VISUAL IMAGE INTERPRETATION

INTRODUCTION

In the previous lectures, you have learnt about basics of aerial photo interpretation, elements of visual image interpretation, interpretation keys and other related concepts. The observation of the differences between objects involves comparing different objects based on the image interpretation elements such as tone, shape, size, pattern, texture, shadow and association.

Now, we will try to interpret few selected images based on the principles of visual image interpretation.

Objectives

After studying this, you should be able to:

- identify and differentiate features present in remote sensing images;
- explain the process of visual image interpretation; and
- develop skills in visual interpretation of remote sensing images.

INTERPRETING IMAGES

The most intuitive way to extract information from satellite images is by visual image interpretation. It is based on our ability to relate patterns and colours in an image to real world features. Human vision goes a step beyond perception of colour as it deals with the ability of the person to draw conclusions from visual observations. In analysing a picture, we are somewhere between the following two situations: direct and spontaneous recognition or using several clues to draw conclusions by a reasoning process (i.e. logical inference). Spontaneous recognition refers to your ability to identify objects or phenomena in first glance. For example, in case of the rectangular shape of an object, you will use your professional experience. You can do this by concluding that a rectangular shape is a swimming pool because of its location in a garden near to a resort or big hotel. A simple visual interpretation of remotely sensed imagery can often reveal considerable detail on the nature and distribution of habitats in an area of interest. You are now aware that characteristics of the image are defined using a set of terms viz., tone, shape, size, texture, pattern, site and association, called as elements of visual image interpretation. The simultaneous and often implicit use of all these elements is the strength of visual image interpretation.

In practice, objects and the features on Earth's surface are described more as classes than as materials. For instance, consider the material 'concrete'. It is used in roadways, parking lots, swimming pools, buildings and other structural units, which might be treated as a separate class. Similarly, we can subdivide 'vegetation' in a variety of ways such as trees, crops, grasslands, lake bloom algae, etc. Finer subdivisions are permissible, by classifying trees as deciduous or evergreen, or deciduous trees into oak, poplar, etc. Two additional properties help us in distinguishing these various classes, namely; shape (geometric patterns) and use or context (sometimes including geographical locations). Thus, we may assign a feature composed of

concrete to the classes ‘streets’ and ‘parking lots’, depending on whether its shape is long and narrow or more square or rectangular. Features with similar spectral signatures for vegetation could be assigned to the classes ‘forest’ or ‘crops’ depending on whether the area in the images has irregular or straight (often rectangular, as is the case for most farms) boundaries. To visually interpret digital data such as satellite images, individual spectral bands must be displayed simultaneously in the form of a colour composite. For example, Indian Remote Sensing Satellite (Resourcesat) 1, 2 and 3 broadly represent the blue, green and red parts of the electromagnetic spectrum. When these bands are fed through the corresponding blue, green and red ‘colour guns’ of a computer monitor, the resulting image strongly resembles what our eyes would see from the sensor’s vantage point. We, thus, have an intuitive understanding of the colours presented and can usually make a meaningful interpretation of the scene (e.g., dark blue colour mostly represents deep water). Before starting with the exercises let us quickly understand the two terms ‘true colour’ and ‘false colour’ images which would be often used here. Fig. 8.1 shows two pictures of the same location. Picture on the left is a ‘true colour’ image (Fig. 8.1a). This means that the picture shows objects in the same colours that your eyes would normally see. Picture on the right is a ‘false colour’ image (Fig. 8.1b), this means that the colours have been assigned to three different image bands which have been acquired in the wavelengths that your eyes might not normally see

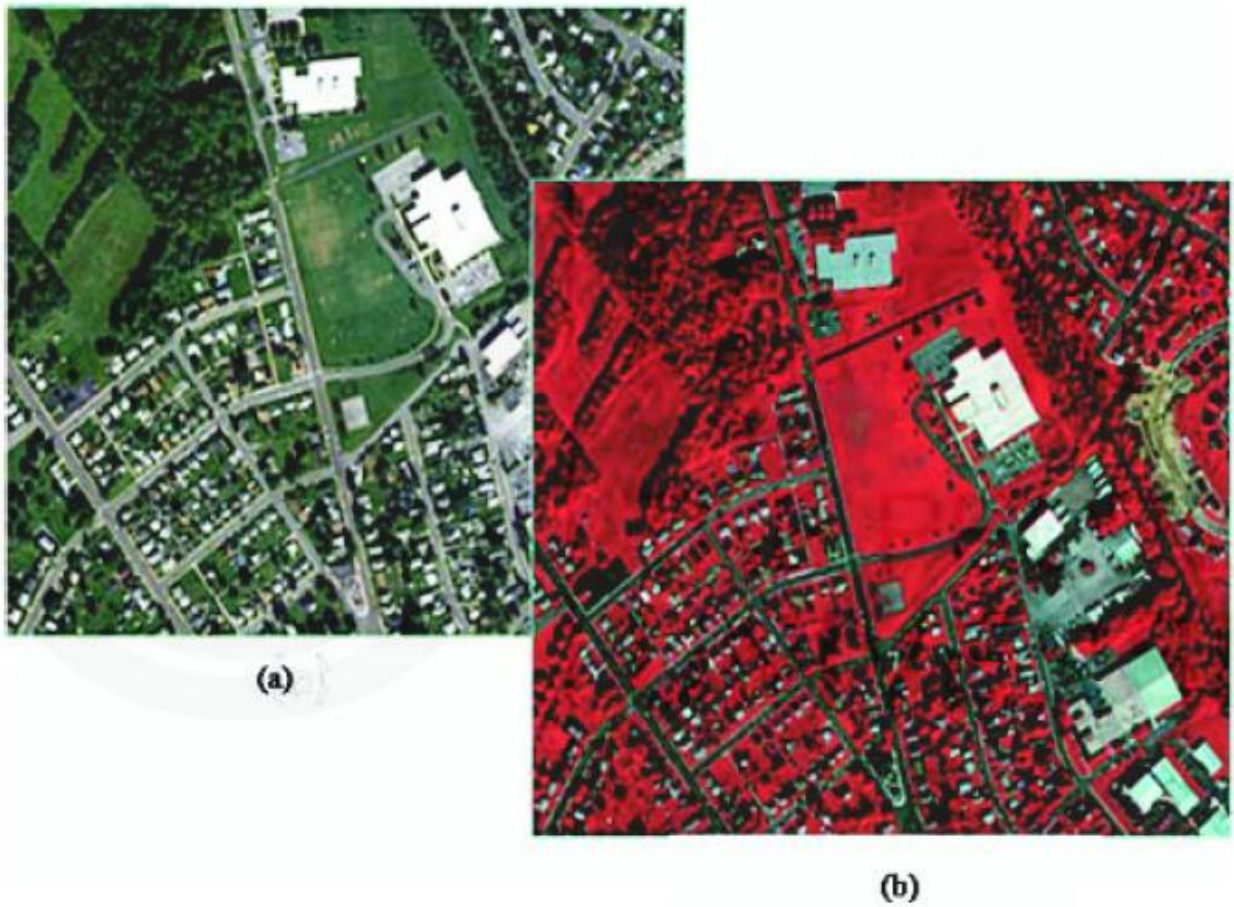

Fig. 8.1: Two satellite images of an area. (a) True colour composite and (b) false colour composite

***(Note: LISS* (Linear Imaging Self-Scanning) IV is a high resolution sensor/ camera on-board IRS P6 satellite. It has spatial resolution of 5.8 m and consists of three spectral bands in the green, red and near infrared regions of the electromagnetic field.)**

Let us now move on to interpreting some of the satellite images using the concepts of visual image interpretation we have learnt. It is important to note that you should carefully observe the images given and try to answer the questions.