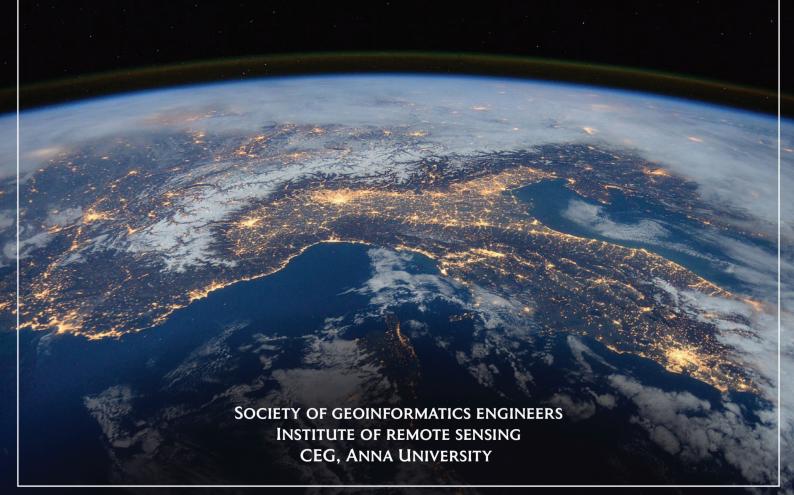
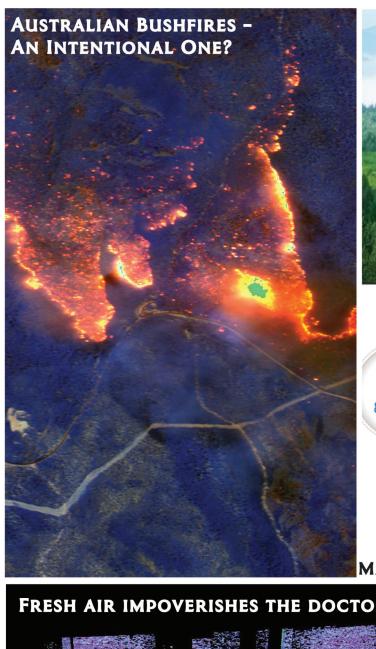
# SPATIA 2019 - 2020

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Revolutionizing Vision and Technology

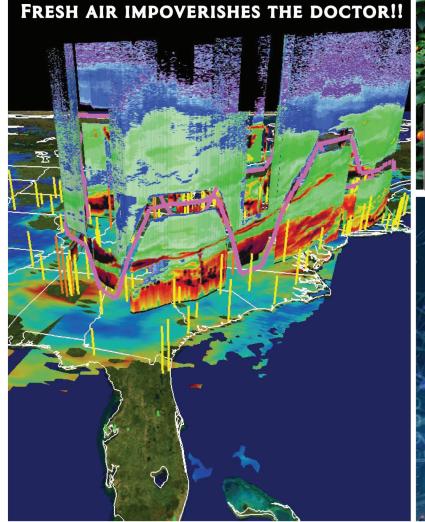








GEOMARKETING - MILLENNIAL TRENDING MARKETING TECHNIQUE TO GENERATE DOLLARS







#### President's Article

#### **Greetings Readers!**



the president of the Society Geoinformatics Engineers, I'm delighted to announce the advent of our news magazine this 2020. Spatia, primarily commenced in the year 2005, aims to enlighten the young minds while triggering their thoughts revolving around the geospatial world. In this edition, our adept wordsmiths would walk you through the activities of SGE and reveal insights into job trends and masters in the field of Geomatics, which they've garnered from the IRS alumina. This edition of Spatia has also a unique collection of the trending fields in Geomatics, besides some hearty Geo comics.

Our society has also encountered a good network with the industry specialised Geo-informaticians and I'm glad that our students have benefitted much. It's amazing how people from various walks of life have come under the umbrella of Geomatics to share their passions and interests with the students of IRS.

Conclusively, I'm much pleased with the good work that our students have put into in bringing forth something spectacular. Their teamwork and hard work are commendable. I wish them heartily and thank all the Professors who offered their support to the students in fabricating yet another mindboggling edition of Spatia.

> -Dr. C. Udhayakumar President, SGE.

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# Existing and Anticipated Applications of Remote Sensing in Agriculture: Athwart Climate Change

Agriculture is an important component of the nation's economy and ecology, and thus its failure could result in the extermination of the ecosystem. Crop production may be inflated with a substantial content of CO2 as it induces evapotranspiration. But it is possible only if sufficiency is achieved in the levels of nutrients, soil moisture and water availability. Increase in CO2 as a result of global warming could reduce the protein concentration in plants and provoke the invasion of weeds, pests, and fungi. The impact of climate change in agriculture is eclectic since, it brings about the intensification of heat and cold waves, extreme weather events like droughts, cutback of precipitation, and shift in timing and length of growing seasons.

Remote sensing has exceedingly contributed to climate change research over the past few decades. Monitoring the Land Use Land Cover (LULC) dynamics of an area throughout the period is crucial in understanding climate change and its mechanism. Satellites such as and Sentinel has been continuously transmitting data and thus is being used to detect natural and anthropogenic changes on the land use and land cover of the region over months to decades by applying change detection, one of the land-updating methods. Whereas moderate-resolution images such as MODIS data is being used in the accurate mapping of abandoned agriculture. This understanding of the landscape could help in erecting prediction models of extreme events including droughts and floods. This has encouraged the government and planning agencies to develop efficient mitigation plans and avoid



drastic effects. Indexes like NDVI (Normalized Difference Vegetation Index) and SASI (Shortwave Angle Slope Index) have been used in monitoring owing to their correlation photosynthetic capacity and biomass of the plants. climate precipitation and potential Evapotranspiration data are processed to identify the degree of dryness of the climate in the particular region to predict the aridity. Vegetation Health Index (VHI) found using AVHRR images is aggregated with the phenological models to serve as a drought indicator. When large fluctuation in rainfall and high conversion of crop lands to the other land cover is observed, that region is declared as a hotspot for climate change and is treated with immediate alleviation.

Future remote sensing applications over climate change on agriculture includes but not limited to:

- Data assimilation where various databases from satellite imagery, aerial photography, climate, weather, surveys and local knowledge can be incorporated to a single model, to improve the accuracy of the research by including both satellite imagery and biophysical parameter in a single dataset.
- Based on the wavelet transform, the satellite data can be subjected to Multi-Resolution Analysis which displays the data in more than one scale/resolution. It will also provide a dynamic adaptive solution to the classification processing problems which results in mixed classes.
- If we could find a way for the measurement of carbon emissions using remote sensing data, it would be of greater significance to integrate it with other biophysical parameters in land suitability analysis for agriculture.
- User-friendly monitoring of satellite data, which would make it easy for a non-technical person such as farmer to be aware of the impending extreme events such as heatwaves, droughts and hurricanes by viewing weather and climate change prediction models.

-Mathi Menaka R, 3rd year, B.E. Geo-Informatics

## Automating Remote Sensing Through Internet of Thing

-Godson G, 2nd year, B.E. Geo-Informatics

Remote sensing technology has come a long way since 1858. While the technology has advanced, there is one aspect of remote sensing that has remained relatively unchanged i.e, the frequency of data acquisition. Now, remote sensing is again on the crag of significant innovation with the advent of new acquisition platforms and forces like cloud computing and IoT. We are moving far away from the conservative interpretation of remote sensing as aerial mapping, GIS and earth observation discipline to something that resembles another recent development, the industrial Internet of Things



The Internet of Things (IoT) incorporates technologies and research disciplines that enable the Internet to reach out into the real world of physical objects. The vision of IoT involves the seamless integration of physical devices to the internet/web, utilizing well-understood, accepted and used protocols, technologies and programming/description languages, for efficient human-to-machine or machine-to-machine communication. Internet-enabled things are generally equipped with sensors, measuring the physical world and its phenomena such as temperature, humidity, radiation, electromagnetism, noise, chemicals etc. A significant attribute of the measurements performed by Internet-enabled things (i.e. sensors, mobile phones, cameras etc.) is the geo-location where each measurement was done.

IoT and remote sensing have conjointly found applications in varied fields. One such is in the National Security and defence of India. Patrolling borders of India has become a tedious and risky task for military and para-military personnel to control intrusions. With the advancements in wireless IoT (Internet of Things) technology, it has become much easier to design, develop and deploy a cost-effective, automatic and efficient system for intrusion detection in the context of surveillance. The light detection and ranging (LiDAR) sensor have been developed for the acquisition of distance with a range of 40 m from the position where an object resides, consequently making the system suitable for all types of environments. Data collected by the sensor is monitored and administered in a server. Software required for the analysis of data and generation of alert notifications is deployed in the server which is an added feature to the system and assists the concerned security personnel to respond quickly and assure the safety.

IoT and remote sensing can also be used as an efficient technology in the domain of waste collection and management in cities. One of the basic services for smart cities is an efficient means of waste collection. Intelligent Transportation Systems (ITS) also enable new services within smart cities. Internet of Things (IoT) can be applied both in smart cities and ITS, forming an advanced platform for novel applications. For high Quality of Service (QoS) in waste collection, surveillance systems can be used as assistive technology. Specifically, the IoT components are incorporated into surveillance systems and ITS for efficient waste collection. An advanced Decision Support System (DSS) for efficient waste collection is used in smart cities. To perform waste collection and dynamic route optimization, the system incorporates a model for data sharing between truck drivers in real-time. The system handles the case of inefficient waste collection in remote areas within the smart city. Surveillance cameras are assimilated for capturing the problematic areas and provide evidence to the authorities. The prime goal of the waste collection system is to provide a high quality of service to the citizens of a smart city.

These examples are only the start of convergence and the combination of remote sensing and IoT with advanced analytics. Consequently, having the power to transform the way we work, live and play. The premise of industrial IoT has been that a connected world of sensory data creates opportunities for analytics and insights that will dramatically increase efficiency, and make organizations smarter and more agile. Remote sensing data from new platforms add new capabilities and give organizations an additional complement of tools to help realize the full promise of IoT.

The United States army of the civil war utilised aerial photography for surveillance purposes. They mounted cameras on balloons to provide intelligence regarding federal or confederate positions, and troop strength

# CERES - A Game Changer

Among the planets, we know to date, the best place to sign-in is our earth. However, a series of planetary bodies and objects have been discovered and some of them may have the potential to harbour life. One such dwarf planet was discovered by the Dawn mission sent by NASA. The dwarf planet in simple terms can be defined as dusty, dark and with several craters. These impact craters hold the key to unravel mysteries.

Ceres was classified as a CI-type asteroid which stands for Carbonaceous Chondritic Rocks. Found at a distance of 2-3.5AU from the Sun, these are least altered by the Sun and have temperatures that would reach a maximum of 50°C. This could bring out the fact that alterations due to solar radiation are minimal. Consequently, water exists as an icy-layer under the crust and might come up to the surface only to sublimate into vapour.

Ceres is the largest planetary object and is found in the Asteroid Belt. Ceres has an axial of 4°. This lack of obliquity results in a zero scope of having seasons. The interior can be differentiated into a rocky core, icy subsurface, and a clayey surface. Ceres is often called an "embryonic planet", which means that it was on the way to evolving into a planetary body. However, gravitational perturbations from the gas giant interfered with the dwarf's growth and also prevented material accretion.

The surface has a lot of impact craters and fractures. Craters with large diameter and depth can be found on the surface. Crater shape can be an intriguing factor. Craters of great depths, where shadows are cast, can give way to an evolution of the planet. Cerian craters have a smooth floor and a fairly un-altered rim. With images having a spatial resolution as high as 35km/pixel, we can particularly see that there are sloppy edges on the crater with missing ejecta. Missing craters and ejecta could be confirmed to the fact of having an icy sub-surface. Usually, when a surface is



impacted, there is a displacement of that particular material as if it were dug. If the impact has a force higher than a threshold, the crater would be deeper and can analogically resemble a droplet of water being displaced. This would result in a complex crater that has a defined rim and a small projection within a crater itself.

The sub-surface is believed to be icy, but it does not have pure water. What it might have is more like a brine-solution. The crater of mysteries- Occator- has bright spots on it that on image analysis was confirmed to be of Epsom origin. These salts were formed as a result of the briny water that might have come in contact with the surface during an impact. Water would have sublimated into the vacuum, leaving behind the salts. The main reason for the sublimation to occur is because the mini planet has only an exosphere that is so thin, it can be considered to be atmosphere-less. Due to this very reason, a life that is delicate enough to not survive the harsh conditions and temperature will not thrive.

Named after the Roman Goddess of Agriculture, we are looking forward to reaping more truths and evolutionary facts about the embryonic planet, which in a way will unlock more secrets about our planet's journey to its present form. Ceres can prove to be a new diversion in the field of exobiology, a true game-changer.

-Darsana L Raj, 3rd year B.E. Geo-Informatics

### Geomarketing - Millennial Trending Marketing Technique to Generate Dollars

Generation Y has embraced all possible tactics of marketing, right from digital marketing to marketing automation, they have it all, and are still exploring new techniques to attract, convert, and close sales. One such trending facet of marketing is geomarketing. Let's delve into the details.

#### **Introducing Geomarketing**

The form of marketing which utilises location data to direct advertising promos to the desired target audience via appropriate messaging at the particular localities is what is called geomarketing. This technique would prevent you from promoting winter coats in Florida! A case in point to understand which product must be promoted where. This is such a vital intelligence gained through geomarketing software.

#### GroundTruth's Geomarketing Software and Tools

Many Geomatics companies are developing geomarketing tools to help brands drive sales through enhanced marketing measures. One such company, GroundTruth, has a tailored geomarketing software that has many geomarketing tools, two of which are discussed below:

#### • Audience Targeting

This feature of GroundTruth shows ads to folks who have visited a particular location or brand within a given time frame. This visitation data is combined with demographics to endorse behavioural targeting. Thus, a company's custom audience can be identified by utilising the gathered data on behaviour and purchases.

#### Location Targeting

Through this feature, brands can garner insight on audience behaviour in a particular location. Appropriate promotions can be implemented by analysing whether customers are on their way to the store or in the parking lot or inside the store, through on-premise mobile location targeting. This proximity targeting thus allows brands to geofence a location that can be utilised to promote ads. Further, the Neighbourhood feature of Location Targeting helps brands to utilise visitation and demographic data to promote within set geographical boundaries.

#### Geomarketing Use Cases

#### • Creating Balanced Sales Territories

Geomarketing tools map existing sales territories to analyse the efficacy of a brand's territory planning. This helps brands to optimise and automate the process of creating a brand's sales territory, thereby, causing a definitive reduction in manual efforts.

#### • Identifying business expansion opportunities

A brand's geographic standing can be evaluated through geomarketing tools. By analysing competition and existing audience demography, brands can identify breached areas to enhance high potential customer base and thus expand a business.

#### Real-Time Example of Geomarketing

The luxury department store, Barneys, New York, digitised its novel flagship in Manhattan. They equipped all their employees with iPads to offer their consumers the using Barneys' better-personalised shopping experience. Clients engaging with the app, primarily receive a prompt to access their location. This location data is then utilised to determine clients' proximities from one of Barneys' retail locations. Those who give access to the app, while shopping, receive targeted recommendations based on their shopping behaviours. Further, Barneys' app promotes other local attractions around its store. Thus, their customer-centric geomarketing tactic makes life easier for their prospects rather than merely being an intrusion of the collection of data to escalate sales. Similarly, other well-renowned brands such as Herradura Tequila and Lowe's also have mastered geomarketing to effectively drive sales and generate profits.

Barneys' app promotes other local attractions around its store. Thus, their customer-centric geomarketing tactic makes life easier for their prospects rather than merely being an intrusion of the collection of data to escalate sales"

#### Scope of Geoinformatics Engineers in Geomarketing

While marketing is perceived as a field for marketers, geoinformatics engineers play a vital role in developing geomarketing software to make geomarketing plautsible for brands. Buckle up, geoinformatics engineers! You have a lucrative and adventurous journey of developing geomarketing software ahead of you!

- Jedidah Singh Rhoda, 3rd year, B.E. Geo-Informatics

#### Rapid Airborne Multibeam Mapping System (RAMMS)

"High Resolution of deep waters using quicker and cost-efficient technology!"

Airborne Lidar Bathymetry (ALB) has long been proven to be a fast, safe and cost-effective method for defining shallow water depths. These systems either have high point densities or good depth penetration, but not usually both. High-resolution and deep-water system datum can be merged, but this is high time, cost and resource-intensive.

To solve this problem, Fugro (Geospatial GIS Solutions) developed RAMMS, a lidar technology. RAMMS is a push-broom system with no moving parts. It transmits a pulse of laser light that generates a 'true swath' of energy approximately equal in width to the flying height. The returning signal is focused into a streak tube receiver where it is beam-formed into almost 900 individual beams.

RAMMS proved to be more efficient than ALB systems as the mapping process was completed using much smaller aircraft which reduced fuel usage and improved sustainability. When the technology was further improved to map profound depths, it was used for more intricate surveys of the ocean floor.

Fugro aims to further enhance the system by finalising the Unmanned Aerial Vehicle (UAV) deployment capabilities. Hence, with the help of UAVs, smaller areas with deep waters like a lake and pond floors can be studied in detail. The system could also be used for surveying places which have been affected by floods by mapping the areas submerged by water. Hence, it could definitely prove to be a crucial tool for disaster monitoring as well.

-Pooja Gopi, 3rd year, B.E. Geo-Informatics

# Magic of Real-time GIS: Food at Your Doorstep, Alarm to Advancing Natural Disasters & Many More!

The advancements made in the Global Navigation System and wireless networking technologies have altered our lives, communication, sharing information and even the collection of geospatial data in the field. We all might have wondered how our GPS's location is usually super accurate. It is all the marvels of real-time geospatial technology. The potential of collecting and analysing real-time data took GIS to a whole new level. Real-Time GIS gives you the ability to simultaneously tap into, analyse, and display streaming data from many sensors, devices, and even social media feeds. This development despite improving research processes and mapping can benefit consumers too. One good example where real-time data benefits consumer is, These location-based services up-to-the-minute geographic information. Consumers can track the location of their drivers and the duration to arrive at their place. For this to come possible, the app employs real-time data to match users with the closest ride and directs drivers to hot spots based on the frequency of ride requests. Also, Uber has used analytics of location big data to understand how many trips start at a particular location, determine the most convenient pickup points for its riders and even find out the fastest routes. This is how the Uber pool services work.

During natural disasters, real-time geospatial intelligence will play a vital role and also be an effective way to track developments. Emergency management services also use GIS platforms to generate crisis maps.

Uber uses big data analytics of location data to understand how many trips start at a particular location, to determine the most convenient pickup points for its riders and even find out the fastest routes ??

You can gain situational awareness from your streaming data whether you are tracking moving assets or stationary sensors. Focusing on every event that matters most to you has become possible with real-time monitoring and big data analysis so you can make the right decision, at the right time. Leading global software company ESRI refers to GIS technology as "the intelligent nervous system." As a kind of modern mapping approach that takes into account ever-changing inputs in a particular area, GIS technology can be used to respond to emergencies by compiling area-specific and population-derived data. In the era of the Internet of Things, the lack of data shouldn't be a problem anymore. Real-time data has brought a solution to such a problem and filled in the gap. During disasters, the real-time data are advantageous. Hence, geographic information is a boon to both governmental and non-governmental organisations and improvements in real-time data analysis are vital to the future of GIS.

# Australian Bushfires An Intentional One?



Australia has always had devastating forest fires but in 2019-2020, a deadly disaster occurred in which an estimated 10.7 million hectares have been burnt up, destroying over 5,900 buildings and killing 500 million animals and 28 people as of 8 January 2020. Greenhouse gas emissions have a clear impact on rising temperatures and, through that, an indirect link on increased dryness in eastern Australia.

Scientists say that lightening and arson might have kindled the fire but this isn't the sole reason for the entire disastrous event. In the cases for forest fires, the worsening cause rather than the initializing cause is considered to be important and keeping this in mind, climate change has been regarded as the major cause for this to occur. "There are now unfair efforts to downplay the clear role of climate change in worsening the intensity and severity of the Australian fires, or to blame 'arson' as a way to distract from the growing threat of climate change," said Peter Gleick, climate scientist and co-founder of Pacific Institute in California and added that, "These efforts should be called out for what they are: gross climate denial. We've only seen a tiny fraction of the climate change that we're going to see in the coming years and the coming decades. If we're seeing these disasters with 1-degree warming of the planet so far, and we know that we're headed for a 1.5 or 2 or 3-degree warming, we can only imagine how bad these disasters are going to get."

"The Australian bushfires were exacerbated by two factors that have a "well-established" link to climate change: heat and dry conditions", said Stefan Rahmstorf, department head at the Potsdam Institute for Climate Impact Research in Germany and a lead author of the United Nations' Intergovernmental Panel on Climate Change's Fourth Assessment Report. "Due to enhanced evaporation in warmer temperatures, the vegetation and the soils dry out more quickly, so even if the rainfall didn't change, just the warming in itself would already cause drying of vegetation and therefore increased fire risk".

In recent years, Australia has experienced long-term dry conditions and exceptionally low rainfall. Scientists say that droughts in the country have gotten worse over recent decades. At the same time, the country has recorded high temperatures; last summer was the hottest on record for the country. Ecologists claim that there is nothing quite to compare with the devastation that is going on over a large area so quickly.

-Priyadharshini S.V, 2nd year, B.E. Geo-Informatics





# Role of Satellite Data Products in Detecting the Invasive Weed: Lantana camara

Many invasive species of flora have multiplied to a great extent mainly in the Western Ghats. Lantana Camara is a weed of National Significance – a native from tropical America that has

been introduced to India for ornamental hedging but later which became a serious invasive weed. It is considered one of the ten most noxious weeds in the world. It is an invasive species in more than 60 countries, causing a serious threat to native bio-diversities. Now, it has started to spread in Tamil Nadu as well, over the Pulney hills, Velliangiri hills, part of the Nilgiri mountains' biosphere and also growing as a threat in Udhagamandalam. Lantana Camara is an extremely prolific seed producer, with approximately 12,000 fruits per plant. It tolerates drought, heat, humidity, pollution, slope and wind. It spreads very fast and hence, forms dense thickets. It suppresses the growth of native species and leads to the loss of plant diversity.

With the available advanced tools such as Remote sensing and GIS, complemented by detailed field data to understand where and why invasive plant species establish and prosper, resources can be deployed in the appropriate locations for their management. By using remote sensing technology, we can map invasive plants in varied habitats for a diversity of lifeforms. High spatial resolution and multi-temporal satellite images such as Cartosat-1&2, IKONOS and QuickBird are used independently or merged, other high-resolution airborne data are also used to provide detailed spatial information on the spread of invasive species to a certain extent. Also, hyperspectral images with very narrow bands such as HySIS and Hyperion can be used for detection and mapping the extent of Lantana Camara. By knowing the distribution, we can reduce the degradation and destruction of biodiversity.

Due to its continuing spread, vegetation is shrunk, which in turn is causing food shortage for herbivores. This also affects the survival of carnivores interlinked to the ecological equilibrium. Also, the chemicals released by lantana discourage the growth of native plants. The dense thickets provide breeding grounds for tsetse flies (vectors of trypanosomiasis). The extensive seed production favours rat populations. If Lantana invades the agricultural land, it may cause a decrease in productivity. Also, Lantana is resilient for burning. Fire favours the growth of Lantana and its growth intensity could be thoroughly enhanced via fire. Thus, by mapping the area covered by this species, we can reduce the growing threat.

-Kayalvizhi S, 2nd year, B.E. Geo-Informatics



Answer: The White House

They built me in neoclassical Palladian style in 1800 BC.
I was designed by James Hoban. Guess my name?

## Smart Traffic Mangement via Internet Of Things & Geographic Information System

#### Curently,

traffic congestion during peak hours is one of the major issues. With cities rapidly growing, managing traffic jams and vehicles becomes vital. IoT (Internet of Things) based traffic management can help to reduce traffic dynamically. IoT incorporated with GIS allows real-time traffic monitoring. Internet of Things is a technology which links physical things to the Internet. The objects or devices when brought onto a digital platform, can be regulated efficiently from anywhere at any time. On this regard, here are, few techniques in which traffic can be managed and monitored effectively.





#### Using Infra-Red Sensors:







The IR sensors are positioned on the traffic light for each main road. The IR sensor is capable of monitoring the heat and movement of vehicles. The thermal bands of the IR are used to measure the heat/temperature. Hence, if there are several vehicles, the IR energy is cumulatively higher. Likewise, IR sensors are placed on several roads. The cumulative IR energy of each road is sent at the control room via WiFi or fibre optics cables embedded underneath the road (but fibre optic cables are capable of transmitting information at a faster rate). Hence, the IR energy of each road is sent instantly. Now a smart algorithm is used by the system at the control room. The IR energies of the roads are first compared and the roads with the maximum IR energy is said to have maximum traffic and it is to be cleared immediately. And the traffic light is turned to yellow and then to Green. Now the lane is cleared. Simultaneously, the other roads which have lower IR energy, the vehicles are made to halt by red colour indication. When two roads are found to have nearly the same IR energy, the road which connects a road of lower IR energy is cleared first. Such an algorithm is followed by the system. This requires the use of GIS to know the location of the roads. Similarly, the roads are dynamically checked for their IR energy values and cleared smartly.



Identification. It is a technology which works on the radio frequency of radio waves. This technology helps to identify and track the objects automatically. The object can be anything, here it means the vehicles. In this technology, the RFID tag is used to get attached to the object which we want to track. This RFID reader continuously sends radio waves. So, whenever the object is in the range of the reader then this RFID tag transmits its feedback signal to the reader. It's very similar to the technology used in the barcodes. By this, we can track multiple objects at the same time. The RFID system contains two components, they are the RFID Reader, RFID tags. This technology is being implemented in the presently developed nations and implemented in all the branded supermarkets and shops in cities.

The RFID technology is also known as Radio Frequency

### RFID technology for emergency vehicles:



At present, only emergency vehicles such as fire brigade and ambulances are attached with RFID tags. These vehicles are identified via RFID readers as ambulances or fire brigade of a specific area at the traffic signals. Hence, the lane is cleared immediately with green colour indication. Through this approach, emergency vehicles are made to reach the destination on time.

Since Aadhar card which contains biometric and all the unique tag required to recognize a person, when this card is linked with vehicular registration which in turn is associated with the bank account. So, when the vehicle crosses the speed limit, the RFID reader attached to the lamps along the roads evaluates the speed of the vehicle indirectly by calculating the distance crossed and the time of transit. Through RFID technology the vehicle crossing the speed limit is identified uniquely and gets entered in the police's spatial database for a penalty. The penalty is taken from the bank account concerned. Through this technology, people can be made to follow the road rules strictly. Hence, traffic accidents can be largely reduced. This IoT and GIS integration will soon empower all the technologies and shall get enforced in all the developing countries. This could also improve the lifestyle of the people and could lead the way for growth

# ADVANCED HIGHER EDUCATION STUDIES FOR STUDENTS TO SATIATE THEIR THIRST FOR KNOWLEDGE

USA



To aspirants looking for masters in the USA, I'm Balaji Ramesh pursuing my masters in Geography with specialization in public health at Virginia Tech, USA. Once you have decided to pursue your masters in the USA, it is highly recommended to work on any research projects and write journal papers during your bachelor's program. This may have a great impact on your profile and shall even help to secure admission in a good university. Apart from projects, try to do internships in reputed organisations.

Some of the trending and beneficial fields to opt for masters in the US are Forestry, Geo Intelligence, Airborne remote sensing and Photogrammetry techniques, Urban planning, Sustainability studies and Eco Informatics. Also, the field you have chosen for your master's degree and its syllabus and guide needs to be considered while shortlisting universities.

Most of the master's programs require you to take the standardised tests such as GRE (Graduate Record Examination) and TOEFL (Test of English as a Foreign Language). The best time to study for these exams is during the middle of your third year which gives an ample amount of time to prepare. Also, you need grade sheets, Statement of Purpose (SOP), three strong letters of recommendation from the professors to complete the online application. October is the right time to start applying to the universities, before that you must have all the required things on hand. Before applying to the university, it is recommended to write to the professors in that department who are working in your aspired field.

The learning atmosphere is very diverse; learning is not just about assessments and exams. There are no semester exams for most courses. Securing more than 85/100 is very easy, even if you were a person who had backlogs in your UG. Professors are friendly and you also have Teaching Assistants who clarify your doubts. It is an entirely different learning experience which I suggest that everyone must try to experience. The standard of the curriculum is far better and not suffixes to compare to our curriculum. The major challenge you face during your studies is loneliness where you have to work for your own (both personal and professional life) but there will always be people around you who will be ready to help.

#### Funding opportunities

There is almost no concept of scholarship, where you just study for free in the USA. It is more like assistantships, where you get paid for your research or teaching and the same pay your education fees too. If you get assistantships, finance is not a problem to pursue your masters in the USA.

#### Advice and Tips to Juniors!

Write to the professors before you fill the application and try to apply for at least five universities with mixed rankings. All the best dear juniors!

#### **CANADA**



Canada is becoming the most preferred country for attaining higher education by Indian students due to various factors. The country is well-known for its diverse cultural environment, providing an immigrant-friendly atmosphere. I'm Sriram Ganapathi Subramanian doing my PhD at the University of Waterloo, Canada. While choosing a master's program at a Canadian University, one should consider the tuition fees, cost of living, the work opportunities available in the field of study and the extremely cold weather.

Financial difficulty is the hardest part of the stay. One should learn to live as frugal as possible. Secondly, it's an academic challenge. Make sure you put in enough hard work and make yourself as systematic as possible.

Canada offers a wonderful research-focused learning atmosphere where great importance is given to creativity and intellectual grasp of concepts. Moreover, there are great research opportunities here and a good work-life balance.

Canadian standard of the curriculum is one of the best in the world. It is a big jump if one is coming from India. A lot of effort is needed to catch up with the expectations in Canadian universities. The funding opportunities are very limited for a Master's student. You need to have a stellar profile and choose a research degree to get funding. For any application, the resume/CV is vital. You can make it stronger by securing good grades and doing internships in big companies or foreign universities to gain research experience. Try to accumulate skills especially in your field of study. Good extra-curricular performance is also a plus. Once you have decided to pursue your master's in Canada, start applying soon. It's generally recommended to apply eight months before the scheduled start of the term. The application procedure is the same as any foreign university. IELTS/TOEFL tests are the most popular high stakes English language tests and it's the English test of choice for educational organizations across Canada. Also, a good statement of purpose (SOP), a fair GRE test score and a well-updated resume along with three strong recommendation letters from professors are the prerequisites for the application.

There are both pros and cons to a Master's degree in Canada. Make an informed decision by a thorough analysis.

#### NETHERLANDS



The Netherlands has a rich history providing education and therefore the ideal choice for any type of student. The country offers a good selection of internationally ranked universities. It's well-known for the excellent scholarship for Indian students. I'm Rachael Martina pursuing my masters in Applied Remote Sensing for Earth Sciences at the International Institute for Geo-Information Science and Earth Observation (ITC), Netherlands. The curriculum standard here is pretty good and it exercises one's critical thinking abilities rather than just memorizing it. The learning environment is hectic yet you will end up learning a lot and master the course. And during the course of the study, I've faced a lot of challenges. I had to change my focus from Geo-Informatics in bachelors to applied remote sensing for earth science here at ITC.

The main struggle was coping up with geology knowledge. But reading up during free hours, one can overcome this easily. For those aspiring students who wish to study in the Netherlands, start applying by early September. Have a day-to-day check of the website so that you have time to apply for scholarships. IELTS/TOEFL tests are mandatory standard English language tests to get into ITC. Build a resume/CV such that the course you are looking for is focused on your interest, projects, and internships. This is one area to show them you are looking for a specialized course. Then other regular documents such as motivation letter, transcripts are fundamental.

Always keep an open mind, be ready to intake large amounts of information and exercise your brain to grasp concepts instead of just memorizing. And finally study not just for grades, study for the experience of learning!

# INDIA INSTITUTE OF TECHNOLOGY



To aspirants yearning for masters in IIT, I'm Abisha Mary G, pursuing my MTech in Atmospheric and Ocean Science Technology at IIT Delhi. Through this article, I desire to appraise you on what it takes to ace a master's in the prestigious IIT.

To get qualified, you must scale through the entrance exam as mentioned on the IIT website, and thereafter, application and interview shall proceed on successfully clearing the exam. Here's the list of entrance exams that you must appear for to procure a master's seat in IIT, Delhi: GATE for MTech and M.S. Research, JAM for M.Sc, CEED for M.Des, CAT for MBA. To crack these entrance exams, one must be well aware of the basic knowledge of your field of expertise. To begin with, you must have a standard textbook that provides adept knowledge. Secondly, procure notes from your learnings. You can also access NPTEL lecture notes for enhanced preparation. Further, if needed, it is advisable but not compulsory, to be a part of reputed coaching centres and avail their study materials. Ensure a planned strategy for learning and practice continuously.

Doing a master's in IIT, Delhi, also has its perks in the form of fellowships. When you get admitted via GATE, you are funded with 12,400 INR per month. Stipends are not only processed for IITs rather any institution to which you get admitted via GATE, but compensation is also provided by MHRD.

One must realize that CGPAs would not get them an opportunity for Masters in IIT Delhi. For application at IITs, criteria would be mostly on subject relevance and GATE score. The interviews for IITs test the interest and knowledge on the subject. But the importance of developing co-curricular skills can only be realized during the course work at IITs. I would say, developing programming skills during UG would be useful if one wants to pursue a master's in technology. The skill of logical thinking and solving using any programming language would surely be an added advantage.

Once you make it to IIT for masters, engage in consistent preparation. For, the evaluation at IITs involves progress throughout the course rather than the final semester exams. The challenges I would say were daily assignments and surprise quizzes. But they are the best ways of learning here. If one develops the habit of daily learning without procrastination, it would be easy to adapt to this environment. Last but not least, always be motivated to learn and enjoy the process. Self-study is one best habit to cultivate!

#### CENTRAL UNIVERSITY

To aspirants looking for masters in India, Central University of Rajasthan (CURAJ) is one of the best places. I'm Harithasree pursuing my MSc in Atmospheric Science at the Central University of Rajasthan. The University offers postgraduate programs in the fields of Science, Arts, Commerce, Education, and Pharmaceutical Studies.

Central Universities Common Entrance Test (CUCET) is an all-India level entrance exam to be taken up for any course at CU. The selection process is based on the ranking in the exam through counselling. Coaching classes aren't needed, just make yourself strong in basic math, aptitude, physics, chemistry and learn the basics of the stream you choose. Since it's a government university, the fee is quite economical, just about Rs. 8000 and lots of scholarships are available for non-general categories. The practical difficulty here at CU is the weather. Moreover, the remote location of the University makes it even harder. Language is also a barrier but it gives a lot of exposure to another part of India where you could discover a completely different culture and way of life. Be open to learning. There is an extensive set of fields and it all depends on the way one chooses and explores them.



Answer: Wagah border

I am an area with high security. I am important for two countries. There is ceremony that take place in evening since 1959. Can you guess my name?

# LUCRATIVE JOB OPPORTUNITIES TO SHAPE YOUR CAREER!





Jayashree Surendrababu

Software Developer GeoNexus Technologies My dialogues with my juniors who are currently doing their undergraduate program in Geo-Informatics have revealed their thirst to pursue career opportunities in the US. So, through this article, I wish to give some insights into the current job trends in the US. At present, in the field of GIS, software development, data science, machine learning, and analyst level jobs are thrust areas. Other fields in Geomatics that are trending highly in the US are Remote Sensing and LiDAR.

Nonetheless, Indian students doubt their ability to ace a job offer while competing against US natives. The good news is that industries here find an adept balance between the available job positions and the skill set required in the Indian students. So, in the field of GIS, you can scale up with a Master's and good programming skills. Be very strong in Data Structures and Algorithms in at least anyone's language. For Remote Sensing and LiDAR, students with MS level knowledge should be fine for the skills these fields require. However, most of the jobs in these fields have visa restrictions.

To work in the US, all you need is a work visa. Most of us here including me are on an H-1B work visa in the US. The minimum educational qualification required to get an H-1B work visa is a 4-year Bachelor's degree and a company that sponsors that visa for you. For example, upon completing your B.E, if you work for an Indian company and that company sends you to the US onsite, you get to work for that company in the US. Some students come to the US to do an MS (using a student visa called F1) and then get a job and a work visa (by submitting applications online to several companies and interviewing).

I must apprise you that the geospatial world requires you to be well versed in coding. Start training to reach a high degree of expertise, especially in data structures and algorithms. And to those of you who view programming languages as phantoms, don't lose hope, you still have opportunities knocking at the door, especially in analyst level jobs. GIS, Remote Sensing, and LiDAR fields offer Analyst level jobs where you'll mostly be using software to carry out the analysis. However, be informed that those who write software earn better than those who analyze.

Here are companies that you should consider interning with to procure industry knowledge: ESRI, Amazon, Walmart, NASA, Civil Engineering Companies (Langan, Timmons, etc.), Energy Billing Companies (DTE Energy, SMECO, etc.), Companies in the utility industry

Interning in one of these premier organizations would give you a better understanding of the career path that awaits you. Consider the private-sector jobs in the US, for this; you can avoid all visa issues. Already, it is getting a little strict here for an H-1B visa. So, I would recommend you to try for a Master's in Canada and reach out to professors for funding. GRE and TOEFL are only important to get an admit, but for funding, you need to reach out to professors from those universities. Send emails to them. Funding in the US and Canada comes in the form of assistantship (20 hours/week job). Make sure your assistantship covers all your tuition expenses.

On a final note, remember that it is never easy in life, so don't worry about anything. Take one step at a time. Enjoy and learn the subjects you have in the IRS. Don't just study your subjects, read everything. Improve your General Knowledge. Reach out to your professors, seniors, and friends for help if you need to learn. India is booming with tech jobs too. Most of the US tech companies have some major development teams based out of India, so they don't have a rigid mindset that the US is the only destination. And lastly, don't forget to have fun, since CEG is the best!

#### CANADA



Rajesh Tamilmani

GIS Web Developer

J.D. Irving., Ltd

While it is the dream of every student to obtain better job opportunities in foreign countries, one must always be enlightened about the job trends persisting in the areas. So, through this article, I'm going to share about the job trends in Canada, since the US seems to pose a lot of hurdles. In Canada, currently, LiDAR, GIS Web Development and Land Surveying are hot industries. The industries there find it cumbersome to identify a professional who is both well-versed in GIS skills and programming. And therefore, the momentum at which career offers bloom solely depend on candidates being able to fulfil the job requirements. Since most of the companies are leveraging geospatial concepts, this would be the opportune moment to enter Canada with a huffed skillset up your sleeves.

Untowardly though, I find a breach between the opportunities available and the skill set required. Most Geomatics graduates know the concepts but they can't develop software. This makes it quite tedious for Indian students to even procure an offer in Canada. In fact, companies here prefer international students even as we work to prove ourselves. As I mentioned earlier, be a master on both geospatial concepts and programming. Look out for companies while you are at university itself, get an internship, and maintain a good rapport with the company.

Nonetheless, I must inform you that behavioural skills matter a lot over technical skills in securing a job here in Canada. Recruiters are aware that graduates are technically capable but what they require is how well you adapt to the Canadian work culture.

As for educational qualification, you must procure either masters or undergraduate from a Canadian university to be eligible for Canadian geospatial jobs. Key programming skills that industries look here in an individual is the ability to adapt to any of the programming languages, and most commonly, Python and C#. This is why GIS developers are paid better and avail promotions in comparison to those who utilize GIS software for analysis. In case, programming daunts you, you can always rely on data processing. But I wouldn't suggest that, because these jobs are not challenging.

As a student, if you are yearning for internship opportunities, you can reach out to ESRI, JD Irving, and MDA. But you must understand that the company in which you intern doesn't matter, rather how much knowledge and real-time experience you gain that matters. To gain a job opportunity in Canada, you must pass through the Language proficiency exam and ESRI certification. Once you scale through these entrance examinations, you are free to approach private, government, and educational institutions for career opportunities. All institutions in Canada are equal opportunity providers without any discrimination. This is why unlike the US; you would face no visa or permit issues in Canada. Once you are here as a student you will never have a problem regarding your visa. The universities here are friendly and helpful all the time. They value their students.

To conclude, let me tell you how I landed my career in Canada. First, I identified my field of interest. Then proceeded by choosing the courses accordingly and kept working towards my goal relentlessly. And here's a little piece of my mind to the IRS student community: Never settle with what you are doing currently. If you are most comfortable in doing something, it means it's not challenging for you. All the best!

#### SHELL



Purnima Jayaraj

Sr. Process Data Engineer
Shell

www.geohorizon.in | Spatia 2020

#### Goal Focused Ambience

In Shell, work is mainly concerned about data management and the work environment is top-notch. Their focus and goals are straight forward. The main software used here is FME and the process is called extract transform load which is related to managing well data from different fields etc.

#### Programming Knowledge Vs Domain Knowledge

Programming skills are just a boost to the core knowledge. If you are not thorough with core knowledge what's the point of having programming. There are a lot of projects going on where people use programming as a tool for core knowledge ex. automated cars, if you don't know the concept of GPS or different coordinate systems being used, applying programming for automated car navigation routes is useless.

So, domain plus programming can make you stand out in any placement.

#### Assessment Criteria

The recruiters in Shell shortlist top eight candidates based on CGPA. So, whoever is top in CGPA will have the chance to attend the interview process. Criteria would be you need to pass a written assessment and then an interview. Questions vary on the individual, but mostly they will ask about your final year projects. Also, be thorough with the basics of geodesy and different coordinate systems and in maintaining the geodetic integrity always. Besides, the recruiter expects few python skills and FME skills. The right time to start preparing is from the start of the final year. It is good for other companies too. Also, choose some project which is relevant to your internship projects too.

#### Advice and Tips for Juniors

Even though people want jobs to settle, I would say always keep backups. In case of no job then what would I do and always choose final projects which you are interested in and also aligns with intern projects. Publish your projects everywhere possible. Publishing your project creates a separate impression on people. Other than that, always have a backup option. Prepare well for placement. Go out-of-the-way and try finding opportunities on your own. Don't expect college to get you placement. There are a lot of companies who can give you jobs. Try seeing a job as a good place to elevate your CV and also as a place where you can learn good practical stuff of our core domain. Whatever we learn in college is not enough. Don't reject jobs just because they give less salary.

# LARSEN & TOUBRO (L&T)



Aakkash Murugesh

L&T Nxt

Being in a central Geospatial team of L&T groups, it's a new day every day. It is always fun. It depends on how you take your work. There is an ample amount of scope to learn. Work is concerned more about business. You can get to know what location-based data and apps can impact today's market.

#### 3D

A first-class CGPA with no arrears will always help you. Also, any recruiter including L&T desires these 3Ds from a pupil i.e., Dynamic with high adaptability, Desperate to learn, and Direct answers (this is a capability).

Hard skills completely depend on the team that is coming for the interview. L&T hosts many GIS/Geospatial teams nowadays. L&T does most of the things in every sector of Geo-Informatics. Right from collecting data using remote sensing platforms (Drone, Satellite, LiDAR), processing it in GIS software (ArcGIS, QGIS) and publishing it into websites or apps (JavaScript, Android, Python). A good amount of skill and knowledge in any one of these can help you a lot in meeting an interviewer's expectations.

#### EXTRA CURRICULUM IS A PLUS

Any extra skill out of your syllabus or curriculum is a plus. Be it a technical one or soft skill; make sure you have excelled in it. Java, python classes, CTF, SGE, NSS works, everything that you do extra. It tells how good you can step out of your comfort zone and deliver your best. Your resume can hold all that in short simple words. Your project is your biggest validation metric. The uniqueness of your final year project matters a lot. Make sure you explain about that and your part in it clearly. L&T also might want you to be flexible with work locations. The way you talk, interact, sit, stand, walk, smile matters a lot to make you stand unique. Do not overdo it, at the same time stay bold.

#### **GEOSPATIAL SEEKS IT**

It has always been a blend of both that can get you to the top. Yes, people with only domain knowledge have gone miles, and people in IT have survived strong. But we as a Geo-Informatics graduate have all abilities to showcase a mixed skill and talent. Programming has its origin in handling data. Handling location data, analysing and presenting it effectively also needs programming skills. Be it using JavaScript to develop web apps, Android for Mobile, .NET, Python and a lot more have constantly aided us in delivering spatial data and information to the users in an understandable manner. We must acquire that skill to thrive in the industry. Also, it again depends on the company/team. More than 60% of firms in the Geospatial sector concentrates on the IT part of the technology, so they need students who have both domain and development skills. L&T is one such company.

#### TRIMBLE 🥕



Mari Sujitha .S Trimble GIS Analyst

Trimble is a great place to work, relaxed and rewarding. Also, opportunities are available for learning and we can maintain a good work-life balance. Here, the work is mainly concerned about 'Transportation network mapping and routing.' Recruiters of Trimble expect programming knowledge, especially in Python and JavaScript, more than domain knowledge. Also, they don't mind your CGPA. They are mainly concerned about your résumé and your communication skills.

Advice and Tips for Juniors

Start to learn programming languages from the second year. Be bold and develop your communication skills. Set your goal first and then start preparing regularly. Also, try to participate in extracurricular activities.

#### PUZZLE

Y	T	F	E	L	В	F	Н	I	J	D
D	Y	A	С	Z	В	N	0	A	E	T
Н	X	M	T	E	V	I	S	S	A	P
A	S	A	M	0	E	A	R	T	Н	К
Z	E	В	I	0	В	T	M	J	N	0
E	N	V	E	L	E	L	К	X	T	U
D	S	С	A	M	S	W	U	M	0	L
G	0	E	M	T	U	Н	X	E	R	A
F	R	U	L	A	T	I	T	U	D	E
L	L	M	P	E	I	T	F	L	I	0
P	N	Q	J	L	В	E	U	I	T	P
T	R	A	V	E	R	S	I	N	G	M
P	A	M	D	0	0	С	s	I	E	E
X	N	E	T	A	Z	P	Y	M	M	T
D	P	A	R	A	L	L	E	L	P	0

#### **Up-Down**

- 1. In atmospheric scattering, \_\_\_\_ scattering occurs when the particle size and wavelength of EM waves are almost equal (not exactly equal).
- 2. \_\_\_\_ is a device which detects the amount of reflected energy.
- 3. When red, green and blue colors are reflected equally, we get \_\_\_\_\_ color.
- 4. Bluish Grey color shade found in satellite imagery captured in visible region is known as \_
- 5. When the movement of the satellite is synchronized with of, called the movement geo-synchronized satellites.

#### Left - Right

- 6. Angle between zenith and celestial equator.
- 7. Basic principle behind compass is \_\_\_\_\_.
- 8. Basic principle behind plane table is \_\_\_\_\_ ism.

#### Down – up

- 9. \_\_\_\_ resolution is also known as revisiting time period of satellite.
- 10. Path traced by the satellite around the earth.

#### Right – left

- 11. In theodolite, telescope normal position is commonly known as face\_\_\_\_.
- 12. 99.9% of remote sensing processes are \_\_\_\_\_ RS
- 13. Representative fraction (RF) = Distance measured on\_\_\_\_\_/Distance measured on ground

he introduction of Artificial Intelligence was essential in the field of remote sensing due to the usage of a vast amount of data. Artificial intelligence (AI) can handle a huge volume of data which makes the machines to learn from experience, adjust to new

# Machine Learning and Deep Learning in Remote Sensing Technology

inputs and execute human-like tasks. Nowadays, remote sensing has evolved into a multidisciplinary field, where machine learning and deep learning algorithms play an important role in generating accurate results efficiently. Using these technologies, computers can process large amounts of data and recognize patterns in the data and are trained to execute particular tasks which are highly efficient in the field of remote sensing. AI is a broad field of study and has major subfields such as machine

learning and deep learning. Machine learning provides the computer to automatically learn from supervised data without human assistance and adjust the actions. On the other hand, deep learning uses huge neural networks to learn from unsupervised data and creates complex patterns for use in decision-making.

In the past few years, space agencies have launched a large number of satellites for earth observation in space.

Due to a large amount of information, end-users have been flooded with a large number of images. But handling this massive volume of data using conventional algorithms

is inefficient. Hence, the development of fully automated analysis methods is vital. Machine learning has the potential for classification of spatial imagery. It includes a variety of algorithms such as Naive Bayes Classification, Support Vector Machine, K-Nearest Neighbor, Random forest and Classification and Regression Trees.

Scientists widely use machine learning algorithms in their research such as disaster assessment, tree species classification, biomass estimation, landslide susceptibility, etc. Also, Maxar Technologies uses machine learning algorithms to create valuable commercial information products.

But extraction is made much easier if the prior knowledge about the needs and the proper methods for extracting according to the

features are given. Feature extraction plays a crucial role in image registration because it decides

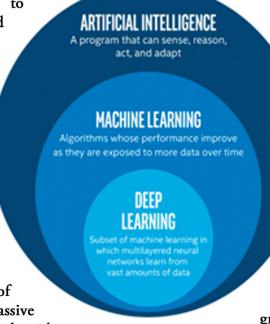
what type of feature is to be used for image matching. Recently, deep learning are applied methods remote sensing registration because of its ability to detect the features from images automatically. learning algorithms Deep have gained popularity in analysing the remote sensing images over the past few years. Using deep learning models, the

greatest level of classification accuracy is achieved. It undoubtedly offers better feature

representations and scientists utilize it for target detection and scene classification.

Thus, a large volume of data could be handled with ease with the advent of machine learning and deep learning. Further, complex problems are now solved efficiently.

-Amirtha varshini R.L, 2nd year, B.E. Geo-Informatics



SPECIM IQ is the world's first portable hyperspectral camera that allows you to analyze material samples anywhere, in seconds. The camera can screen the imaging target and can show the results on the camera display in just seconds. The weight of the camera is 1.3 kg and it contains a chargeable battery, a memory card for data storing, and allows true portability for imaging in locations, where it has not been possible before.

## SGE

# Innovative and Intellectual Words at the Society of Geo-Informatics Inaugural Function

The annual inauguration ceremony of the Society of GeoInformatic Engineers was conducted on September 8, 2019. The chief guest of the inaugural ceremony was Dr Babu Madhavan who is instrumental in the formation of SAKURA - GSR, is also the proud alumnus of the Institute of Remote Sensing, College of Engineering Guindy, Anna University. He gave a lecture on "Measure the Earth by Photogrammetry UAV" and enlightened us on his 25 years journey in the field of Geomatics. A wide range of applications of drone remote sensing and the achievements of the SAKURA-GSR was illustrated. Dr Babu Madhavan gave an overview of the domains of Geospatial technology



jobs that pay well. The lecture was concluded by his words, "If students hone their skills and work relentlessly towards their passion, they are bound to be successful professionals in life".



# Guest Lecture from Hexamap Pvt ltd solutions

A Guest Lecture was conducted to enable our students to start thinking from the perspective of a Geo Informatics Engineer. Speaking on the occasion, Mr Maharajan, Director of Hexamaps Solutions Pvt Ltd gave a lecture entitled 'How can you build your WebGIS Applications'. He gave insights on the real-time applications of GIS and illustrated a few applications to invigorate our innovative minds. The significance of possessing a strong knowledge of programming languages was explained. Overall, the workshop was an eye-opener for our aspiring students, to work with perseverance and to improve their technical expertise in achieving their goals.

#### CELESTIA'20

Celestia'20 is an intra-college symposium organized by the Society of Geoinformatics Engineers, which was conducted on January 8-9, 2020 for the academic year 2019-2020. Staying true to its name, it tries to kinder the innate flame within the students. With a plethora of events focusing on all frontiers of knowledge, Celestia aimed at empowering the engineers in the field of Geo-Informatics with the knowledge of the latest technologies. Celestia offered the platform for voicing out the innumerable ideas of the springtime folks who shall make the country reach greater heights. Both technical events such as Paper presentation, Poster presentation, Techwiz, GIF and non-technical events such as Vallinam, Treasure hunt were conducted to offer a unique blend of challenge and fun.

#### **INAUGURATION CEREMONY**

On this occasion, we were privileged to be oriented by Dr Madasamy Arockiasamy Ph.D., Professor and Director of Centre for Infrastructure and Civil Engineering at Florida Atlantic University, USA. He gave us an insight into higher education at Florida Atlantic University, its achievements and its facilities. He also explained the bloom of artificial intelligence in today's world. He articulated the fact that life is competitive because it is cruel, always finding a way around your plans, dreams, hopes to identify ways to humble you. He concluded the forum with an encouraging note stating that 'Every one of us is successful; for success is the ability to put a smile on the face of people'. He reinforced the concepts of self-confidence and self-esteem and assured us that everyone has unique talents and possesses everything that is required to lead a successful and fruitful life.



# WORKSHOP- High-resolution images from 100 fagl

Navigating the future with drones - Aiming to provide intense training in handling drones, a workshop named 'High-resolution images from 100 fagl' was held on January 8, 2020. The workshop was conducted by Sakura Geoinformation Software Research Pvt Ltd and it was led by Dr B. Babu Madhavan, the director of Sakura-GSR. The event was designed to bring students on a single platform to know about drones and their working. The concepts behind the working of drones, their advantages and their importance in this present contemporary scenario were explained adequately. The entire session by Sakura-GSR was very informative and it was a great plinth for the innovative minds to acquire skills in drone technology.



#### Fresh air impoverishes the doctor!!

A breath of fresh air is a great thing to take but in this contemporary scenario, air pollution has threat. World Health an alarming Organization (WHO) data indicates that 9 out of 10 people breathe air having high levels of pollution. The national capital of India is facing a major problem regarding air pollution. The Air Quality Index (AQI) value of Delhi reached its zenith of 1005 during Diwali, last year. Also, according to the Delhi Pollution Control Committee's real-time data, the AQI was recorded to be far worse in the city. There are various reasons for air pollution. It might be due to anthropogenic activities or natural calamities. Identifying the exact sources emissions and taking actions to curtail them can keep the pollution levels in check.

Satellites are tremendously switching the way we monitor pollution on the ground. Technological developments have resulted in new enhanced satellites especially for tracking pollution and identifying the sources of emissions. To carry out research studies in the field of air quality, remote sensing and GIS can serve to be a very crucial tool serving various purposes from monitoring the air quality of a region spatially to creating spatial models for predicting future air quality conditions. Copernicus Sentinel- 5P which was launched by ESA (European Space Agency) is said to be the most advanced pollution monitoring satellite. It tracks carbon monoxide, nitrogen dioxide and ozone, along with aerosols.

It also monitors formaldehyde, which is one of the sources of carbon monoxide. Fire hotspots and smoke plume signatures are readily seen in satellite imagery, and many satellite sensors like GOES, MODIS and TOMS are widely used to map the geographical distribution and aerosol transport on large scales. MODIS and TOMS provide global coverage approximately once a day and it is only capable of providing snap-shots of large-scale aerosol spatial distribution during the time of satellite overpass, which is not very suitable for tracking and monitoring large scale aerosol events. On the other hand, GOES which has a single channel provides coverage of the entire globe at thirty minutes intervals giving a summary of the extent of aerosol coverage, which results in an indication of the aerosol intensity. Thus, GOES helps to track the time history and spatial distribution of aerosol transport. Another notable technique is the LIDAR technique where the return signal is based on the scattering of the laser transmitted energy by atmospheric particles including aerosols, dust and molecules. The instantaneous magnitude of the return signal provides information on the backscatter properties of the atmosphere at a certain height determined by the time delay of pulse-echo.

Thus, remote sensing can serve as an effective tool for monitoring pollution and help us to step towards a clean and green environment!

-Dharshana R, 2nd year, B.E. Geo-Informatics

# India Features Its First Step in The Drone Technology

Technology calls it the biggest endeavour in Indian map-making since the Great Trigonometrical Survey in the 1800s, which produced the first high-precision maps of India. Now, we are equipped to map India with drones. Do you believe that this technology would cover large parcels of land while offering high quality and high-resolution images with greater accuracy? Tech-savvy giants claim so! The high-resolution obtained from drones facilitates

The high-resolution obtained from drones facilitates greater accuracy. This novel tech uses a single-pixel to capture the ground details in a process called Ground Sample Distance (GSD). This calculates the distance between the centres of two neighbouring pixels, each containing geospatial data. Here maps are produced at a 1:500 scale digitally. This increased accuracy yields tremendous benefits.

# Drones can be equipped with high-resolution cameras, audio sensors, GPS, movement detection, license plate readers, facial Recognition, etc.

They empower urban bodies and panchayats to formulate reliable development and planning activities, by digitization land titles, giving citizens verified land ownership. Even business sectors are leveraging drone mapping for various applications.

One must understand that drones are fundamentally different previous map-making technologies for they can capture high volumes of data too, in addition to enhance accuracy. Drones can be equipped with massive arrays of sensors including high-resolution cameras, sensors, GPS, audio movement detection, license plate readers, facial recognition, etc. They can be used to regulate disaster management activities and rescue operations by collecting crucial information from damaged site. States Maharashtra, Haryana and Karnataka are leveraging drone-based mapping. The Survey of India has undertaken the project for mapping the village Gaothen which is in the state of Maharashtra, covering more than 40,000 villages. Similarly, drone-based mapping for the five districts in the state of Karnataka including village, semi-urban and urban areas have also been carried out.

-Sabeena. M, 3rd year, B.E. Geo-Informatics

#### FRESHER'S VIEW

#### Juvairiya Farsana. M

I got to know about this course from a couple of people. I also came across a YouTube videowhich intrigued me to look up on this course. A phone call with a senior in CEG convinced us that this was the one for me. CEG was a main attraction. Moreover, the subject seemed interesting, spatial data analysis with a blend of information technology, altogether this course was a rare one and this college was something that we dreamt of, so, voila! Here I am in CEG meeting a lot of great minds.

#### Gayathri. S

I was fascinated about satellites and spatial mapping. My curiosity in creation of maps and remote sensing made me to choose Geo Informatics as my specialization. My passion for maps started with use of Google maps. I've always wanted to learn about the mapping technologies, location tracking system used in Google maps and customize tools for it. I like physics and love physics about space. After joining CEG, I got to know that the course has varied domains that are not only deals with space. Also, it has branches in hydrology, urban planning ...etc.

#### Maria Chimya Shawa

What attracted me to Geo Informatics? Let me start by giving a short background story. I have four siblings, three of which are studying in various universities in my country. Growing up, we went to the same schools, had the same teachers and learnt the same subjects. I wanted something different. I learnt about Geo Informatics through research online and the information I had found described it as a very diverse course that has different applications in multiple fields. The idea of data analysis and the concepts of GIS seemed very interesting to me, I told my mother about it. She approved, that's all the encouragement I needed and I decided to apply for the course.

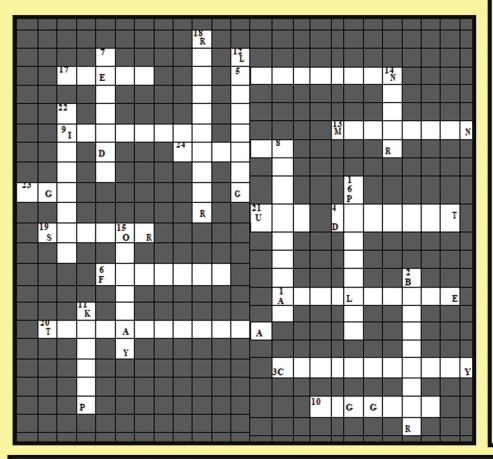
#### Mary Stenila

What attracted me to take up this course is my interest in nature, space and the diverse research opportunities available currently. I looked up for many courses, but nothing interested me lot. I had no idea about Geo Informatics, but to be honest, I got excited just by hearing the name of the course which me explore about it and it matched with most of my interests. I envisioned myself as a scientist and that's all. The rarity of the course was also a reason. I stepped into this course without any knowledge about it and I am looking forward for a great learning experience. Since the general public is not aware of this course, we all shall make it popular!

#### Balasubramanian. S

Remote sensing fascinated me to choose Geo informatics. Usually all scientific research and development on the surface of the Earth can be possible only when we sense the regions. Sensing it manually is impossible. So, we use remote sensing. This concept fascinated me to choose Geo Informatics. Also, I came to know that higher studies on it offer better career opportunities.

#### CROSSWORD



#### **ACROSS**

- 1. The ratio b/w the area of a feature on a map and the area of the same feature on the earth's surface.
- 3. The design, drafting, Compilation and reproduction of maps.
- 4. Any collection of data with common theme.
- 5. Projecting feature in a data layer into three dimensional space points become vertical lines, lines become walls and polygons become solid blocks.
- 6. A shape in a spatial data layer such as a point, line or polygon that represents a geographic object.
- 9. A line on a map connecting points of equal temperature
- 10. The sawtooth effect observable when a curve is drawn on a raster display [Graphics].
- 13. A great circle on the earth that passes through the poles, often used synonymously with longitude [Navigation, Geodesy]
- 17. A statement or logical expression used to select feature or records from a database.
- 19. Instrument that collects data by detecting the energy reflected from earth or other pl planet 20. Features of one type that are generally placed together in a single geographical layer 21. coordinates system is a grid-based method of specifying locations on the surface of
- the earth that is a practical application of a 2-D cartesian coordinate system.

  23. is a standard for use in cartography, geodesy and satellite navigation including GPS.

  24. The point on the celestial sphere directly above an observer

#### DOWN

2.A data layer in a GIS that all other layer is referenced to geometrically.

7.A code representing the location of an object, such as an address, a census tract, a postal code or X, Y coordinates.

8.A graph showing the distribution of values in a set of data. Individual values are display along a horizontal axis, and the frequency are displayed along a vertical axis

11.A schematic map used as a reference for a collection of map sheets, outlining the total area covered and usually providing a reference code for each map.

12. The measure of the heights of objects and points according to a specified elevation, usually mean

sea level [Surveying]

14. The point on the celestial sphere directly beneath an observer [Astronomy]

15 is a GIS operation that superimposes multiple data sets together for purpose of identifying relationship between them.

16. The apparent shift in an object's position when it is viewed from two different angles [Photogrammetry, remote sensing, astronomy]
18. An instrument that measures the intensity of radiation in a particular band of wavelengths in the

electromagnetic spectrum.

22.A map that shows which areas are visible and which are not from a specified X, Y, Z position

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