

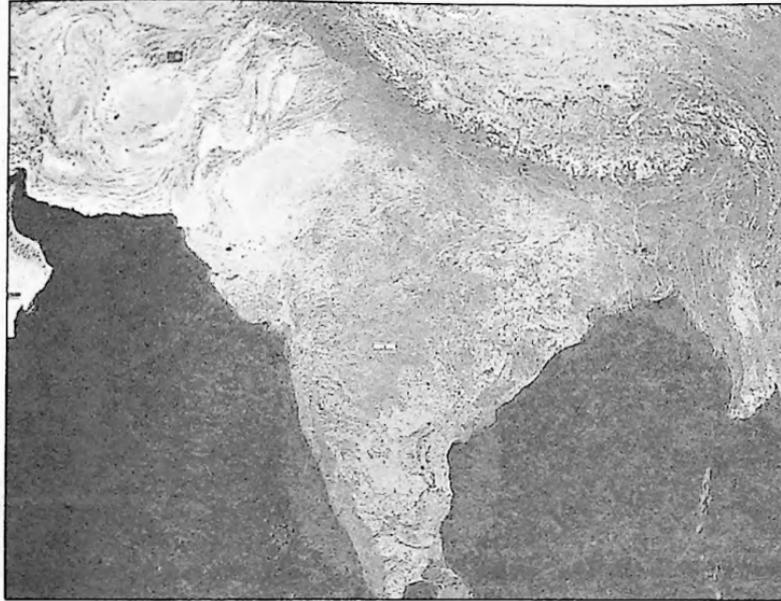
CAREER IN GEOGRAPHIC INFORMATION SYSTEMS

MAP YOUR PATH TO SUCCESS

Rruchi Shrimalli

How many times have you used Google Maps to find your way to a new destination? Have you ever wondered who developed the app that Ola and Uber cab drivers use to find their routes? Or have you ever used the apps that allow you to track how much distance you have covered while you were running to burn fat? Well, all these apps are based on the Geographic Information System (GIS)!

The GIS is a system to capture, store, manage, analyse, manipulate and present all types of geographical or spatial data. In simple words, we can say that GIS enables us to know about a particular location on Earth in great detail. Along with capturing the image of a particular location point, the GIS depends on attribute data* too.



Attribute data is the additional information about a particular point of space.

Suppose there is a school near your home. The exact location of the school is the Spatial Data but the additional informa-

tion like the name of the school, number of students studying there, how many classes it has etc will be its Attribute Data.

The GIS is a very upcoming technology these days. It is being used to solve problems and

make decisions at government levels, corporate levels, and even individual levels. It can help us track the movement of terrorists, compare the geological features or status of deforestation at a point by comparing the pictures of the same place over a period of time, understand the density of any given feature in a particular area among several other things.

Six major purposes GIS serves are:

1. Mapping Features: This technology helps us to locate real-world features and visualise spatial relationships between them.

2. Mapping Quantities: Suppose you want to source cotton. GIS can help you find places where cotton grows in abundance and also regions where it is scanty. Mapping quantities can help in resource and supply management.

3. Mapping Densities: Density means number or quantity of a particular feature in a defined area. GIS can help us determine the population density of Kolkata vs population density of Delhi, or number of McDonalds in Mumbai vs number of McDonalds in Chennai.

4. Determining Characteristics of Area of Interest (AOI): We can have a good idea of type of people living in a particular area and their lifestyle by studying different features there. For example, knowing how many people are exposed to Noise Pollution near Palam Airport and what is their socio-economic status might be useful in determining policies that might help them better. Similarly knowing what the farmers are growing in a particular area can

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help the government to roll out best schemes tailored to their needs.

5. Finding What is Nearby: In case of an emergency, how useful it is to be able to find a shelter home nearest to you by setting up a specific radii (distance you can cover)! GIS enables this geoprocessing tools like BUFFER.

6. Mapping Change: By observing a feature over a period of a few years or decades, it becomes easier to anticipate what might happen in future. Is a particular river slowly changing its course or is a forest slowly disappearing and giving way to urban development? GIS can capture and store images which can be compared at any point of time to see the changes happening at a particular location.

Career Prospects in the field of GIS

GIS has wide-ranging applications. Keeping an eye on Earth from space allows us to tackle various problems related to geography and geosciences. Remote sensing of images, mapping, modeling, developing geospatial databases, information systems design, geocomputation, geovisualisation, and GIS analysis are some of the fields in which one can specialise and work in this field.

GIS specialists play an increasingly important role in government departments such as agriculture, urban and rural planning, forestry, natural resource management, infrastructure development, public health, and defence sector.

GIS analysts and techies are involved in building increasingly advanced in-car navigation systems and automatic vehicle location systems. They also work in the aviation sector, maritime sector, and traffic management.

Geoinformatic data analysts are in demand in Geography and Earth Sciences such as Oceanography, Meteorology, Climate Change Studies, Disaster Management, and Environmental Modelling and Analysis. Criminology (especially Crime Simulation), Telecommunications, Architectural and Archaeological Reconstruction, and Business Location Planning are some other fields where GIS specialists are in demand.

Central Government agencies such as Advanced Data Processing Research Institute (ADRIN) and National Remote Sensing Agency (NRSA) in Hyderabad; Indian Agriculture Research Institute (IARI); Indian Council of Agriculture Research (ICAR); Indian Space Research Organisation (ISRO) Bangalore; North East Space Application Centre (NESAC) Shillong; Regional Remote Sensing Application Centre (RRSAC) in Bangalore, Dehradun, Kharagpur, Jodhpur and Nagpur; and Space Application Centre (SAC) in Ahmedabad often advertise job opportunities for GIS analysts.

Similarly, there are many GIS jobs advertised by State Governments from time to time. National Informatics Centre (NIC), State Electricity Board, and Space Application Centres employ geoinformatics specialists.

One can also apply in international organisations and United

Nations, utility companies, environmental agencies, mineral exploration companies, national survey and mapping organisations, tourism industry, emergency services, and market analysis and e-commerce industries.

Those who specialise in geoinformatics also find ample opportunities in the private sector. Tech and Telecom giants like Google, TCS, Reliance Communications, Reliance Industries, Reliance Energy as well as upcoming companies like Magnasoft Technology Services, CyberTech Systems, and Geofiny Technologies employ GIS specialists.

Next-gen technology such as Self-driving Cars, Virtual Reality, Citizen Sensors, Unmanned Aerial Vehicles (UAVs), and Wearables are some of the exciting new fields in which GIS specialists can work. Autodesk, ESRI, Oracle Spatial, Bentley, and MapInfo are some of the well-known global companies in the field.

Those who have an entrepreneurial streak can set up their own business in the field while those who are academically inclined can go for academic and research positions such as Reader and Professor.

As more and more industries are employing spatial data to plan and manage their activities, demand for skilled professionals in the field is growing at a tremendous rate. The US Department of Labor has rated Geospatial Technologies along with Nanotechnology and Biotechnology as three most important high-growth industries in the 21st century.

A salary for a GIS specialist starts at Rs 2,50,000 per annum and soon scale up to Rs 5,00,000 and more.

What do you need to study to enter the field?

Mr Chandrashekhara Balachandran, founder of The Institute of Geographics Studies, (TIGS), shares, "The most common route to a career in Geoinformatics is to earn a diploma or degree in Geography, Computer Sciences, and GIS. The field is dominated by techies rather than geographers these days even though a geography graduate can offer several new insights into the field. The GIS-specific courses are your best bet for making a career in this field as they offer the best of geography-related knowledge and skills as well as a range of programming and application skills too."

Most employers favour candidates with postgraduate qualifications. Science background is a must too. Those who have done B.Sc, B.Tech, or BE in IT and Computer Science fields or are Agriculture, Geography and Geology graduates can take admission in M.Sc or M.Tech courses in Geoinformatics and Remote Sensing. There are options to go for higher studies and do PhD in the field too.

People from other fields can do MA courses, and shorter certificate and diploma courses too to upgrade their skills. For example, the Institute of Geoinformatics and Remote Sensing (IGRS) offers two to six month courses in GIS disciplines such as Introduction to GIS and LRS, Photogrammetry, Spatial Analysis, Geostatistics, GIS Project Development,

WebGIS and Geodatabases. The PG Diploma course offered by the Indian Institute of Remote Sensing (IIRS) offers specialisations such as:

- Agriculture & Soils
- Forest Resources and Ecosystem Analysis
- Geosciences
- Marine and Atmospheric Sciences
- Natural Hazards and Disaster Risk Management
- Photogrammetry and Remote Sensing
- Urban and Regional Studies
- Water Resources

Most GIS courses have modules cover models, techniques, and technology used in database management, projection systems, remote sensing platforms, annotation dimension and plotting, 3D visualisation, thematic mapping, geographic information systems, global positioning systems, and latest trends in geospatial science and technology. Apart from GIS and Remote Sensing, one can specialise in Disaster Management, Global Navigation Satellite Systems, Cartography (Making Maps), Photogrammetry (Using Photography in Surveying and Mapping), Web Mapping, and Geodesy (Using Math to represent Earth in 3D).

Who should go for GIS-related courses?

The field of GIS is still at its nascent stage and is quite demanding. You should have a genuine interest in it and an enthusiasm to find new solutions every day. Self-motivation, creativity, and strong verbal and communication skills are imperative to your success in the field. You must also have great analytical skills, problem-solving skills, and willingness to learn continuously and upgrade your skills. You should also be mentally prepared to relocate to GIS hubs in India and abroad.

GIS Training Institutes in India
Some of the institutes, universities and organizations offering GIS-related courses in India are:

- 1. Ahmedabad**
 - Blazing Arrows Pvt. Ltd. trains engineers and technicians in QGIS, ArcGIS, OpenGeoServers, OpenLayers etc.
 - Faculty of Geomatics and Space Applications at CEPT University offers M. Tech, M.Sc, and PG Diploma in Geomatics with specialisation in Enterprise
 - Scanpoint Education Research Institute (SERI) offers a 6-month Certificate course, a 1-year PG Diploma course, and a 2-year postgraduate degree course that are all recognised by the Gujarat University.
- 2. Ajmer**
 - MDS University offers MSc and PG Diploma courses in Remote Sensing & Geo-informatics
- 3. Allahabad**
 - Deptt of Geography at University of Allahabad offers PG Diploma in Remote Sensing & GIS.
 - MNNIT Allahabad conducts M.Tech and PhD courses in GIS and Remote Sensing.
 - Sam Higginbottom Institute of Agriculture, Technology & Sciences of the Allahabad Agriculture University offers PG Diploma in Remote

Sensing and GIS too.

- Department of Geography, SSJ Campus, Kumaun University offers MSc in Remote Sensing and GIS.

- 4. Anantpur**
 - Sri Krishnadevaya University offers UG and PG courses in GIS.
- 5. Bengaluru**
 - Akhyansha Technology offers GIS training in lidar, Aerotriangulation, Photogrammetry, orthophoto mobile mapping, 3d city modeling etc.
 - Bangalore University offers 1-year PG Diploma in Geoinformatics.
 - Edgemap Softwares [P] Ltd offers unique GIS Training courses as well as Recruitment services.
 - Karnataka State Remote Sensing Applications Centre (KSRAC) offers 2-year M.Tech in Geoinformatics recognised by the Visvesvaraya Technological University (VTU).
 - Sharpmind Info Train conducts training Programs on GIS & Remote Sensing software and also offer internship opportunities and placement assistance.
 - Sunsoft Technologies Inc. offers a wide range of training programs on GIS and CADD. It is the India office of the Sunsoft Technologies, Australia.
- 6. Bardhaman**
 - DDE at Burdwan University offers MA and M.Sc programs in Remote Sensing and GIS through distance learning.
- 7. Baripada**
 - North Orissa University offers M.Sc program in RS and GIS.
- 8. Bhopal**
 - Barakatullah University offers M.Sc in Applied Geology and Geoinformatics, and M.Sc (Tech) in Remote Sensing.
 - Maulana Azad National Institute of Technology offers 2-year M.Tech in Remote Sensing and Geoinformatics.
 - National Centre for Human Settlement and Environment offers Diploma in GIS.
 - School of Planning and Architecture offers GIS courses too.
- 9. Bhubaneswar**
 - CADCAM Academy offers short-term training projects and Diploma courses through its academy GIS Odisha. It also offers live projects on GIS & GPS system.
 - Department of Geography at Utkal University offers PG Diploma in RS & GIS with specialisation in Regional Planning, Waste Management, Watershed Planning, Coastal Management, Forest Management etc.
 - I-Space (Institute for Spatial Planning And Community E-services) India offers GIS Training for professionals & engineering students.
- 10. Chandigarh**
 - Department of Geography at Panjab University offers 2-year Masters in GIS and Remote Sensing.
 - UNIGIS at PU offers internationally recognised distance learning program along with the Centre for Geoinformatics, University of Salzburg, Austria (Europe).

- 11. Chennai**
 - Department of Geography at University of Madras offers M.Tech in Geoinformatics and M.Sc in Applied Geography, Geoinformatics, International Environmental Management (with Northampton University, UK), and online M.Sc in Geographical Information Science and Systems (with Salzburg University, Austria).
 - Institute of Remote Sensing (IRS), Anna University offers BE in Geoinformatics.
 - KCube Consultancy Pvt. Ltd offers extensive training on real time basis in Open source GIS.
 - School of Public Health teaches GIS module as a part of its Masters in Public Health and M.Sc Bio Statistics courses.
 - Surrapps Consulting offers training program on Modern Surveying Techniques such as Differential GPS and Total Station GIS, Remote Sensing, LIDAR and Applications, Utility and Cadastral Mapping, Open Source Mapping and Data tools etc.

Other universities and institutes offering GIS courses across India are Annamalai University, Centre for Geoinformatics at All India Institute of Local Self Government, Bharathiar University, IIRS, University of Petroleum and Energy Studies, Institute of Environment & Geo-Informatics, Institute of Photogrammetry and Geoinformatics (IPGI), Indian Institute of Technology, Dhanbad, PSNA College of Engineering and Technology, Centre of Excellence in GIS, Gandhigram Rural University, Institute of Geoinformatics and Technology, Assam Engineering College, Cotton College, Jiwaji University, The Indian Institute of Geospatial, CCS Haryana Agricultural University, Guru Jambheshwar University, Centre for Environment, Institute of Science and Technology, Geological Survey of India Training Institute (GSITI), Indian Institute of Surveying and Mapping (Survey of India), JNT University, National Institute of Rural Development and Panchayati Raj, Osmania University, Survey Training Institute, Mehul Institute of Technology Remote Sensing (DAVV), Rajiv Gandhi University, Banasthali University, IIT Roorkee, NIT Warangal and many more.

(The author is a career counselor based in New Delhi. e-mail : ruchishrimalli@gmail.com)

Image: Courtesy Google

Test of General Awareness (Useful for IBPS (Clerks & Officers)/SBI/SSC/UPSC Exams)

ANSWER KEY		
1. A	15. B	29. B
2. D	16. D	30. B
3. C	17. B	31. B
4. D	18. D	32. B
5. C	19. A	33. B
6. A	20. A	34. A
7. D	21. B	35. A
8. B	22. A	36. A
9. B	23. B	37. A
10. D	24. B	38. A
11. B	25. B	39. B
12. A	26. B	40. B
13. B	27. B	
14. D	28. D	