Estimation Method for Depopulation Area using MGD

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Context

I Background & Purpose

Background

- In response to declining population, Korea government is struggling to diagnose a variety of economic and social problems that may occur and to prepare future needs

- According to population projections by Statistics, It decreased gradually after peaking in 2030, and growth rate in 2040 is expected -0.39%

- It should be reflected in the regional planning to know population distribution in the future era.

- As we can use the information of individual buildings(position, type, year-built, distribution, etc), it can be used to aggregate data into the sub-regional micro spatial unit.

Background

2013 Population **50.22 million** ➡ 2040 Population **51.09 million**

Estimated By Statistics Korea
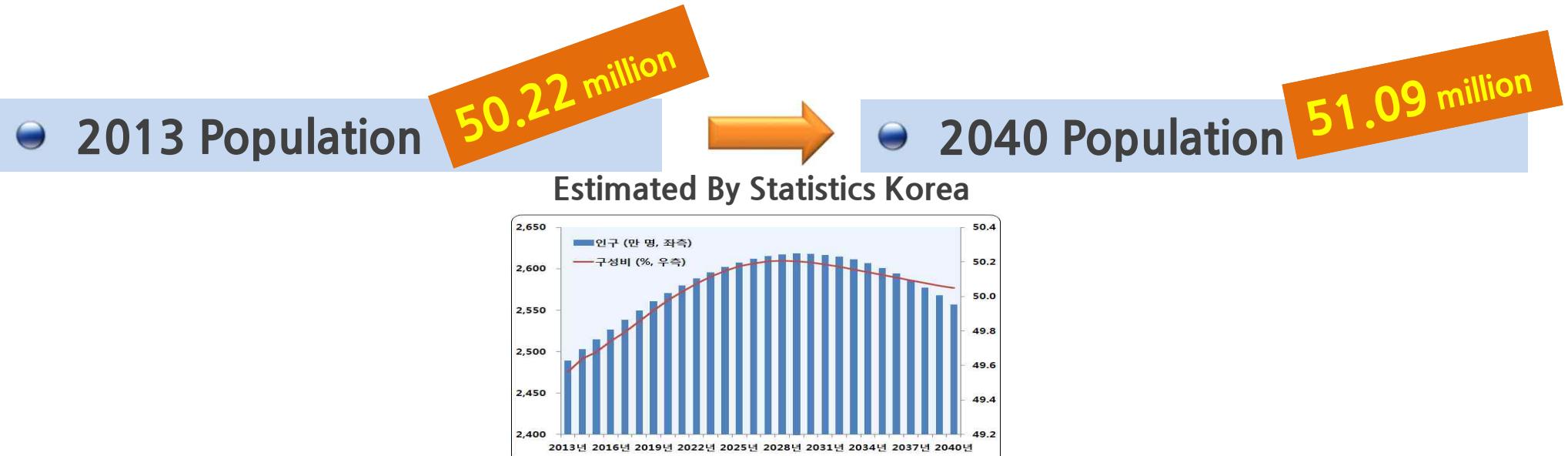

Where is become to depopulated area in 2040?

Administration statistics
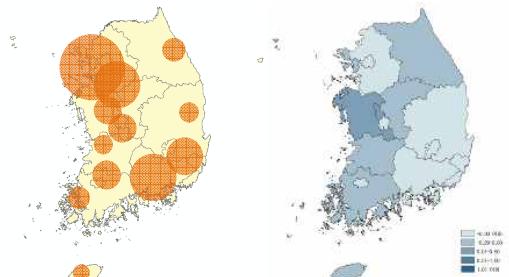
Can not to identify distribution of population

?

We need pattern or segmentation of pop.

Grid(500m) statistics

고밀
중밀
저밀
과소
비거주
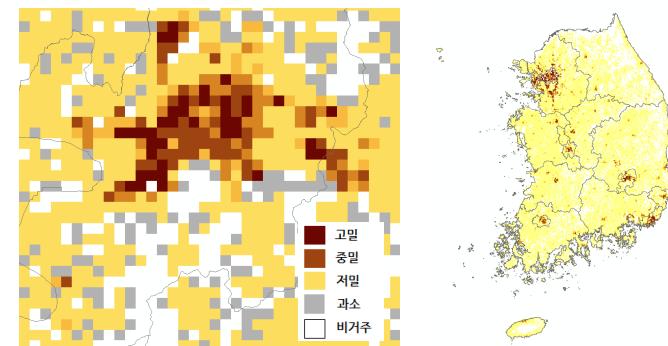
Can to identify distribution, pattern of population

Purpose

- The purpose of this study is to devise the estimation method of depopulated area utilizing micro geospatial data.

➤ Developing spatial disaggregation method by calculate population weight of grid level using micro geospatial building data.

➤ Estimate the 2040 population on 500m grid unit applying the spatial disaggregation method.

➤ Applying to future sustainable spatial structure planning

Ⅲ Methodology

Definition & Method

- **What is "Depopulated area (過疎地域)" ?**

  ：Sparsely populated areas in accordance with the absolute decrease
  in the resident population

- **Estimate of depopulated area in 2040**

  ：using '2040 estimated population(municipal level)'

  ：using 'micro building data(sub-location level)'

  ：using 'ratio of residential building(grid level)'

- **Delimiting Indicator for depopulated area**

  ：less than 5 resident per 500m grid (0.25㎢)

  (including people uninhabited area)

Disaggregation Method

- Goal : 2040 estimated population of 17 Metropolitan unit are disaggregated to 193,476 Grid unit

- Process
  - 1 Step : decompose to residential and non residential area using the residential buildings (using building data)
  - 2 Step : Metropolitan unit are allocated to grid unit
    $P\_M * W_a$(ratio of pop_umd) $* W_r$(ratio of r_building)
  - 3 Step : Estimate pop_40 by adapting adjusted factor (ratio of 85+eldery, accessibility to CBD, high density area of population)

Disaggregation Method

- **1 Step : Estimated population 2040 by Statistics Korea**
  (17 Metropolitan city/province unit)
- **2 Step : Calculation estimated-pop of sub-municipal unit**
  (230 sub-administration unit)
- **3 Step : allocating to grid unit using weight and adjusted factor**
  (193,476 grid (500m) unit)

Building point

(17 unit)   **(230 unit)**   **(193,476 unit)**
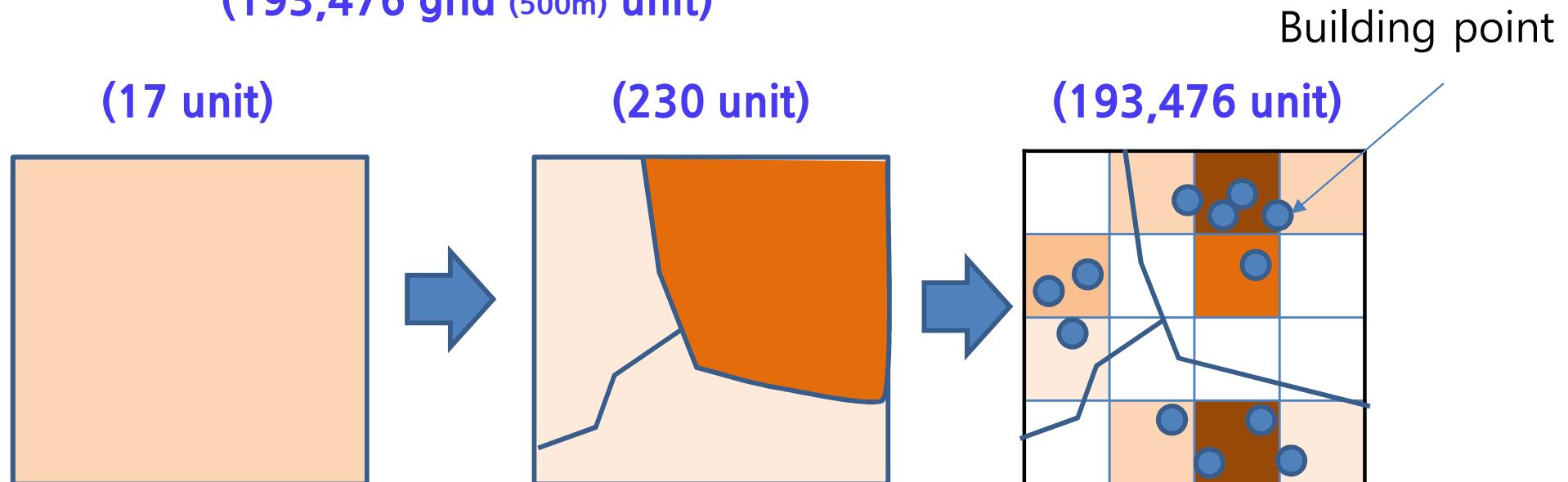
Disaggregation Method using building data

◆ **Grid-based statistical maps using building locations and attributes**

Architecture
Information system

(AIS)

+

building address

Geocoding with address
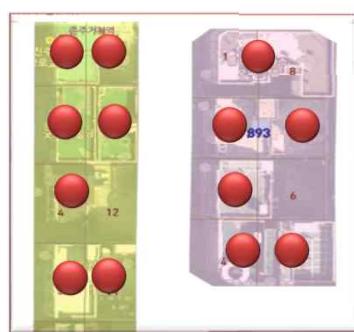
Spatial Join/Query

Grid Unit

Admin.BD

Building count

	21 미만
	21 - 40
	40 - 63
	63- 70
	70-105
	105 이상

Building Area

	16.6 미만
	16.6-32.2
	32.2-49.9
	49.9-55.5
	55.5-83.3
	83.3 이상

	271 미만
	271 - 527
	527 - 817
	817 - 909
	909 - 1364
	1364 이상

	16.6 미만
	16.6-32.2
	32.2-49.9
	49.9-55.5
	55.5-83.3
	83.3 이상
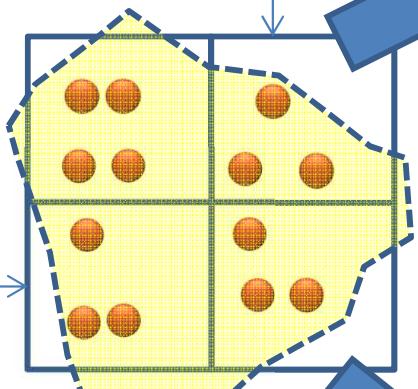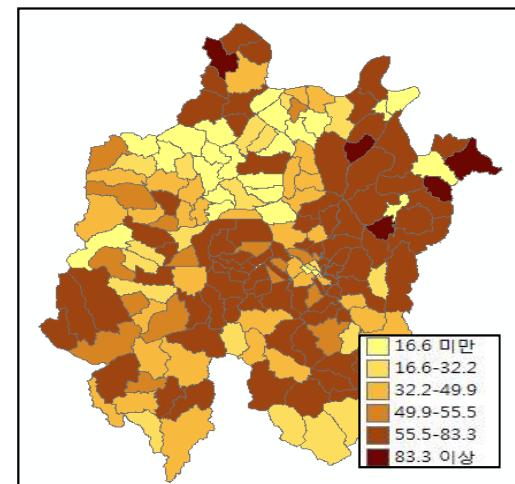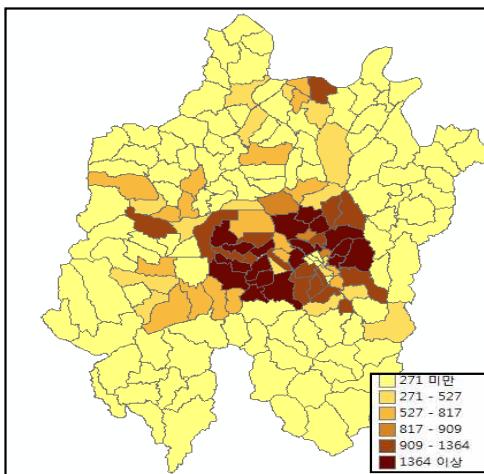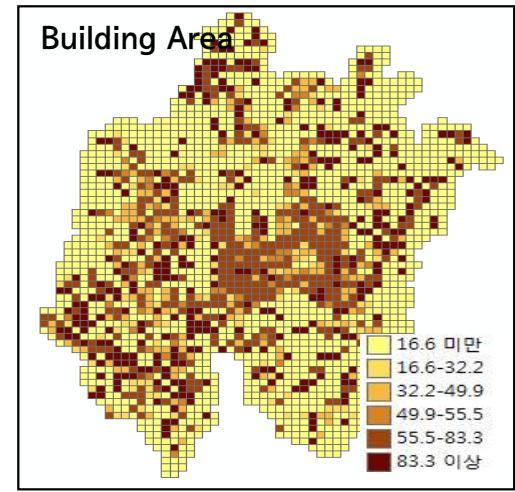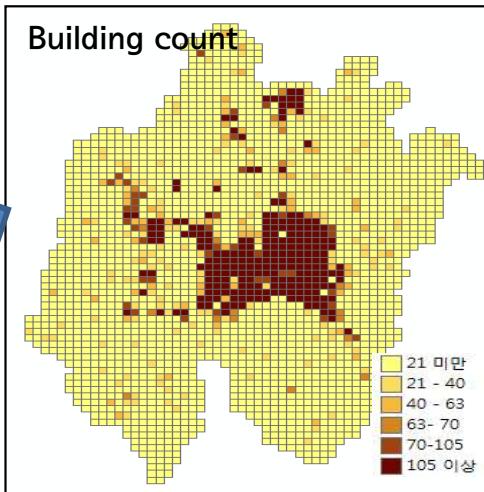
III Estimating Depopulation Area in 2040

Estimated population on sub-admin unit
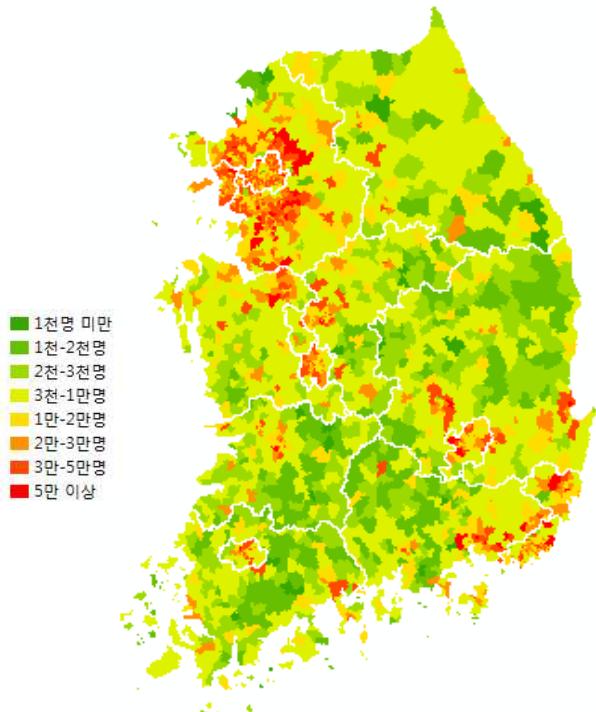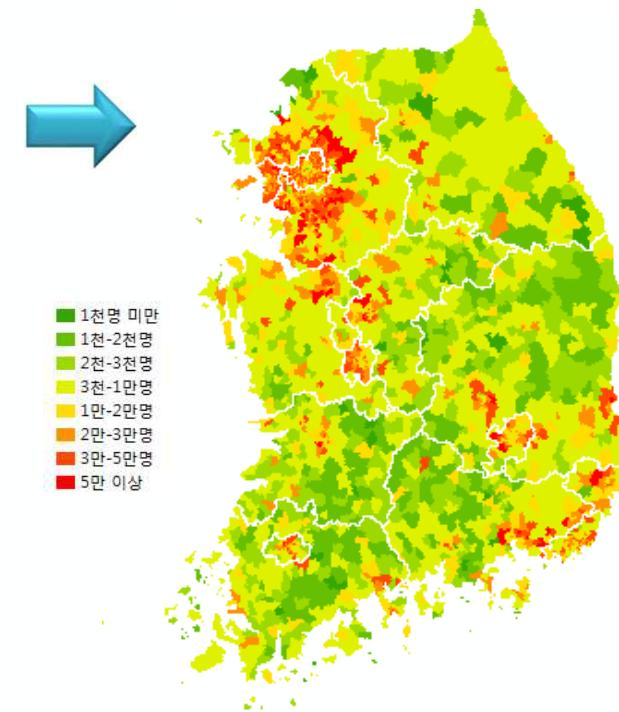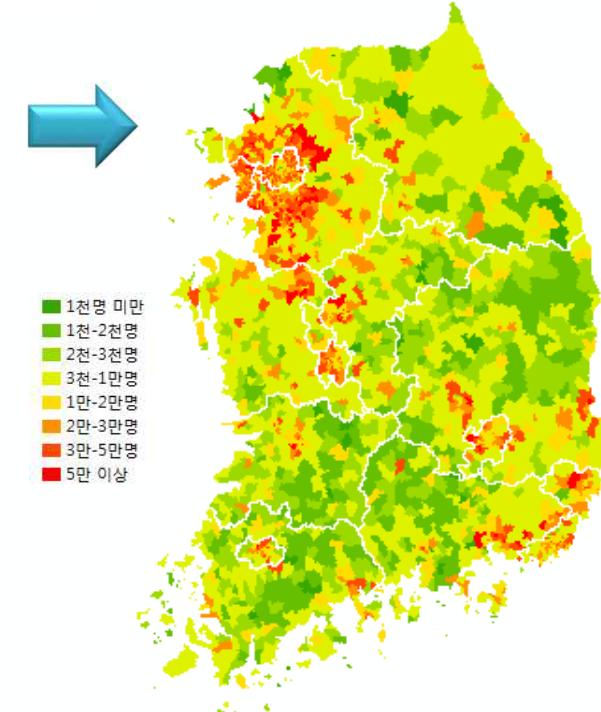
Estimated population on 500m Grid unit

Distribution of Population 2040

Seoul

Busan

- 0
- 1 - 50
- 51 - 100
- 101 - 300
- 301 - 500
- 501 - 1000
- 1001 이상
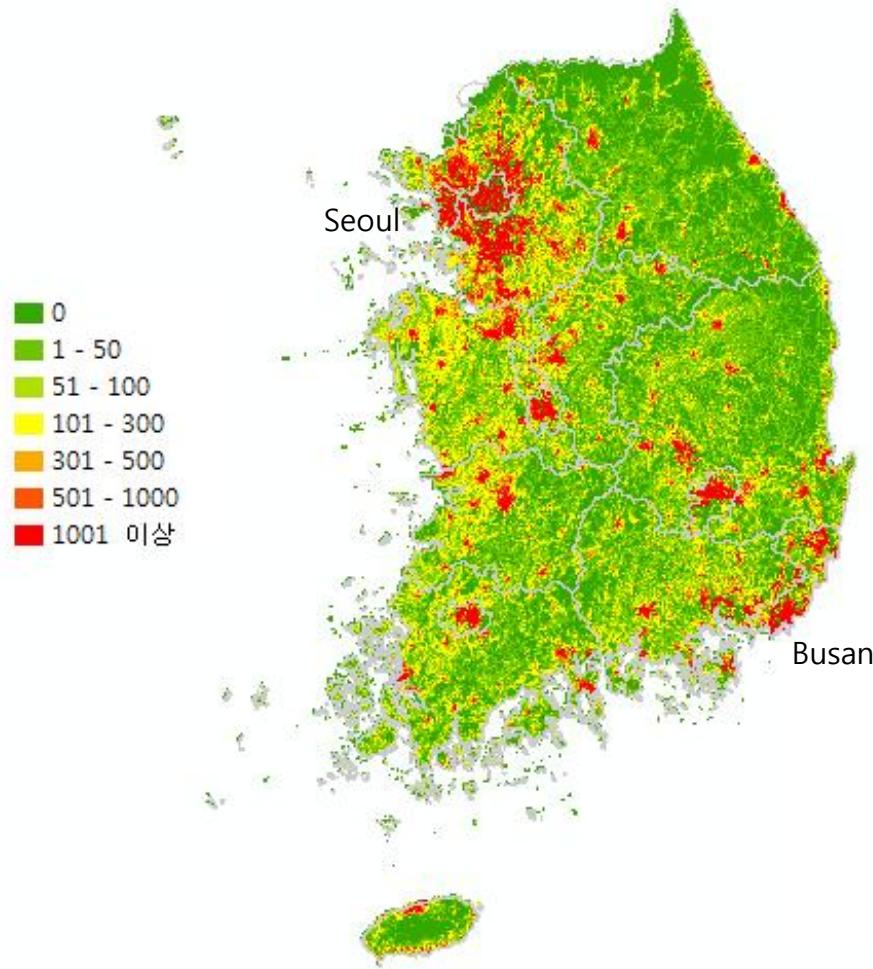
Change of Population 2013~2040

Population Declining area
Population Keeping area
Population increasing area

Depopulated Area

🔵 **Delimiting Indicator for depopulated area**

: **500m grid (0.25㎢) of less than 5 per residence**
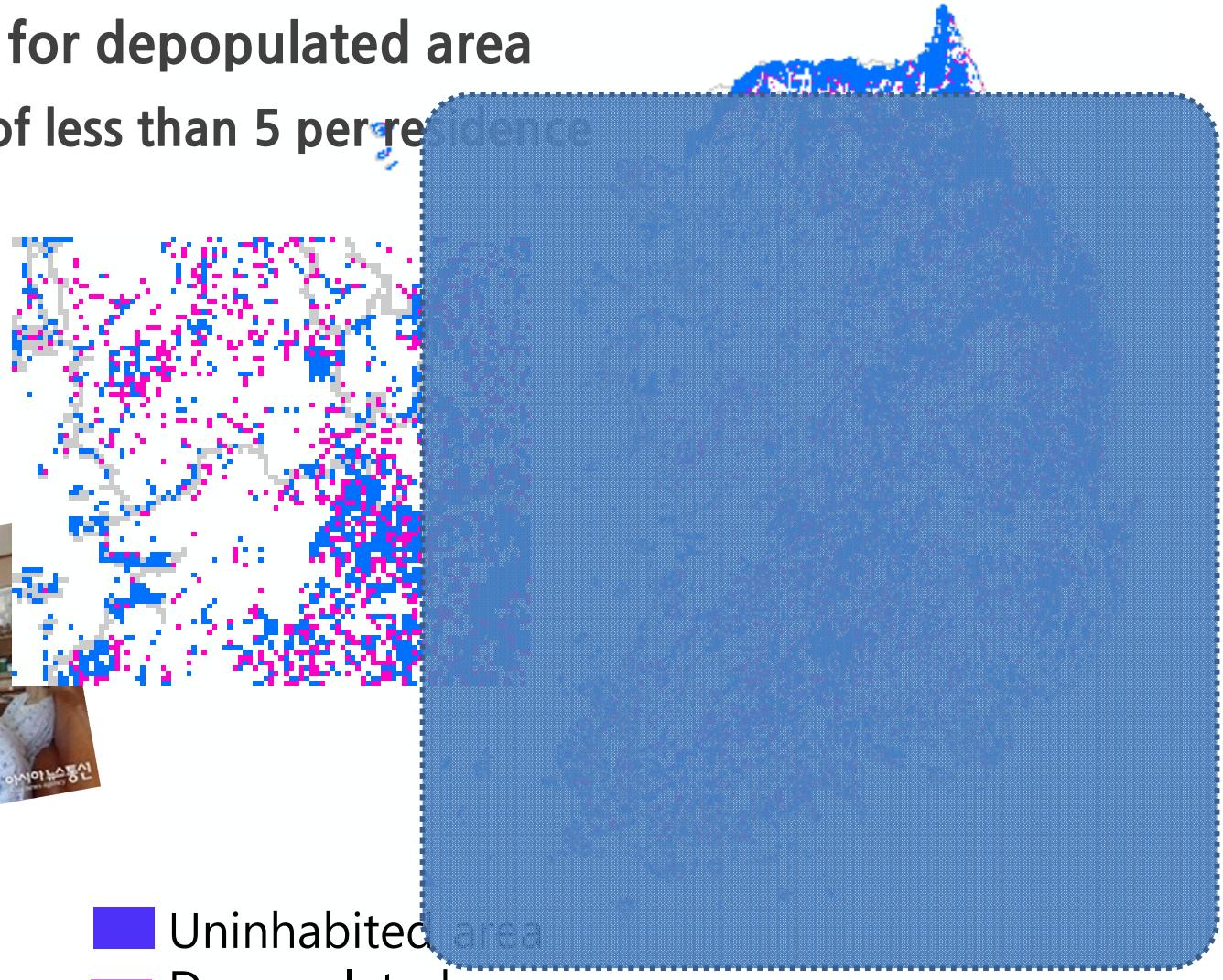
■ Uninhabited area

■ Depopulated area

IV

Concluding Remarks & Future Work

Summary

- Address-based micro building data has enabled to make the bottom-up oriented production of statistical maps at a varying range of spatial unit.

- In this study, we are unable to verify the parameter.

Future work

- Enhancement of the geocoding method for address matching of micro geo-data

- Developing of Area Interpolation method for produce many kinds of micro statistics

Thank you for your attention