GEOGRAPHIC INFORMATION SYSTEM (GIS)

A **geographic information system** (**GIS**) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data. GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data in maps, and present the results of all these operations. GIS sometimes refers to geographic information science (GIScience), the science underlying geographic concepts, applications, and systems. It is attached to many operations and has many applications related to engineering, planning, management, transport/logistics, insurance, telecommunications, and business. For that reason, GIS and location intelligence applications can be the foundation for many location-enabled services that rely on analysis and visualization.

History of development

The first known use of the term "geographic information system" was by Roger Tomlinson in the year 1968 in his paper "A Geographic Information System for Regional Planning".[4]Tomlinson is also acknowledged as the "father of GIS".

Implications of GIS in society

With the popularization of GIS in decision making, scholars have begun to scrutinize the social and political implications of GIS. GIS can also be misused to distort reality for individual and political gain. It has been argued that the production, distribution, utilization, and representation of geographic information are largely related with the social context and has the potential to increase citizen trust in government.

Uses of GIS

There are numerous ways in which GIS is used across different industries. A few examples are:

1. Emergency response teams normally use GIS when they want to collect logistics with regards to how they will move in times of natural disasters.
2. The system also comes in handy when authorities want to discover any potential wetlands that need to be protected from the harmful effects brought about by pollution.
3. Companies also take advantage of the GIS so that they may be able to choose a strategic market location that has not yet been saturated by other competitors in the particular niche industry.
4. Management personnel use this system also so that they can be able to locate areas that are bound to suffer from catastrophes with regards to the infrastructure that is in place there.

Remote sensing

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to on-site observation, especially the Earth. Remote sensing is used in numerous fields, including geography, land surveying and most Earth Science disciplines (for example, hydrology, ecology, meteorology, oceanography, glaciology, geology); it also has military, intelligence, commercial, economic, planning, and humanitarian applications. In current usage, the term "remote sensing" generally refers to the use of satellite-

or aircraft-based sensor technologies to detect and classify objects on Earth, including on the surface and in the atmosphere and oceans.

History

The modern discipline of remote sensing arose with the development of flight. The balloonist G. Tournachon made photographs of Paris from his balloon in 1858. Systematic aerial photography was developed for military surveillance.

Use of GIS and Remote Sensing in Fisheries Sector

Direct Methods of Fish Detection

The most direct and simple method of remote sensing in fisheries is visual fish spotting. Fishing fleets which exploit major fisheries such as tuna are dependent on visual fish spotting from aircraft to direct their fleets.

Aerial photography is of little importance to the majority of commercial fisheries. The location of mobile fish schools, for example, cannot be provided fast enough to the fishermen.

Aerial photography, however, can be of assistance to a fisheries scientist as it provides information about the distribution and relative abundance of fish, particularly the schooling species. The pattern of distribution and the location may identify the species observed, and the surface area of a school, measured from an aerial photograph, has been shown to be correlated with the biomass of some species.

Echo-sounders and sonars have been in use as remote sensors for at least 50 years and are now widely used by the fishing fleets of the world. Sonars are useful for the detection of fish and biomass estimation.

Indirect Methods of Fishery Assessment

Estimation of a fishery resource can be assisted by the measurement of parameters which affect its distribution and abundance. Much of the research dealing with environmental effects related to fisheries are concerned with the correlation of a single parameter with the spatial and temporal distribution of fish. It is most likely, however, that fish respond to the sum total of environmental factors. Thus, it becomes necessary to correlate a large number of parameters, obtained by remote sensing techniques, with fish distribution.

The environmental parameters most commonly measured from airborne and spaceborne sensors are as follows: surface optical or bio-optical properties; surface temperature; vertical and horizontal circulation features; salinity; oil pollution; and sea state.

Identification of Fisheries resources

Except fish school identification, GIS and remote sensing technology is used to identify different fishery resources like, Ponds, Lakes, Wetlands ect.

Application in Agriculture

1. **Crop production forecasting:** Remote sensing is used to forecast the expected crop production and yield over a given area and determine how much of the crop will be harvested under specific conditions.
2. **Identification of planting and harvesting dates:** Because of the predictive nature of the remote sensing technology, farmers can now use remote sensing to observe a variety of factors including the weather patterns and the soil types to predict the planting and harvesting seasons of each crop.
3. **Horticulture, Cropping Systems Analysis:** Remote sensing technology has also been instrumental in the analysis of various crop planting systems. This technology has mainly been in use in the horticulture industry where flower growth patterns can be analyzed and a prediction made out of the analysis.
4. **Crop condition assessment and stress detection:** Remote sensing technology plays an important role in the assessment of the health condition of each crop and the extent to which the crop has withstood stress. This data is then used to determine the quality of the crop.
5. **Crop yield modelling and estimation:** Remote sensing also allows farmers and experts to predict the expected crop yield from a given farmland by estimating the quality of the crop and the extent of the farmland.
6. **Identification of pests and disease infestation:** Remote sensing technology also plays a significant role in the identification of pests in farmland and gives data on the right pests control mechanism to be used to get rid of the pests and diseases on the farm.

Social media in Fisheries development

What is social media?

Social media are web based tools of electronic communication that allow users to personally interact with others individually or in groups for the purposes of exchanging information, sharing thoughts and opinions, influencing and facilitating decision-making by creating, storing, retrieving and exchanging information in any form (text, pictures, video, etc.,) by anyone in the virtual world (Suchiradipta and Saravanan, 2016). Accessibility of social media through mobile phones and the scope of mass-personal and mass-self communication makes it a popular platform among the masses to share ideas and increase linkability and content sharing across multiple platforms. Different types of social media platforms are described in Table.

Type of platform	**Examples**	**Description**
Social networking sites	Orkut, Facebook, Google+	Mostly used for creating personal profiles and networks with friends, colleagues and peers. They are the most popular form of social media platform and have the highest reach, mainly because of the personal reach. By posting content related to fishery sector one can contribute in the development of fishery sector in digital world.
Blogs	Blogger, Wordpress	Earliest from of social media. They are mostly personal web logs but are increasingly being used by corporate houses to reach their clients. Media richness is high in blogs.
Micro-Blogs	Twitter, Instagram	Similar to blogs with character restriction (140 for Twitter) and allow users to create and share content. Media richness is high as in blogs. Use of hashtags (#) for highlighting content, mostly used in micro blogs helps in indexing of content and makes them easily searchable by other users.
Content communities	Video (YouTube, Vimeo, Vine)MS	Mostly formed to share specific type of content easily amongst many users. Media richness is high for specific content. They are easy means to reach a global user base

	Office docs, PDF,PPT (Slideshare)	in an interesting way.
Socially integrated messaging platforms	Whatsapp, Facebook messenger, Snapchat	Highly popular due to group messaging options and high media richness. Users can create and share any form of content in groups or to individuals.

Why use social media?

The special features of participation, openness, conversation, community and connectedness makes social media a unique user experience (Mayfield, 2008). Facebook has 195.16 million active users in India, YouTube gets more than 50 million unique users each month, Twitter has 23.2 million users, WhatsApp has 70 million users in India and the highest monthly active users in the world (www. statista.com, 2016). All these statistics prove the huge potential that social media can be for extension practitioners to reach out to the people. India is a huge market for social media that is constantly expanding into the rural areas and that improves the scope of reaching not only the farmers but the farm families and youth altogether for higher impact.

Importance of use of Social Media

- Highly cost effective
- Simultaneously reaches large numbers of clients
- Location and client specific, problem-oriented
- User-generated content and discussion among the community members
- Easily accessed from mobile phones
- Increases internet presence of extension organizations and their client reach
- Democratization of information by making it accessible to all
- Brings all stakeholders into a single platform