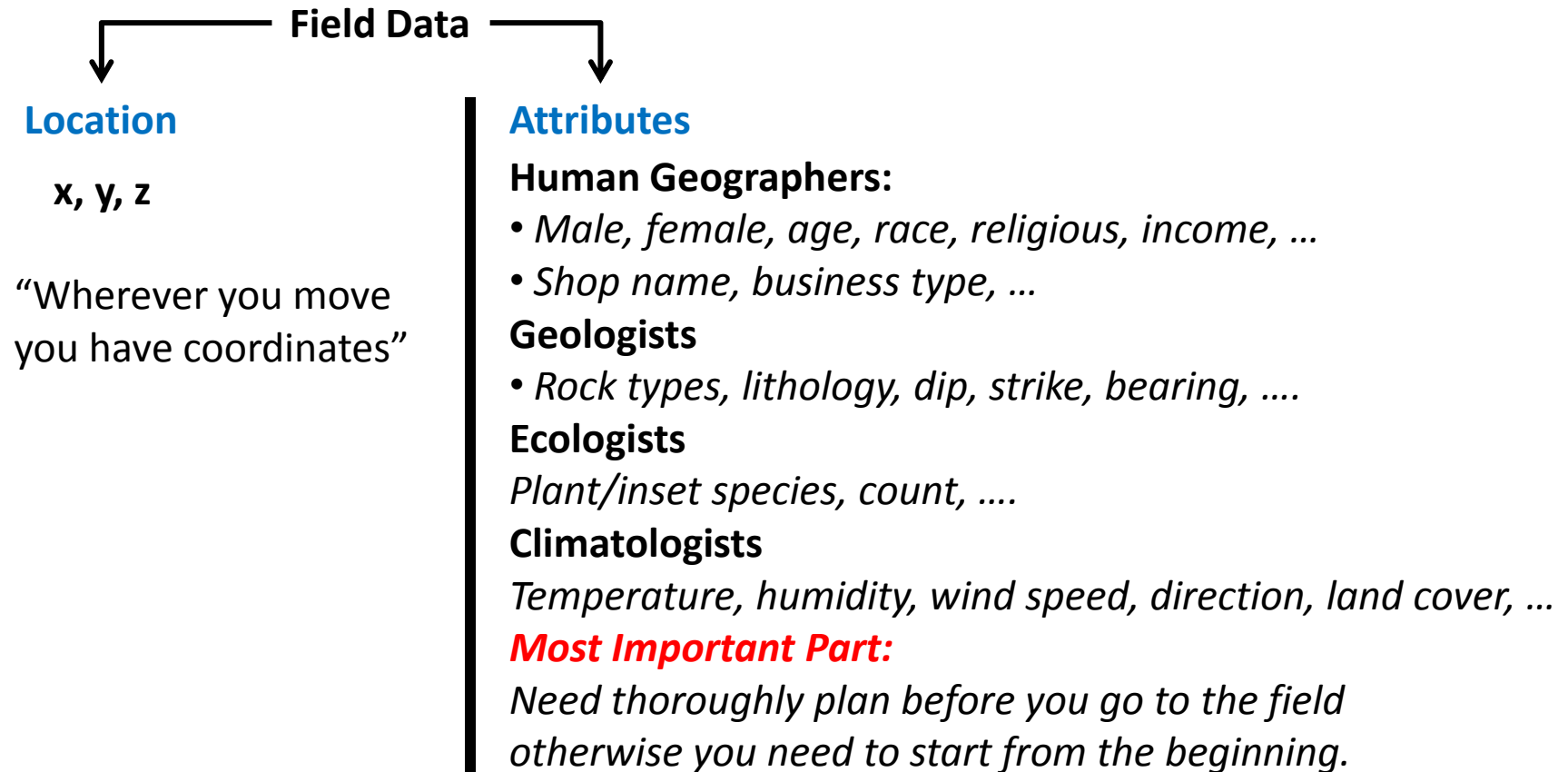
Total population inside 350m : 1443

Point/line buffering and population data analysis



Field Data Structure

One of the spatial data (Location + Attributes)



Field Data Structure

Attribute Table in GIS

X	Y	TYPE	VALUE_01	REMARK	ATTACHMENT	IMAGES
418336.68	3997566.4	Temperature	32.6,12.2, 194, bar	Dried crop land	1	AW020726.jp
418556.28	3996879.1	Temperature	35.2, 16.2, 180,bar	Agricultural test center	1	48f423e1.jpg
419217.74	3996271.3	Temperature	28.3, 13.2, 270,wat	Near the pond	1	pine-tre.jpg
418943.9	3994777.0	Temperature	28.7, 5.2, 202,park	Kasuga koren	1	park.jpg
419490.26	3996394.9	Temperature	26.3,3.2,280, for	Forest	1	TN_fores.jpg
418308.23	3994644.1	Temperature	30.2,5.6,230, grs	This is grass land	1	179465_3.jpg
418837.14	3994496.6	Temperature	31.5,3.2,183,urb	Urban area	1	181_8141.jpg
418874.66	3996773.6	Temperature	34.2,10.3,250,car	Car parking	1	parking_.jpg
419330.35	3995495.2	Temperature	26.3,5.4,180, wat	Pond	1	pond1.jpg
419566.91	3993898.3	Temperature	30.2,7.4,190,urb	Built-up area	1	photo_ka.jpg

Location

Attribute

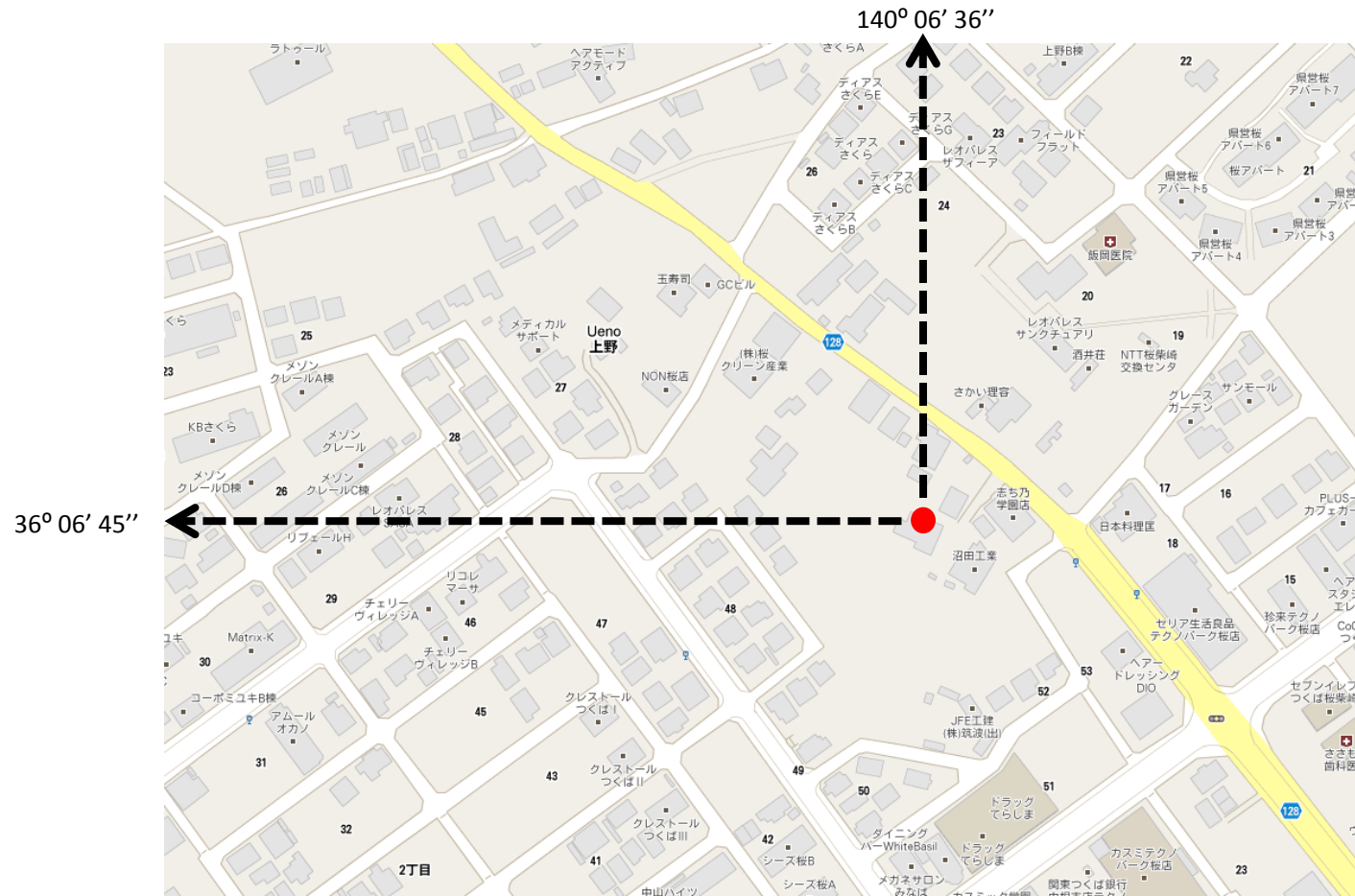


Coordinates Acquisition in the Field

Coordinates Acquisition in the Field

1. Paper Map
2. GPS/GPS Built-in device
3. High resolution satellite image
4. Address matching/geo-coding

Coordinates Acquisition in the Field



Map with building footprints(Known point Get coordinates)

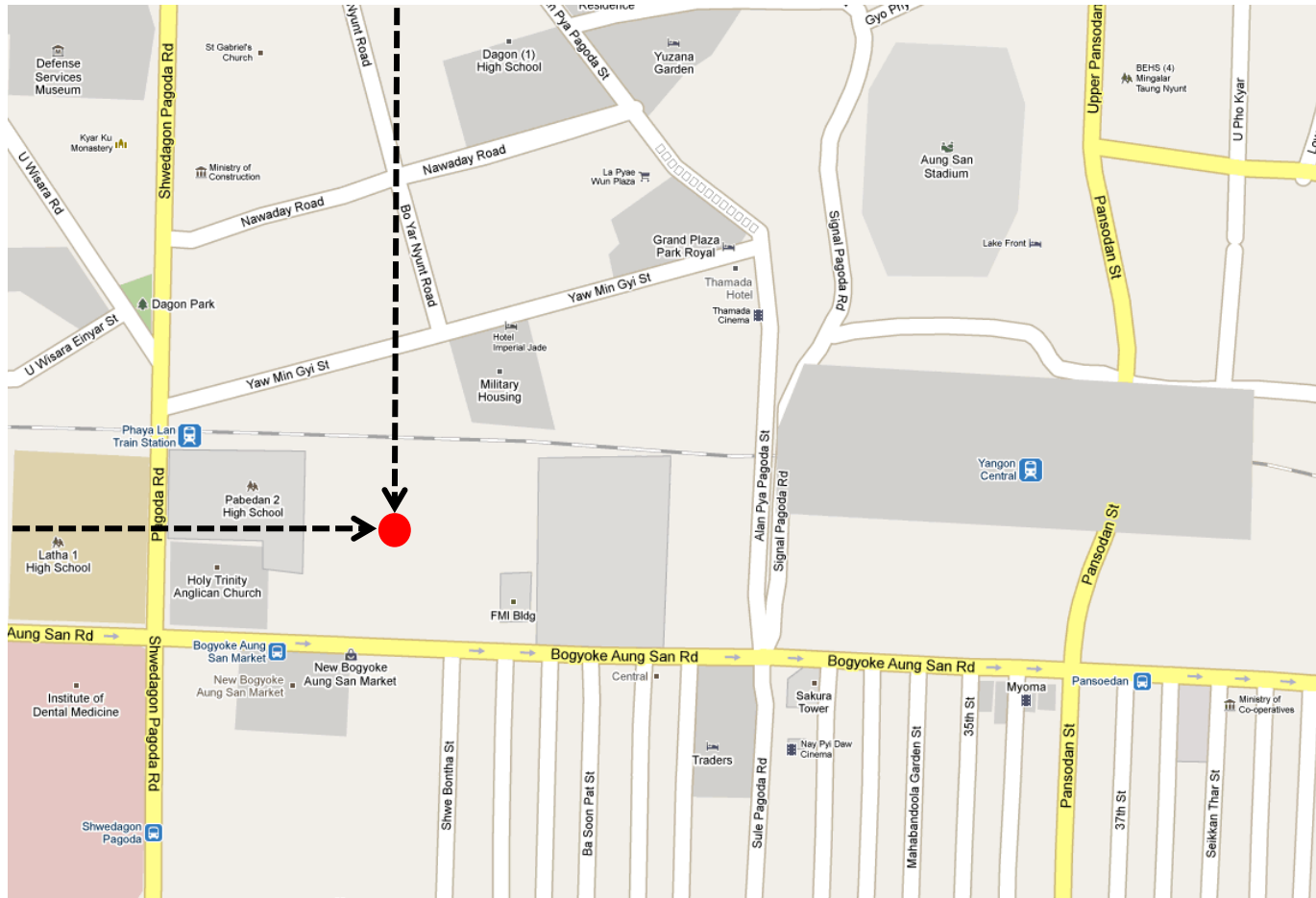


Coordinates Acquisition in the Field

96° 09' 20"

16° 46' 59"

Use GPS
To get coordinates
And locate the point
on a map



Map without building footprints (Known coordinates Get point)



Coordinates Acquisition in the Field

GPS/GPS Embedded Devices

Advantages

Good for rural areas where the land marks are absent
(road intersection, building shapes, etc.)

Tiny and handy (Compare to compass)

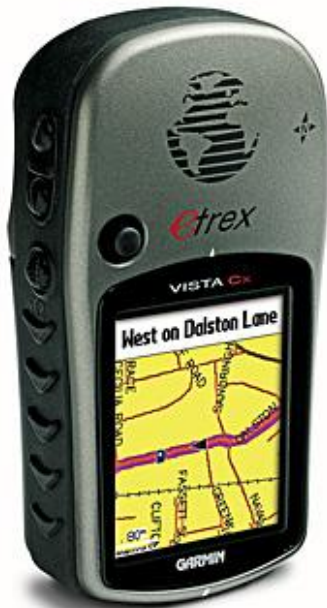
Integrate with other devices (Built-In)
(mobile phone, laptop, digital camera, etc.)

Good for geologists, ecologists, archaeologists,

Disadvantages

Landscape dependent (accuracy varies on landscapes)

(Open space: 4m; Semi open space: 10m; closed space: 17m)



Coordinates Acquisition in the Field



High Resolution Satellite Image

Advantages

- More precise coordinate information
- Landscape independent (inside the building, closed spaces, open spaces, etc.)
- Good for human geographers/urban area studies (public facility, social survey, etc.)

Disadvantages

- Not appropriate for rural areas (need GPS)
 - *Costly
 - *Large file size (Tsukuba University, 32m resolution required 300MB disk space)
 - *Software required to handle
- NOTE: We can use Web Map Service (WMS) to access Google Maps or Microsoft Bing Maps data from our own GIS application via a HTTP interface. That will eliminate (*) disadvantages.



Coordinates Acquisition in the Field

Address Matching/Geo-coding



Example:

Finding spatial relationship between green spaces and human health

You need to convert patient address to x, y coordinates to integrate with other GIS data

Advantages

Massive data with addresses
(Patient data, facility data, ...)

Disadvantages

Only available in advanced countries
Require national level GIS infrastructure
(like NSDI)
Accuracy is based on algorithms and level of available data

Common Algorithms

Linear (most countries: using street name)
Block (Japan: sequence of blocks, Ken>Shi>Ku>Chome)
Zip Code (combine with above two algorithms)



Field Data Collection Methods

Many methods, here are some ...

1. Personal Field Data Collection
2. Centralized and Mobile Field Data Collection
(Either group or Individual survey)



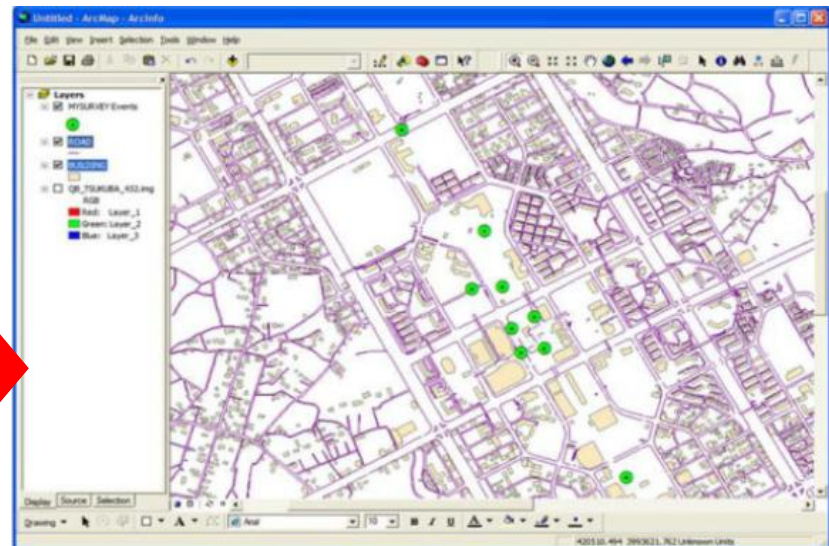
Field Data Collection Methods

Personal Field Data Collection

Use mobile PC and high resolution images

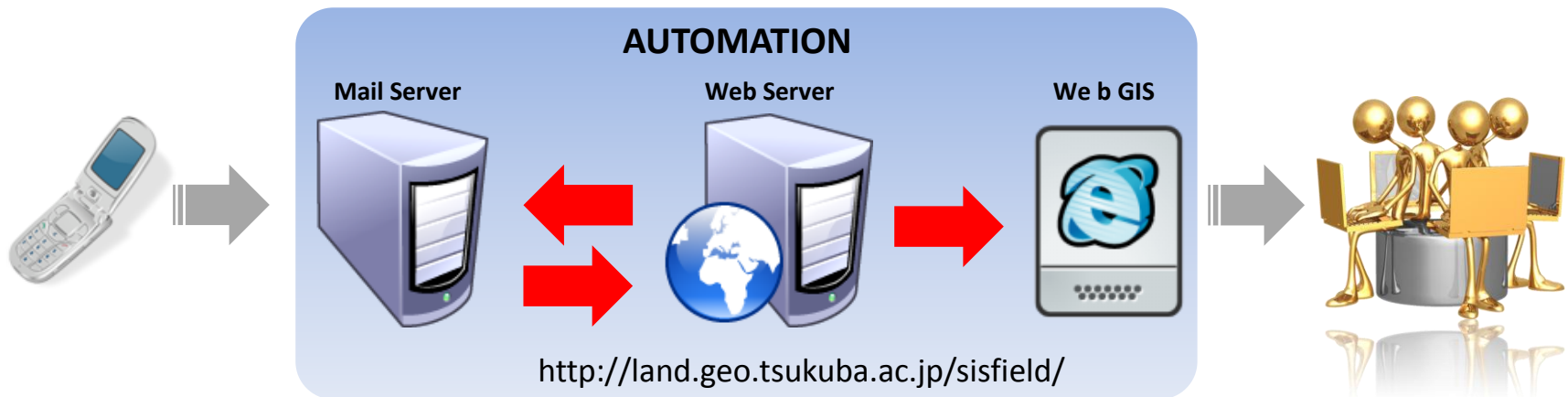
Download: <http://giswin.geo.tsukuba.ac.jp/sis/en/software.html>

Software + Manual (Japanese & English)



Field Data Collection Methods

Centralized Geo-database and Mobile Field Data Collection





2010 SIS Field Work Class participants: Four faculty members and sixteen students from University of Tsukuba and two faculty members and nine students from South China Normal University, China. **2010.11.27**