

autonomous
vehicles | data
market places |
renewable energy
| geospatial
capabilities |
m-Farms |

Inside this issue

Moving towards fully autonomous vehicles is the future of transport. A start has been made!

IoT enabled data marketplaces and Geospatial technologies set to transform lives and communication

Off-grid and renewable energy critical for sustainability and higher accessibility

Geospatial capabilities being leveraged to build up efficiencies in the infrastructure sector

Technologies change urban spatial economics as costs of distance decline

ICT - remote sensing and geospatial analytics for better livelihood for poor farmers in Africa

Are we moving towards a driverless, fully autonomous transport system?

Would that be safe enough, reliable enough? These are some of the questions, we need to seek answers for. In this issue, we also look at how Internet of Things [IoT] coupled with geospatial technologies is shaping lives by increasing accessibility and enhancing communication channels. Also on the agenda is growing demand and acceptability for off-grid and renewable energy solutions and the use of geospatial technologies to build efficiencies in infrastructure sector takes centre stage; how technologies are changing spatial economics for urban planning. And finally, how convergence of geospatial and remote sensing technologies are offering better livelihood to poor farmers in Africa. We are happy to receive your reviews, Enjoy the read ahead!



Intelligent transport and logistics

Moving towards fully autonomous vehicles is the future of transport. A start has been made!

Questions abound on possibilities of fully autonomous and driverless vehicles hitting the roads in 2019. Will transport truly become intelligent? The answer is both, a yes and a no. The reason, because though a lot of companies have tested driverless taxi services, they have done so only in limited areas and as a pilot project, introduced to a small select segment of people. Not as a full-service operation. Nuro did it in Singapore, Uber in Pittsburgh and Waymo in Arizona. Pony.ai did an in-house test run for its employees in Gaungzhou.

When we talk of autonomous vehicles, it is important to understand and specify the level of Automation achieved. As per SAE International, automation in vehicles is categorized into 5 categories - "Level 0: No Automation" to "Level 5: Complete Automation". The experiments that have so far been done belong to "Level 2: Partial Automation" or "Level 3: Conditional Automation". So, a move towards a completely autonomous future is still a few years away.

Right now, safety needs require self-driving cars to compulsorily have a human safety driver who can come to rescue in case of exigencies. A lot of technical human supervision is also required to understand the behaviour of self-driving cars and plug the loopholes that exist. Due to this, the cost of self-driving cars is huge. For a move to fully autonomous, we need to reach zero human interventions. Until fully autonomous driving is fail-proof, accident-proof and affordable, we cannot call it mass market ready.

There is an intense competition in self-driving segment with major OEM's jumping into the fray. Prominent Automakers including Tesla, General Motors, and Mercedes-Benz; Tech giants including Google and Baidu; and popular ride-hailing service platforms including Uber and Didi Chuxing are all vying for a slice of the autonomous driving opportunity. Besides the above early entrants, companies such as Tencent, Visteon, Volvo, BMW, Audi, Geely and Alibaba are all working towards developing, creating and testing self-driving technologies.

Infact, recently, Nanyang Technological University, Singapore (NTU Singapore) and Volvo Buses together unveiled world's first full size, autonomous electric bus that will soon begin trials within NTU Smart Campus. If the trials go successfully, this electric bus would be introduced on public roads. The single-deck Volvo Electric bus which is 12 metres long with 36 seats, can carry up to 80 passengers. With numerous sensors and navigation controls led by a comprehensive artificial intelligence (AI) system, the Volvo 7900 Electric bus looks set to provide a safe and reliable drive.

The use of GIS and GNSS technologies in transport cannot be undermined. They are crucial in developing sound urban mobility solutions. Traffic mapping, route selection, charting out safe routes for autonomous vehicles are areas where GIS and GNSS will play a key role by helping companies develop sustainable mobility solutions for the future.

References:

<https://news.cgtn.com/news/3d3d514d3241544e33457a6333566d54/index.html>

https://www.geospatialworld.net/geospatial-world-magazine-flip/?utm_source=mar-apr-2019-mailer&utm_medium=email&utm_campaign=geospatialbydefault&utm_content=end-button

<http://www.automotivetestdrivers.com/a8bdjt3w3iq/>



Telecommunications

IOT enabled data marketplaces and Geospatial technologies set to transform lives and communication

Data Marketplaces enable the exchange of data sets and data streams across various services be it banking, transportation, communication and more. This helps companies provide localized and personalized services across various domains that directly impact the lives of people. By 2020, Digital Marketplaces, by their sheer presence and wide acceptance in the e-commerce segment are set to impact approximately 40 per cent of worldwide retail.

What makes IoT enabled data marketplaces crucial to sustainable development of communication technologies is their wide use-case spectrum. Selling IoT data encourages businesses to opt for digital transformation. With developments in ICT sector, IoT is now becoming affordable and the significance of IoT plumbing, data sharing and data monetization is trickling down, gradually yet surely. Companies have now begun to understand the importance of supplementing internally generated data with reliable external fresh IOT and GIS data. This can be of immense help in working towards bettering the lives of people and yet remaining competitive. It can help enhance customer experiences and lead to better decision making. Artificial Intelligence (AI) and Machine Learning (ML) are now being optimally used to create new business opportunities.

So, what are the 6 key elements that go on to create sustainable and successful data market places. [A guide developed by McKinsey](#) lists them for easy understanding - Consistent data quality, Metadata, Cross-domain data discoverability, Blockchain and distributed ledger technologies, Decentralized yet federated data, and Governance.

ICT's powered by Geospatial technologies are trying to bring connectivity to remote and isolated places that have hitherto remained unconnected due to high communication costs and lack of awareness. It is surprising that though almost 80% of worlds population can be covered at least under 3G services, in reality only 50% is connected as of now.

Geospatial information can be used effectively for creating better, sustainable cities. It can help with disaster management, air quality control, agriculture, coastal zone management and various other application areas.

References:

<https://news.itu.int/architecture-iot-data-marketplaces/>



Energy

Off-grid and renewable energy critical for sustainability and higher accessibility

Access to clean, reliable and renewable energy to off-grid populations has created a massive market opportunity globally. All major global energy players are keen to tap this domain. In 2018, the total annual investment in the off-grid energy access sector surpassed \$500 million, with 75% of all strategic activity in the off-grid energy access sector being commercial in nature.

It is easier to understand the importance of off-grid energy access if we just look at the energy availability and population scenario. About 1 billion people, which is about 13% of the current global population, still do not have access to electricity and reliable power. Though a large number from this would get access to electricity in the coming years but expectations are that population growth will outpace energy availability very soon. As per one estimate, from 2010 to 2017, over 400 million people globally got access to electricity from off-grid solar solutions. By 2030, around 71% of all new electricity connections are expected to come via off-grid or mini-grid solutions.

What is fuelling demand for off-grid and renewable energy is the high awareness and acceptability in the public. People are conscious of sustainability issues in society and are more than willing to support all initiatives in this direction. Investments made in these sectors can substantially reduce damage to public health, protect our natural resources, lower energy costs and create even more clean-energy jobs. These factors play an important role in encouraging people to adopt off-grid solutions and renewable energy.

References:

<https://www.forbes.com/sites/woodmackenzie/2019/03/04/how-off-grid-energy-access-is-shaping-the-energy-transition/#b43a34f454ca>

https://www.washingtonpost.com/opinions/why-ratepayers-get-the-bill-for-dominion-energys-coal-ash-cleanup/2019/03/15/8de885fe-4507-11e9-94ab-d2dda3c0df52_story.html?noredirect=on&utm_term=.7d61efff01e7

https://www.washingtonpost.com/opinions/2019/03/22/missed-opportunity-virginia/?utm_term=.5bf1c23f689f



Infrastructure & Engineering

Geospatial capabilities being leveraged to build up efficiencies in the infrastructure sector

Geospatial data, technology and services are being used to improve efficiencies across a number of industries worldwide, a case in study is presented here for Australia. Increased productivity & reduced costs that enable GDP growth are just some of the reasons, major world economies are warming up to the idea of using these technologies across sectors. Especially in construction or infrastructure sector, geospatial science brings not just efficiency but also accuracy & transparency right through the project planning and construction phases.

Australia has had a very well-developed segment and abilities in surveying, cartography, photogrammetry, geographic information science and remote sensing. They are now working towards enhancing modern geospatial capabilities that are set to play an important role in economic, social, and environmental well-being of the nation. These capabilities are being used majorly across public infrastructure and analytics, innovation and entrepreneurship, research and development, education, training and capacity building.

It is estimated that satellite positioning technology would likely add up 2.1% to Australia's gross domestic product by 2030. This shall be achieved through productivity gains in mining, construction, and agriculture alone. These technologies will also have a role to play in weather forecasting, onshore and offshore mining, mitigation and management of natural disasters and land use planning.

Australia is now heavily investing in Satellite Based Augmentation System (SBAS) technology that can bring massive improvements in positioning accuracy bringing it down to less than five centimeters from the current accuracy levels of five to ten meters. This shall positively impact productivity and safety in areas such as GPS services on smartphones, safety-of-life navigation on aircraft, increasing water efficiency on farms and helping to locate vessels in distress at sea.

Enhanced geospatial capabilities will help in creating smarter, better connected, and better serviced cities. Be it urban mobility, construction, agriculture or communication, every sector is going to reap the benefits of location based technologies.

References:

https://issuu.com/aiqs_be/docs/tbe18mar



Urban Development & Smart Cities

New Technologies will be disruptive for Spatial Economics over the next decade

For decades decisions on where people live, work and socialize are determined by the cost of distances. This will no longer be a phenomena if the cost of distance declined sharply – it will transform urban development, supply chains, business models in infrastructure, retails, healthcare, transportation, telecommunication and food production matrix in agriculture sector; and may even redefine competition.

In early years of the twentieth century, the economist and geographer Alfred Weber proposed a model of placing industrial activities in geographical locations where total transportation costs were minimalistic – taking into account proximity to labour markets and also to clusters of natural resources.

The new era of spatial economics, especially in several advanced economies in the US & Europe is fast gaining momentum taking into account costs but not the proximity. The cost of distance will continue to drastically decline and this will have an impact on mainstream development and on the economies of scale . Businesses will be oscillating between opportunities of expanding markets and risks on investments in setting up of new ‘millennium villages’ and sub-urbanisation.

New products and services are created with the convergence and amalgamation of several technologies such as 3D printing, Robotics, delivery drones and autonomous vehicles and communication satellites. These technologies are altering the economies of scale and traditional business assumptions by offering fast & cost efficient mobility for people, movement of goods and information. As the fundamentals of growth will udergo massive changes, cost of distance will be a disruptive force for infrastructure developments. Businesses will be required to reassess spatial correlations between density, distance and scale on bucketing billions of investments in setting up of locations for retail stores, manufacturing plants, utility infrastructures for water, energy and telecom...and much more.

In the 1950’s era of industrialization the assumption was that government intervention and regulatory frameworks were necessary to disrupt socio-economic institutions, for shifting balance from agrarian to industrialization, for opening new markets and eventually bring equilibrium in the socio-economic conditions of the masses. The suite of 3D printing, robotics, drones and ICT technologies today, will be at the forefront of defining post urbanisation era, stir up existing business models, transform lifestyles and create more value in spaces at a distance of modern conglomerations and open up new vistas for infrastructure development and sustainable urban expansion.

References:

<https://www.bain.com/insights/spatial-economics-the-declining-cost-of-distance/>

<https://www.mdpi.com/2071-1050/11/5/1339/htm>

<http://ppesydney.net/utopia-and-economic-development/>



Agriculture

Nasa launches mFarms project with Alliance for a Green Revolution in Africa (AGRA)

Agriculture is largely dependent on weather conditions. Globally climate change is causing extreme weather events – rising temperatures, heavy rains, cloud bursts, droughts, forest fires. In conjunction with these climate events, depleting water resources further weaken innate resilience of the ecological systems and soil conditions. The agriculture sector is also in rough waters due to volatile commodity markets and changing dietary preferences. Several regions in Africa are most vulnerable - as the demand for food is on the rise due to growing populations and current conditions / agriculture processes are not efficient and adapted to address shortfalls in food production, processing and distribution.

With crop modelling systems developed on decades of data on precipitation, potential rainfall patterns, soil and vegetation conditions - NASA has created tools that are useful in monitoring African agriculture. The project is named as NASA m-Farms, launched in partnership with the Alliance for a Green Revolution in Africa (AGRA). This m-Farm platform offers relevant datasets that can be accessed on both iPhone and Android platforms in text, image and time satellite derived farmer information.

This project leverages upon information technology and remote sensing expertise for creation of a platform-independent and distributed model for dissemination of relevant information and knowledge about crops, yield forecasts and market variables. NASA remote sensing data is made accessible to the traders and farmers and in an innovative way AGRA with several other organizations, civil society, researchers in the field of agriculture, farmers and various other stakeholders – will be working together to expand mobile phone users, scale up internet connectivity , and o significantly change the rules of farming with a mission to improve productivity, sustainability and lives of poor farmers in Africa. Several such project are required to use convergence of technological capabilities of telecom, remote sensing, geospatial analytics and, the most important a will to create such platforms that empower poor farmers to live a life of dignity and prosperity.

References:

<https://earthdata.nasa.gov/community/community-data-system-programs/access-projects/agra-farmer-management>