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Remote Sensing Imagery Sensors and Image Interpretation

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Abstract: Remote sensing a universal term that represents the activity of gaining data of an object with a sensor that is genuinely away from the item from an aircraft or satellite. Special cameras are used to gather remotely sensed picture which help the analyst to sense the things about the earth.
Remote sensing makes it probable to assemble data of risky or unapproachable zones. Remote sensing data allows researchers to examine the biosphere's biotic and abiotic segments.
Remote sensing is used in various fields to acquire the data which is widely used in Geographical Information System.
Image interpretation is most basic feature of remote sensing technology. Image interpretation is a process of recognizing the images and collect information for multiple uses. The photographs are usually taken by satellite or aircrafts.
Keywords: Image interpretation, image interpretation devices, sensor, remote sensing, data analysis.

I. INTRODUCTION

Environmental monitoring, Natural resource conservation, Biodiversity conservation, food security need solutions that can be extracted mainly from the information given by remote sensing data [1].
Image interpretation in remote sensing is simplest way of collecting information of remotely sensed data. The interpretation of image is based on few elements named as height, tone, shape, size, shadow, pattern, location and site. Image interpretation is a way of analyzing aerial photograph or advanced remote sensing image and physically recognizing the highlights in that picture. The various elements are explained below:

1) *Height*- 'height and depth' is also known as elevation or altitude. The objects with tallness will give a shadow and can provide information about its height.
2) *Tone*- the information can be recorded in shades of grey ranging from black to white.
3) *Shape*- it is one of most important element of interpretation.
4) *Shadow*- generally from polar orbits satellite take images of the shadow casted by the objects. These shadows can give information about hill, tower and tall things.
5) *Pattern*- pattern is the geographical arrangement of lines or scale.
6) *Location*- in the form of coordinates the précised location can be obtained.
7) *Size*- it allows to recognize the image clearly.
8) *Site*- the relationship of feature to the surroundings provides clues to its identity.

II. REMOTE SENSING SENSORS

Remote sensing means the procedure of getting data about any item without truly reaching it in any case. Since all objects have their spectral features, it measures and records EMR (electromagnetic radiation) imitated or given by the planet's surface via sensors. The sensors include airborne sensors and satellite sensors. The major developments and applications in this field are reviewed below

A. Remote Sensing Data Fusion of Different Source

Due to the the quick advancement of remote sensor innovations, the various devices and Multiple source remote sensing data fusion techniques [2] has been growing as per needs and interest. The different techniques has been applied to various fields of environment. This procedure is popular multi-disciplinary approach which takes and joins information from different places and offer ascent to top notch noticeable portrayal of information. Medical image processing and defense security etc. This was first described by Pohl and van Genderen 1998. Remote sensing fusion techniques have been classified in 3 different levels that is pixel level fusion of data, feature level of data fusion, decision level fusion of data.

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Pixel level fusion of data joins or combines fresh data from various sources and produces one informative data. The feature level fusion is applied to extract features like texture, corners, lines etc., which is used for further processing. Decision level fusion of data consolidatesoutcomes given by various calculations to get a last intertwined choice. At the point when the outcomes from various calculations are communicated as a confidences instead of choices, it is called as the soft fusion of data; else, called as the hard fusion of data.

B. IKONOS Satellite Sensor

The IKONOS [3] is the first economically available high resolution satellite sensor used to observe earth surface which was successfully launched on September 24, 1999at Vandenberg Air Force Base in California, USA. It was operated by digitalglobe. It is used in various fields like environmental mapping, mapping natural resources, mining, construction, forest and crop analysis etc. IKONOS is capable of capturing images at near infrared region which is useful for environmental monitoring. It is capable of giving high resolution data.

C. Moderate Resolution Imaging Spectroradiometer

In 1999 NASA launched a satellite imaging sensor in earth's orbit, it is capable of capturing data of thirty-six spectral band that ranges from wavelength of 0.4 to 14.4 (μm). This was imaging spectroradiometer [4]. This device images the entire earth's surface area in few days (usually in 1 or 2 days). The United States Forest Service's use MODIS imagery for wildfire management and management of forest.

D. SPOT Earth Observing Satellite

SPOT earth observing satellite [5] is high-resolution optical imaging satellite placed in space for studying, watching activity happening on earth, forecasting weather and handle natural resources. 5 SPOT satellites have been launched in following years so far SPOT 1launched in the year 1986, SPOT 2 launched in the year 1990, SPOT 3 launched in the year 1993, SPOT 4 launched inthe year 1998, SPOT 5 launched in the year 2002 respectively. Earlier satellites were launched using the European Space Agency, while SPOT 6 in year 2012 and SPOT 7 in year 2014 were launched by the Indian PSLV. The SPOT orbit is circular, polar and sun-synchronous. The images interpreted fromthesedevices are very useful in obtaining images of any place on earth every day and can map vegetation.

E. Deforestation Analysis Using Remote Sensing Imagery

Using remote sensing imagery [6] the forest cover and forest fragmentation estimation of countries like Costa Rica (in 1986 and 1991) is easy. Costa Rica constitutes about 5 percent of world's total plants and bird's species. **Landstat Thermatic Mapper (TM5)** was used to collect the information With the studies it was found that nearly 29 % forest were closed in Costa Rica an 31% was under national conservation. Nearly 50% of forest cover has been lost in five years from 1986 to 1991. In change detection analysis the regions included was nearly 47%.

III. CONCLUSION

In this paper various devices that perform remote sensing imagery have been reviewed. The paper discussed about image interpretation elements, and how to take out information from images provided by remote sensors. A range of remote sensing sensor and their application are covered. Remote sensing imagery is a key for monitoring earth surface and gain important information about many things that are necessary for monitoring activities happening on earth. These remote sensing techniques can be applied to various fields of science to acquire information like it can be used in surveying equipment from the ground, it can be used as device to map habitat suitability, its can be used to access NPP(Net Primary Productivity) of an area in an ecosystem. It can apply to computer science in field of artificial intelligence as machine learning has so many applications in geosciences.

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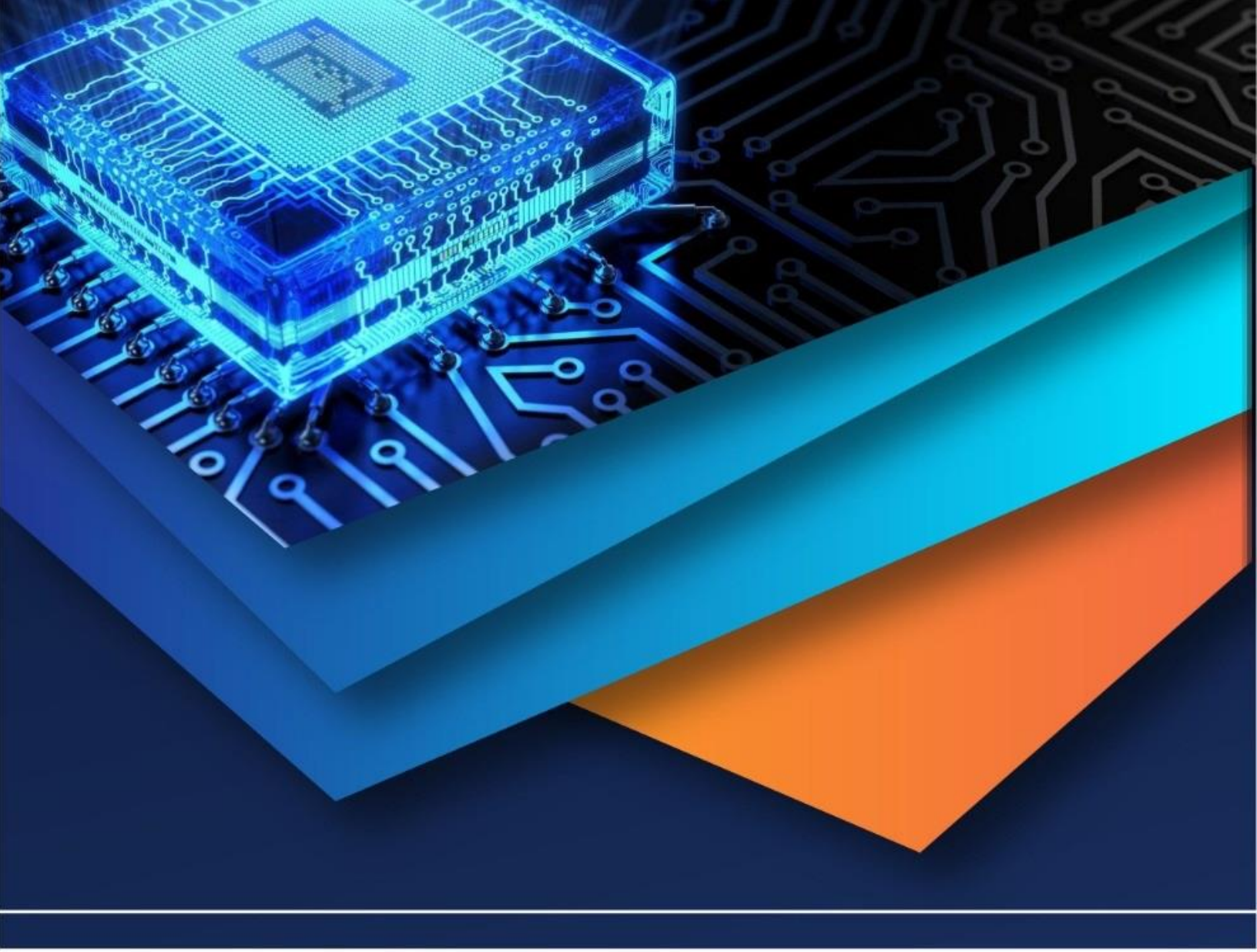

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