Assignment-2

Raju Shrestha
Roll No. 48

Date
Page

1.) Define visual image interpretation. Describe basic elements of visual image interpretation in remote sensing with illustration.

⇒ Image interpretation is the process of extraction of qualitative & quantitative information of objects from aerial photographs or satellite images.
Visual interpretation involves visual analysis of aerial photographs & satellite images.

visual image interpretation is a process of identifying features seen on the images by an analyst/interpreter & communication of information obtain from these images to others for evaluating their significance.

Basic elements of visual image interpretation includes;

i.) Tone :-
It refers to the colour or relative brightness of an object in colour image & the relative & quantitative shades of gray in black & white image.

ii.) Size :-
objects can be misinterpreted if their sizes are not evaluated properly. It is a function of scale in an image. Hence, the size of objects must be considered.

iii.) Shape :-
It relates to the general form, configuration or outline of an individual object.

CamScanner

iv.) Texture :-

It is an expression of roughness or smoothness as exhibited by the images. It is the change of tonal values (frequency of tonal changes).

v.) Association :-

It is occurence of features in relation to its surroundings.

vi.) Shadow :-

It is an especially important clue in the interpre-tation of objects in following two ways.

- Shape of shadow provides a profile view of objects.
- objects within shadow reflect little light & are difficult to dicern on image, which hinders interpretation.

vii.) Site :-

It refers to the topographic position for example sewage treatment facilities are positioned at low topographic sites near stream or rivers to collect waste flowing through the system.

viii.) Pattern :-

It develops in an image due to spatial arrange-ment of objects. Hence, patterns can be defined as the spatial arrangement of objects in an image.

Thus, these are the basis elements of visual image interpretation.

2.) What is the importance of scale in image interpretation? What do you understand by image interpretation key? Give examples.

⇒ The importance of scale in image interpretation lies in its influence on detail, context, measurement, accuracy application relevance, data integration & visual analysis. Higher spatial resolution images provide fine details necessary for identifying small features, while lower resolution offers a broader overview. Scale helps to distinguish between large-scale patterns & localized details, providing essential context.

Interpretation key is the criteria for identification of an object with interpretation elements. Image interpretation depends on the interpretation key which is an experienced interpreter has established from knowledge & the study of current images.

Interpretation key can be of one of two generic types; selective keys contains numerous example image with the supporting text. Interpreter selects example that most closely resembles the feature on image being studied. Elimination keys are composed of word descriptions ranging through various levels of broad to specific characteristic discrimination.

Example:-

Features	Tone	pattern	crocon shape	Edge & crown	Texture
1. Cedar	Dark	spotted grain	conical & sphere (sharp)	Circular & sharp	Hard & coarse

ii.)	Cypress	Dark but lighter than cedar	spotted	conical with round crown	Circular	Hard & fine
iii.)	pine	light & unclear	Irregularly spotted	conical with shapeless	Circular but unclear	soft but coarse
iv.)	larch	lighter than cypress	spotted	conical with unclear crown	circular with unclear edge	soft & coarse
v.)	fir	Dark & clear	Irregular	conical with wider crown	circular with zigzag edge	coarse
vi.)	Deciduous	lighter	Irregular	Irregular	unclear	coarse

3.) Describe electromagnetic spectrum in remote sensing. Which atmospheric conditions would be best for remote sensing in the visual portion of the spectrum? Why? What are the ideal time & atmosphere for aerial remote sensing?

⇒ Electromagnetic spectrum encompasses all the wavelength of electromagnetic radiation, ranging from gamma rays with the shortest wavelengths.

The best atmospheric condition for remote sensing in

the visible spectrum includes clear skies, low humidity min--imal aerosols & particulates stable atmospheric conditions & optimal sun angle. It is best because these factors contribute to acquire high quality, clear & accurate image from remote sensing.

The ideal time & atmosphere for aerial remote sensing is during mid-morning to early afternoon under clear skies with low humidity, minimal aerosols & particular & stable atmospheric conditions.

A) Describe the various types of image preprocessing techniques. What could be the advantage of geometrically correcting an image to geographic coordinates prior to further analysis & interpretation?

⇒ Image preprocessing is the term for operations on images at the lowest level of abstractions. These operations do not increase image information content but decrea--se it if entropy is an information measure.

Different types of preprocessing techniques includes;

1.) Pixel Brightness Transformation :-

Also known as brightness correction. It modify pixel's brightness & the transformation depends on the properties of pixel itself. Here, output pixel's value depends only on the corresponding input pixel value.

ii.) Geometric Transformation :-

It permits the elimination of geometric distortion that occurs when an image is captured. The normal geometric transformation operations are rotation, scaling & distortion.

iii.) Image filtering & segmentation :-

The goal of using filters is to modify or enhance image properly and/or to extract valuable information from the pictures such as edges, corners & blobs.

iv.) Fourier Transform :-

It is an important image processing tool which is used to decompose an image into its sine & cosine components.

Advantages of Geometric correction are as follows :-

- Accurate spatial representation
- Data integration
- Changes detection
- Improved interpretation
- Facilitating accurate environmental & resource management.