Intention and Situation based Information Filtering for Street Navigation*

(based on a paper presented in BigComp2014, Bangkok)

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* Divya Udayan J, HyungSeok Kim, Jee-In-Kim, Keetae Kim, "Semantic Levels of Information Hierarchy for Urban Street Navigation", BigComp 2014.

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Direction to Akihabara

Real Akihabara!

Representation of Location

Lookup a geographic location from :

❖ **Existing geographic scheme**
❖ **Individual location**

❖ **Simple and abstract description**
❖ **Real and complicated information**
   are not always useful

- **No user intention/preferences**
- **No mapping to complex real world**
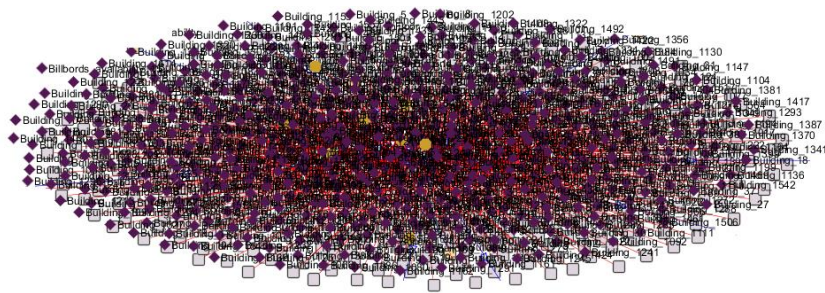
Our Approach

Semantic LOD
  - Enhancing information based on <u>user intention</u>
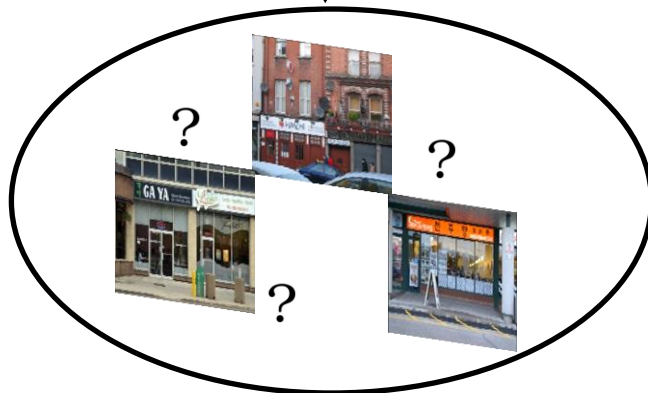 **- Reduce scene complexity by <u>information filtering</u>**

Multi-Level Information Representation

Information Filtering for LOD

Spatial Domain

User Intention/Preference

Spatial Select

Ranks

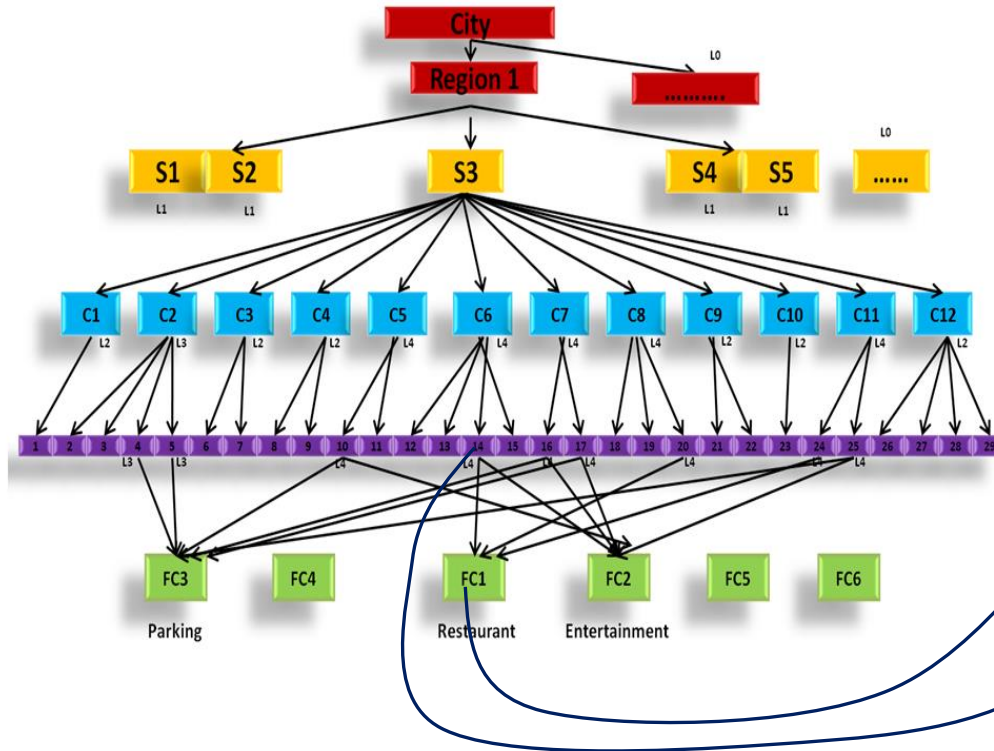Information (Structural + Functional)

Different Visual Level Representations
Based on their Rankings.
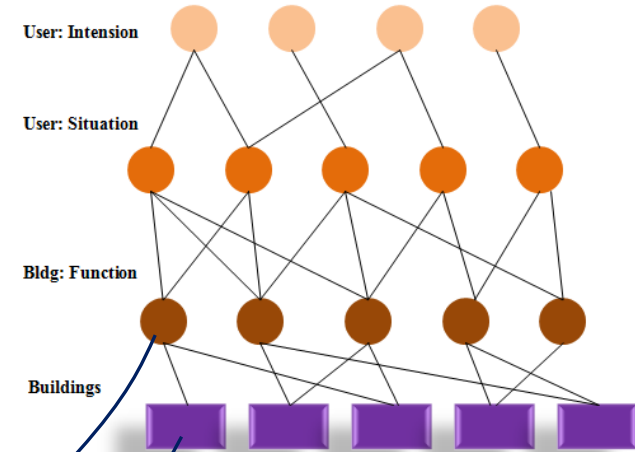The rankings are computed
by considering user intention/preference
and situation.

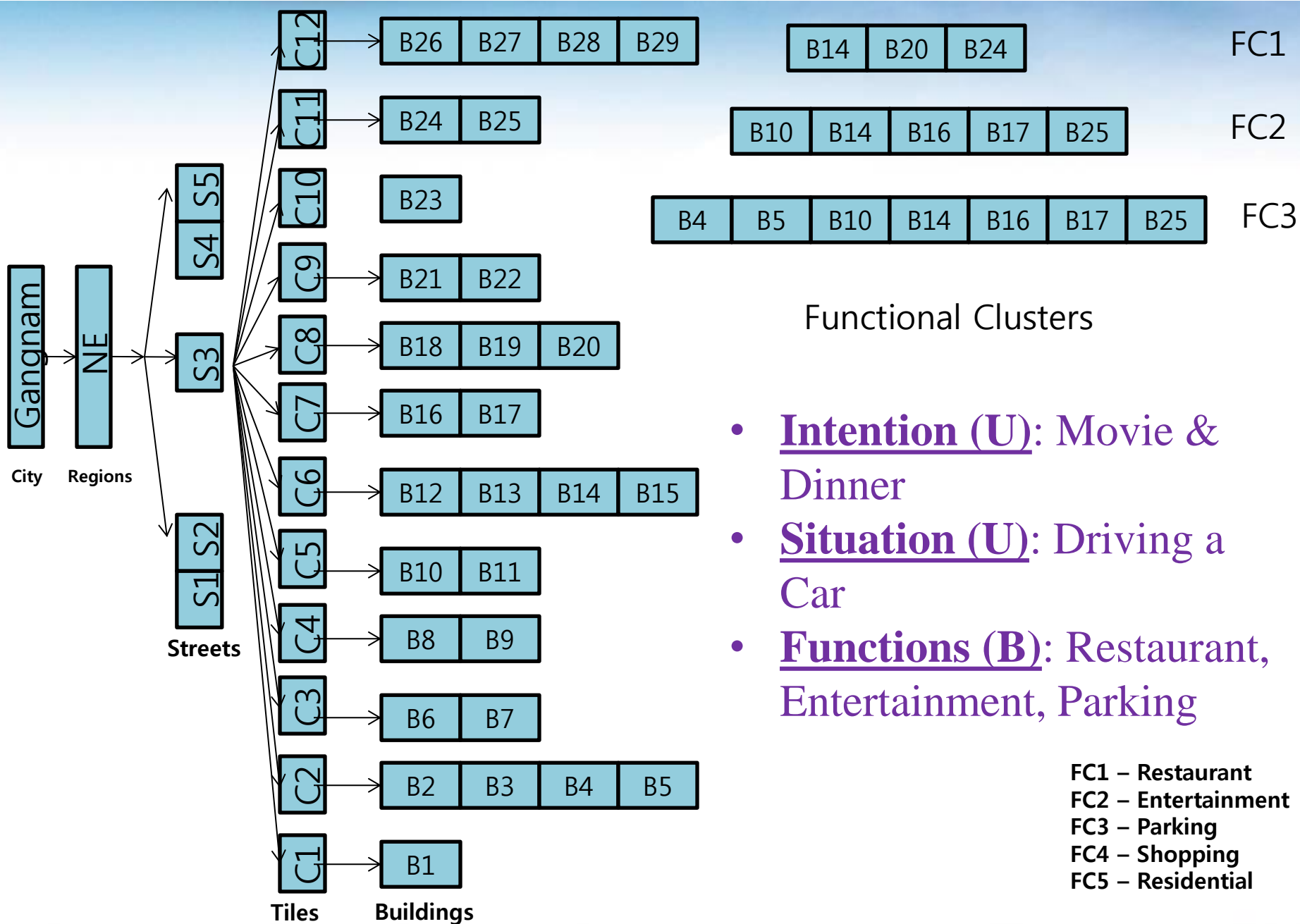# Multi-level Information Hierarchy

Data Structure of Semantic LOD

FC1: B14 | B20 | B24

FC2: B10 | B14 | B16 | B17 | B25

FC3: B4 | B5 | B10 | B14 | B16 | B17 | B25

Functional Clusters

- **Intention (U)**: Movie & Dinner
- **Situation (U)**: Driving a Car
- **Functions (B)**: Restaurant, Entertainment, Parking

FC1 – Restaurant
FC2 – Entertainment
FC3 – Parking
FC4 – Shopping
FC5 – Residential

City — Regions — Streets — Tiles — Buildings

Gangnam → NE → S3

S5 S4
S3
S1 S2

C12 → B26 B27 B28 B29
C11 → B24 B25
C10 → B23
C9 → B21 B22
C8 → B18 B19 B20
C7 → B16 B17
C6 → B12 B13 B14 B15
C5 → B10 B11
C4 → B8 B9
C3 → B6 B7
C2 → B2 B3 B4 B5
C1 → B1

Query Conditions

Rank 1(R1):
(RESTAURANT =true && ENTERTAINMENT=true && PARKING=true)
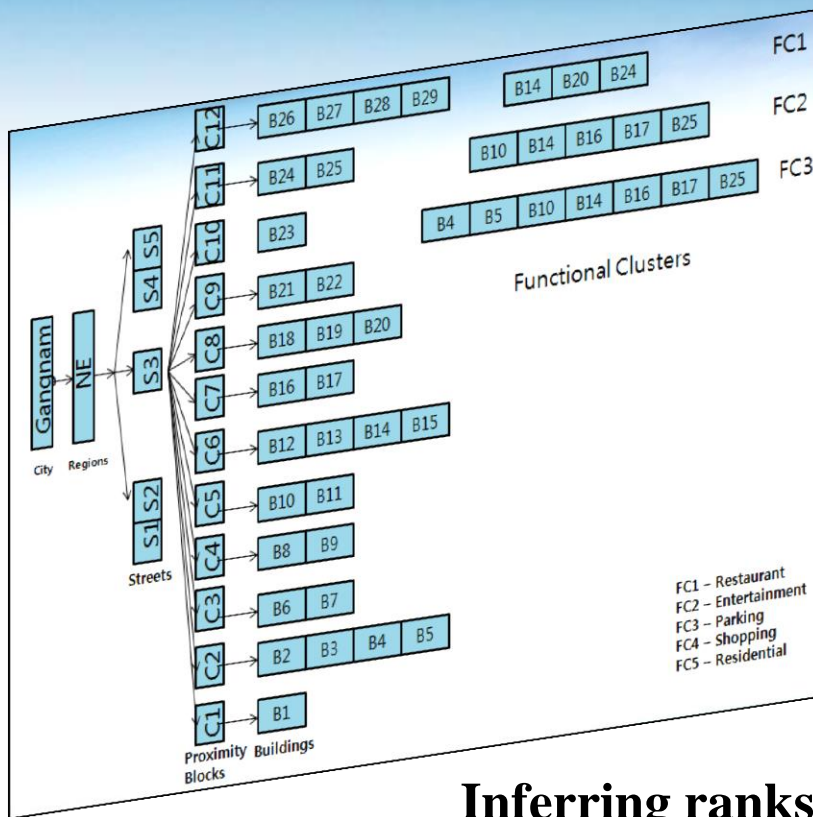**Rank 2(R2):**
(RESTAURANT =true | ENTERTAINMENT=true)
Rank 3(R3):
(RESTAURANT =true | ENTERTAINMENT=true && PARKING=true)
Rank 4(R4):
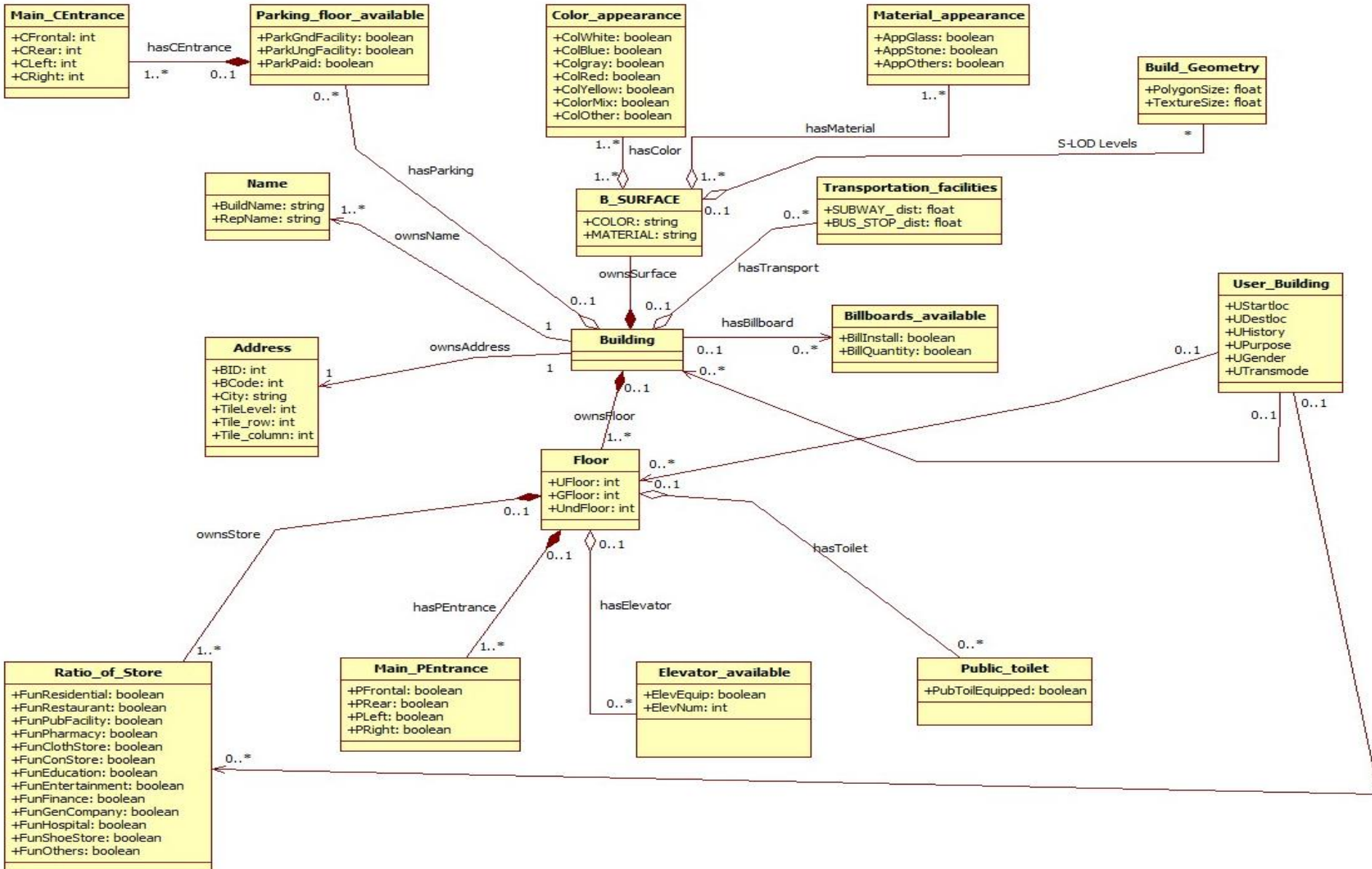(RESTAURANT =false && ENTERTAINMENT=false && PARKING=false)
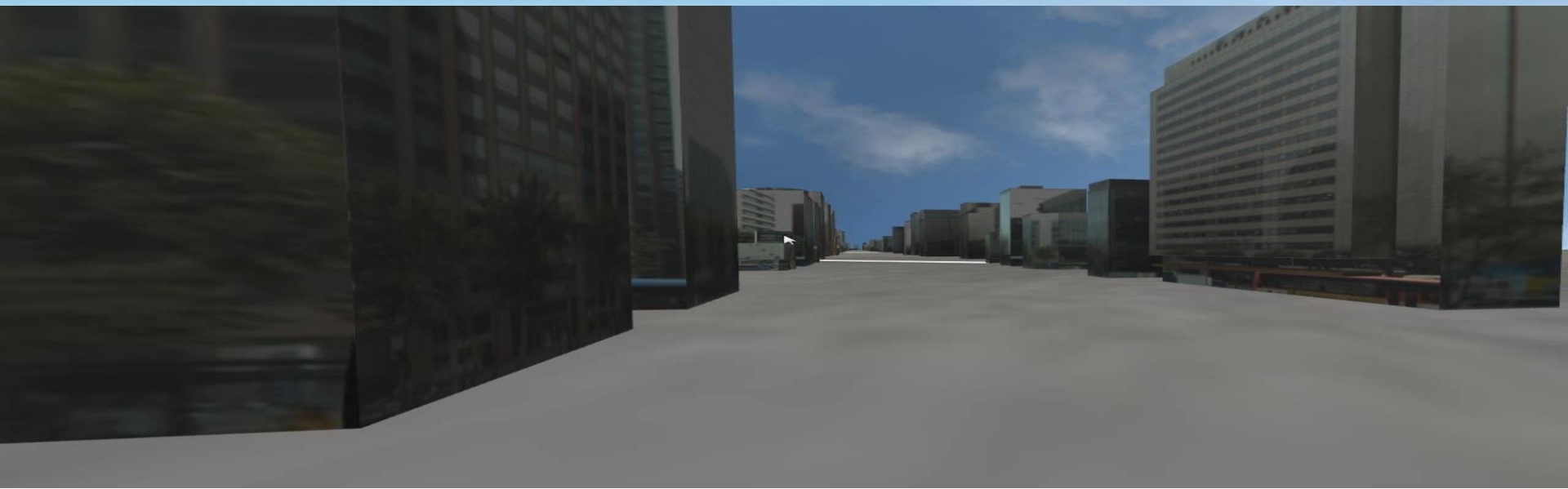
- **Levels of the Requirements may differ.**

Inferring ranks & Distribution of Level of detail of Tiles

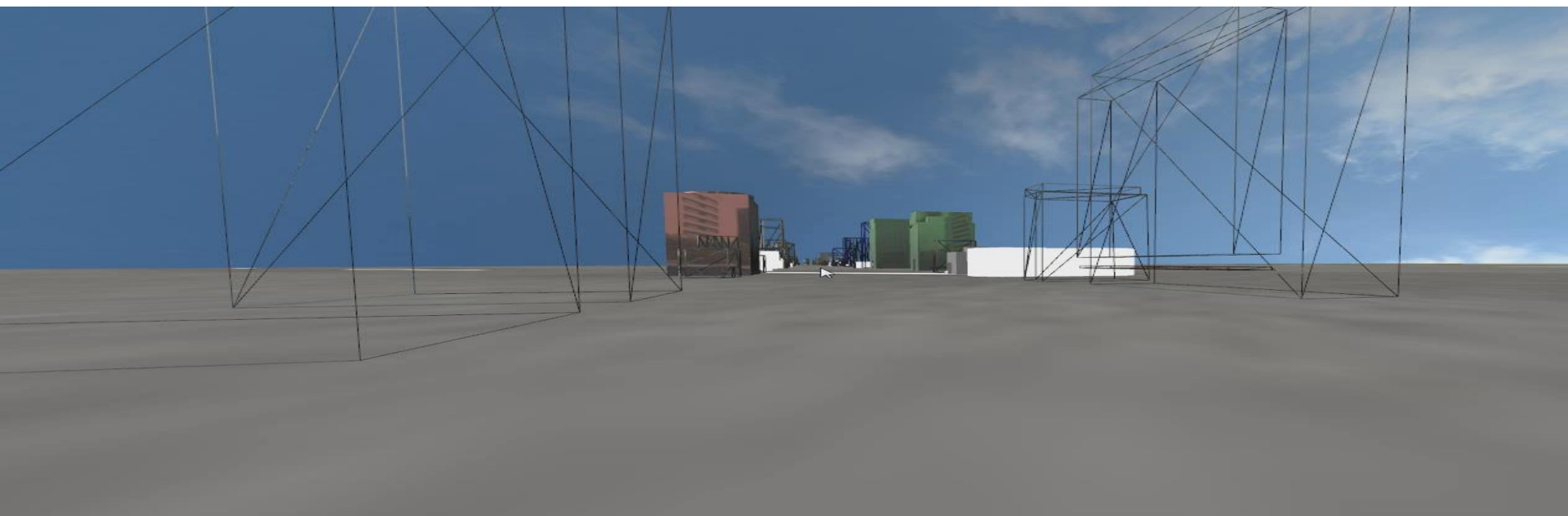| R1- LEVEL4	R2-LEVEL3	R3-LEVEL2	R4-LEVEL1
C6{B12,B13,B14,B15}	C8{B18,B19,B20}	C2{B2,B3,B4,B5}	C1{B1}
	C11{B24,B25}		C3{B6,B7}
	C5{B10,B11}		C4{B8,B9}
	C7{B16,B17}		C9{B21,B22}
			C10{B23}
			C12{B26,B27,B28,B29}

Data Base Schema

Without Information Filtering ⬆

With Information Filtering ⬇

Summary

- **Information Filtering** for LOD
- Functions of Buildings and Functional Clusters
- User **Intention/Preference** and **Situation**
- A Mechanism of Matching the Intention/Preference and Situation to the Functions