ANALYSIS ON EFFECTS OF SEOUL METROPOLITAN SUBWAY STATION BY USING GIS AND RS

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ABSTRACT : Population concentration phenomenon of city need large-scale ride, and ride is important urea that develop area and is armed surrounding landuse. But, it is difficult to evaluate effect that ride gets landuse change and community development as quantitative.

Therefore, this research evaluates change and effect of landuse as political to subway station that is main ride of Seoul City, and chose standard and position for right place arrangement of electric railway station.

Research contents analyzed subway station effect area interior and external landuse change taking the advantage of buffer function of GIS(Geographic Information System) and classification technique of RS(Remote Sensing), and decide precedence at subway station establishment and chose position of subway station for effect area outside area.

1. INTRODUCTION

Modern society is repeating many changes by fast development and human's industrialization. Specially, it is intent phenomenon population of metropolis specific region, and these phenomenons get into standard that can know industrialization of the area. Population concentration phenomenon of city need large-scale ride. This cause increases of traffic discharge. Developing area and surrounding landuse is armed, public traffic equipment of downtown area and expansion of road network is important.

Subway route is piercing area that surrounding floating population is many or railway station sphere is formed. Also, it is established in place that can secure high utilization ratio. And, there is airport, main traffic equipment such as terminal and link measure.

This study compare and analyze the buffer result of radius 1km for subway station interior and external landuse change as quantitative taking advantage of buffer function of GIS and RS technique. Also, chose position for subway station establishment.

2. Approach Method

Administrative district and Position of subway station of Seoul City to study area is acquired by 1:25000 digital map. It is Created point and polygon coverage by ARC/INFO. Each created coverage and subway station buffer zone coverage overlapped and converted to grid. Also, using satellite image that was acquired in 1985 and 1996 year, land use classification was accomplished. Lastly the position of subway station for buffer zone external area is determined by extracted information.

3. Pilot Study

3.1 .Data construction for study area

Study area is Seoul city that use subway more than average 5 million in a day. Figure 1 shows 3 dimensions view of study area. Figure 2 is Seoul City subway network. Figure 3 displays position of 194 subway station except some subway station and buffer function is used to establish buffer zone for subway station.

Figure 1. Study Area

Figure 2. Location of Subway

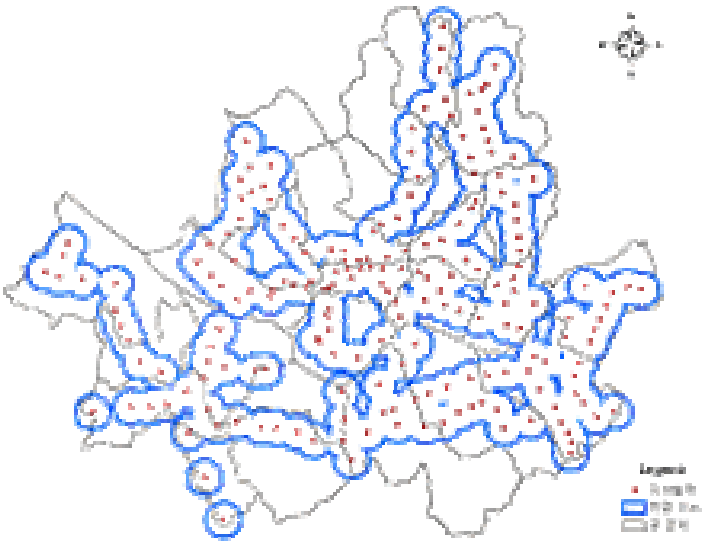

Figure 3. Buffer of Subway

3.2 Landuse classification of satellite image

Supervised classification for landuse is divided to artificial structure, bare land, water, forest, farmland and is accomplished sampling. Region growing techniques is used to automatic sampling by training site. And area and image of classification is acquired by maximum likelihood classification decision rule. Figure 4, 5 represent image of landuse classification.

Figure 4. 1985 Landuse

Figure 5. 1996 Landuse

3.3 Spatial analysis by GIS

3.3.1 Overlap analysis

Spatial analysis for subway station is analyzed landuse change for interior and exterior of buffer zone using image of 1985, 1996 that is processed by RS.

To analyze landuse change for Interior and exterior of subway station buffer zone, landuse statistics is extracted from grid operation of buffer data and satellite data.

Table 1. Land use change of the interior and exterior of subway station

Classification items	buffer interior			buffer exterior		
	1985 ratio (%)	1996 ratio (%)	increase and decrease (%)	1985 ratio (%)	1996 ratio (%)	increase and decrease (%)
artificial structure	52.6	68.0	15.4	21.9	33.2	11.3
bare land	21.0	10.0	-11	16.1	8.8	-7.3
water	2.5	5.0	2.5	6.0	8.6	2.6
forest	12.5	11.1	-1.4	42.2	41.1	-1.1
farmland	11.4	5.9	-5.5	13.8	8.3	-5.5
total	100	100	0	100	100	0

3.3.2 Selection of Subway station

Subway station positions are determined by following method.

First, choice subway station for exterior of buffer zone. Second, choice area in high population density or many artificial structures except forest or rivers

As a result, areas that dominate more than 30% of artificial structure in exterior of buffer zone choose subway station at first. And, it is appeared to B area, C area sequentially. Figure 6 represent to selected subway station.

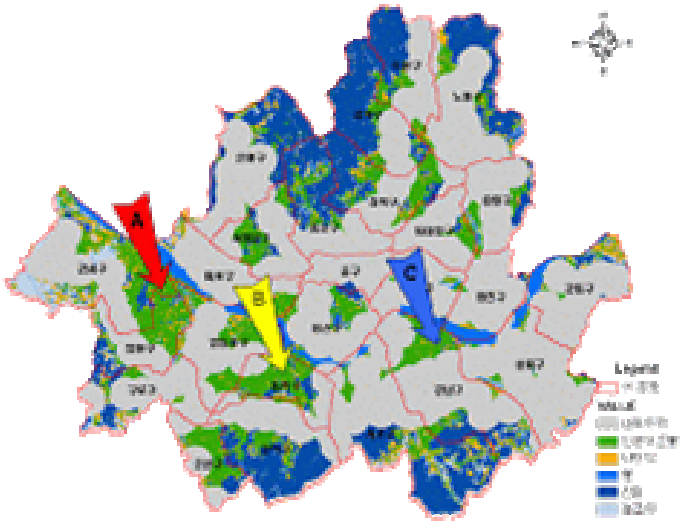

Figure 6. Selection of Subway Station

4. Conclusions

First, it was able to be proved the increase of artificial structure and water, the decrease of bare land, forest and farmland.

Second, it was thought that artificial structure was increased under the influence of open to subway station.