

# Comparison of Visual Interpretation and Image Classification of Satellite Data

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## I. INTRODUCTION

Remote sensing is the science and art of obtaining information from data using a remotely located sensing device (e. g., aircraft, satellite). Development in aerospace and computer technologies accelerates the techniques of information extraction in remote sensing (McCloy, 1995). The information can be extracted by visual interpretation of human or digital processing of computer. Table 1 provides a comparison between the human and the computer information extraction. As seen in the table, the methods of human interpretation and computer processing supplement each other (JARS, 1993).

High-density land use activities is done in the Korean peninsula. It may deteriorate the classification accuracy of coarse resolution satellite images such as Thematic Mapper (TM, 30m resolution) or enhanced SPOT color image (20m resolution). Therefore, the purpose of this study is to compare the classification accuracy between visual interpretation and digital classification result of SPOT color images with 20m resolution and TM data with 30 m resolution.

Table 1. Comparison between human and computer information extraction

Method	Merit	Demerit
Human (Visual interpretation)	<ul style="list-style-type: none"> <li>• Interpreter's knowledge are available</li> <li>• Excellent in spatial information extraction</li> </ul>	<ul style="list-style-type: none"> <li>• Time consuming</li> <li>• Individual difference</li> </ul>
Computer (Digital processing)	<ul style="list-style-type: none"> <li>• Short processing time</li> <li>• Reproductivity</li> <li>• Extraction of physical quantities or indices is possible</li> </ul>	<ul style="list-style-type: none"> <li>• Human knowledge is unavailable</li> <li>• Spatial information extraction is poor</li> </ul>

## II. STUDY SITE

The study used the satellite images observed from Mokhyun Stream watershed and Tahdong Stream watershed. The former site is located at Kwangju-eup, Kyunggi-do and the covering area is 20,9km<sup>2</sup> (Fig. 1). The latter is located at Daedeok Science Town, Daejeon and the area is 21.0km<sup>2</sup> (Fig. 2).

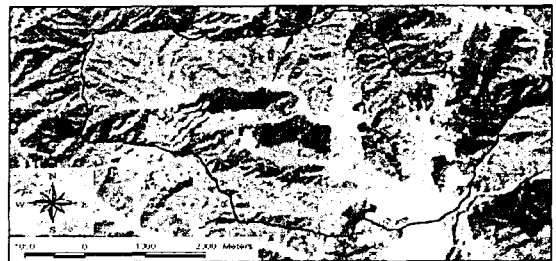


Figure 1. Mokhyun Stream watershed.

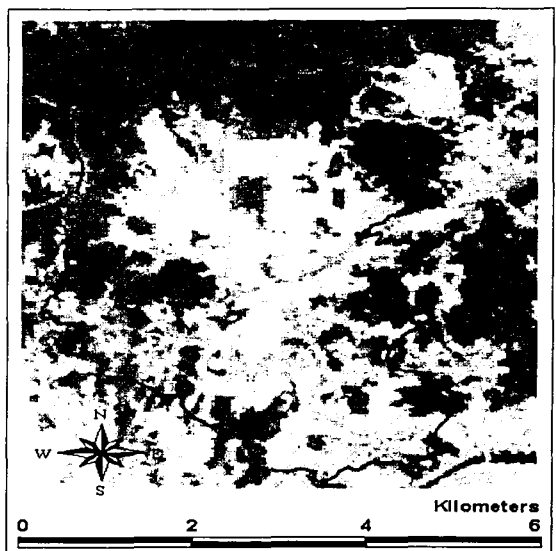


Figure 2. Tahdong Stream watershed.p

A 20m resolution SPOT XS image obtained on July 1, 1996, and 30m resolution TM image on May 8, 2000, were used to extract land cover information in the study area. Korea Multi-Purpose Satellite-1 (KOMPSAT-1) Electro-Optical Camera (EOC) panchromatic image with 6.6m resolution and aerial photographs with 1:20,000 scale were used as the reference data. For the vector data, digital topographic maps with 1:5,000 scale were used as the sources of Ground Control Points (GCPs) and the reference data. Table 2 shows the data used in this study.

Table 2. Data used in this study

Data type	Data Source	Path/Row	Resolution	Date
Raster	SPOT HRV	-	20m	1996, 07, 01
	KOMPSAT1- EOC	(R)*	6.6m	2000, 03, 01
	Aerial Photograph	(R)	1:20,000	-
	TM	115-35	30m	2000, 05, 08
Vector	Data Source	Data Type	Scale	Date
	Topographic Map	digital	1:5,000	1998

\* : Reference(Collateral) data

### III. RESULTS

Accuracy assessment was performed by pixel by pixel comparing visual interpretation of the acquired satellite images, the results of Hybrid Classification (HC) and visual interpretation of air photo. The results of image classification and accuracy assessment are presented in the following. In order to assess the accuracy of Mokhyun stream watershed site, the results of SPOT visual interpretation and SPOT HC were pixel by pixel compared with air photo interpretation. Overall accuracy of the visual interpretation was 6.1 % higher than that of the digital image classification. Forest is most clearly discriminated in both comparison results. For the crop field, grass, and urban area, visual interpretation was more accurate than SPOT HC.

For Tahndong stream watershed site, the classification accuracy was also assessed using TM

and KOMPSAT-1 EOC images. Overall accuracy of the visual interpretation was 20.6 % higher than that of the digital image classification. Forest is the most clearly discriminated in both comparison results. For the crop field, bare soil, urban, and water area, visual interpretation was more accurate than TM HC.

### IV. CONCLUSION

In this study, classification accuracy was pixel by pixel compared between the results of visual interpretation and digital classification using SPOT and Landsat TM images, and the following conclusions were then derived:

First, the overall accuracy for the SPOT visual interpretation was 6.1% higher than SPOT HC at Mokhyun stream watershed site and TM visual interpretation was 20.6% higher than TM HC at Tahndong stream watershed. Therefore, visual interpretation of enhanced color image is important in the area with high density land use like the study site in the Korean peninsula.

Second, the crop-field which are spatially complex and spectrally similar to the other classes were discriminated in the visual interpretation better than the classification.

Overall, the visual interpretation can be effectively used for the small area in the Korean peninsula because human pattern recognition is effective for spatially complex and high density land use area.

### REFERENCES

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