Chapter

Volunteered Geographic Information System and Its Contribution in Service Sector Employment

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Abstract

The potential of identifying the position of the observer in the geographical system in relation with neighbouring details and the instantaneous communication to the web server has created big data in geographic information, which has evolved in web Geographical Information System (GIS). Web GIS server provides the most reliable information in real-time. The technology is in its newbie has fascinated every age group to become the member of Web GIS. The use of technology and services are so user-friendly that even a layperson can handle without errors. The technology is finding its way in many service sectors like E-Commerce, vigilance, security and real-time tracking. The scope of expansion of this technology regarding the user community and knowledge utilisation awaits its versatility. The augmentation of techniques with its unique combinations has resulted in the building blocks of innovation and citizen-friendly apps. The growing user community is, in turn, encouraging the amateurs and professional to contribute to it. The web GIS facilitated service sector employment, which provides service at doorsteps, hence creating a scope of opportunities for young entrepreneurs.

Keywords: volunteered geographic information, location-based service, global positioning system, E-Commerce, vehicle tracking

1. Introduction

The volunteered geographic information which emerged, when the high-resolution satellite images were made available. High-resolution imageries attract the public to visualise the world from the sky (bird's eye view). People are enthusiastic to visualise the earth and gradually the identification process that contributes to the improvement in clarity. The raster-based maps got digitised to vector format by the creation of features by the stakeholders. There is a long history for the human to use maps, while making different types of decisions, from daily route planning to national military strategy. Maps or the geographical information on the maps have become the obligatory part of our daily life. This paper aims to use an example and initiative of using GIS in E-Commerce application of construction and architecture. GPS and GIS systems with similar functionality will more widely be

adopted or even would become a must in future E-Commerce applications. The task of creating such huge data and its updating is almost impossible for any single organisation. With the advent of web 2.0, many individual contributors simultaneously generated the digital data.

The employment of the service sector was providing some service at a particular location at a specific time. The service type may be on a regular basis or a temporary basis. The regular service is a traditional service in the regular course of time like the supply of milk and newspaper, school bus and postal services and the like. The occasional services like the personal transport, delivery of goods, painting and catering, housekeeping and maintenance and building construction require an exact location for prompt delivery.

Moreover, some of these services required at doorsteps, which were very difficult for strangers to deliver/provide service in a particular geographical location because of the lack of the locational knowledge about the area. The ability to provide the locational information through web-based GIS servers on the go, in the smartphones as shown in **Figure 1** improved the services from providing agency to the consumers.

The added advantage of the voice-based response assisted the drivers during navigation. The safe driving improved, and the advanced information regarding route and driving instructions of the navigation with the real-time traffic and weather information and the distance to be covered with the travel time ensure the punctual destination reach. Advancement in the domain network and computing has contributed to the evolution of the Spatial Data Infrastructure (SDI) enterprise. Targeted at providing access to the information that they require and an environment in which geospatial users and producers contribute, SDIs are still in the progressive stage, but the architecture is a necessary and useful mechanism for LBS. Wireless data communication combines the mobile and spatial data communication by giving consumers easy access through wireless devices (mobile telephones, personal digital assistants, palmtop computers) to relevant information on the Internet and intranets. The consequential technology is the positioning technology, the way to find out the position of a mobile device accurately. Referable to the unique

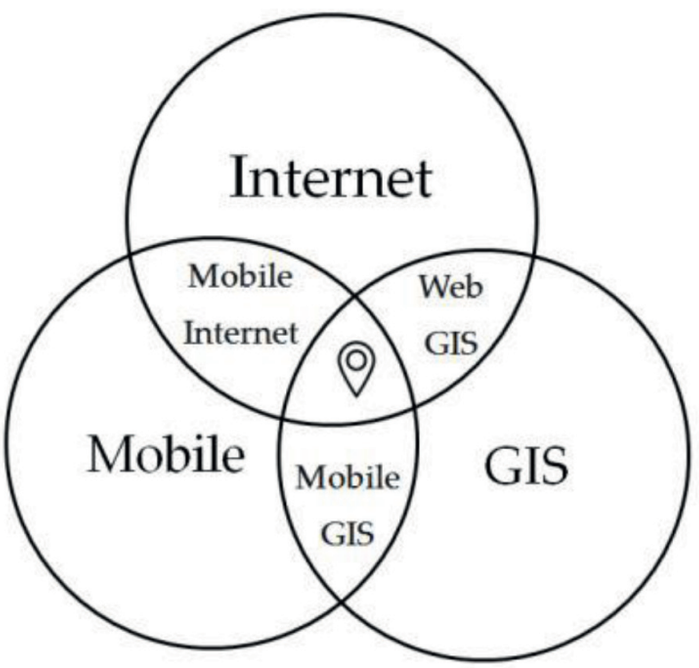

Figure 1.
Structure of smartphone-based geographical locational service [1].

features of the cellular environment, it is a significant challenge to locate the target precisely. E.g., global positioning system (GPS), assisted GPS, network-based technology, the travel time of signals.

2. Crowdsourcing

Crowdsourcing is the concept of integrating the work of the significant participants (crowd). Here the smallest contributions are accumulated to do large tasks which are having hardships physically and economically. It is the more public contribution of work than of the specific professional task, most commonly operated and owned by non-profit making organisations having public involvement. Before the digital era, the term crowdsourcing referred for creating the funding procedure and creating commons of public interest like building communal spaces like the water bodies, parks and vacation spots. In the digital era, the concept of crowdsourcing refers to the creation of data, computation and analysis. It also channels the experts who wish to solve an issue and share the solution to the general public [2].

3. Volunteered geographic information

Virtual globes have unlocked the world of satellite imagery to the general public. They allowed education, entertainment, and exploration for the newbie's [3]. Importantly, a domain to communicate their investigations and information that the public is interested in [4, 5]. The development of Digital Earth (DE) is focused on the whole of humankind to progress considering humanity as a whole. The determination is towards the positive contribution for public peace, safety, order, and general prosperity consistent with the Brundtland Commission on sustainable development [6]. DE is as much social science as it is a phenomenon of quantitative science and engineering. It should equally respect as the social science with an ontology and epistemology, i.e. the study of the nature of the 'reality' of DE (ontology), and the study of the process of the acquisition of knowledge [7].

Geo-informatics is an essential tool in the developing cultural universe of human society. The collection of Geospatial Information with its attributes and its regular updates is a gigantic task in the dynamically changing complex world. The increased precision of positional accuracy and availability of latest high-resolution satellite imageries is the source of Geo-information in Participatory Geographical Information System (PGIS), further enhancing this is the time-to-time updated information in the reliable real-time world. The citizens act as sensors to capture spatial data; these data are edited and managed by a collaborative environment [8, 9].

Volunteered Geographic Information (VGI) is all about the location information of mundane things appearing on the earth surface which is recorded by volunteered people through Crowdsourcing methods. The traditional techniques of geographic information were intern gathered from surveying techniques by professionals. Whereas, the conventional methods were accurate but failed to keep the map information up-to-date. The task of disintegrating the work and distributing work to many people mainly called outsourcing, in the corporate sector this system introduced for the economic purpose. In many cases, firms took risks experimenting with outsourcing while lacking a firm understanding of the relationship between internal functions and its spatial implications. Outsourcing has set companies with unexpected drawbacks. The miscommunication and lower quality of products, absence of completeness and focus, which ended in delaying of the

production process. Technological advances have surpassed some of the needs business process outsourcing. The volunteered contributions cannot be pejorative, as they arrived from local expertise having a thorough knowledge of the place. The VGI is open data available for all, and volunteers contributed it. The task of identifying geographical location needed rigorous training in the field of mapping and surveying. The high-resolution satellite imageries made this task more straightforward and comfortable even for amateurs. Some of the natural colours like the blue waterbodies and green trees in the colour satellite imageries made the identification task even more straightforward. The correlation techniques with already available information in the neighbourhood facilitated them to locate the positions and explore more new things. As the process tasks within firms remain unclear, there is a degree of uncertainty about which jobs need to stay geographically clustered together.

The reduction in the monetary value of GPS receivers, with an increase in positional accuracy and the amalgamation of GPS with smartphones, made this technology affordable for the common man. The availability of high-resolution satellite imageries including spatial and attribute data like the Google Earth, Open Street Map (OSM), Bhuvan, Bing maps, in the active web-publication makes it easy to identify and connect the geospatial happenings. The identification of known familiar features in adjacency will resort for confirmation of nearby details. Demand and manufacturing in large-scale reduced hardware prices. Free and open source software's encourages investing intelligence in the geospatial world and befits reaped by all for constructive purposes.

Techniques of pathfinder for converting the crowd into the resource that can provide information through predominantly designed apps ultimately depends on the popularity, awareness, necessity and usage and literacy rate in the region. Whereas, the data collection in the peacetime corresponding to all the major theme may not be exhaustive. The evolution of virtual earth technology has provided access to low-cost and easy-to-use methods and to communicate geospatial information more effectively among the general public, as well as among scientists [3, 10]. Crowdsourced data via smartphones will generate data in real time. This information has enormous perspective in emergency service and disaster management [11]. The inception of open access science, open source software development, open data, social media, transparency and open government movements, have made public sector data accessible freely.

The achievement of long-term VGI sustainability is possible, only if citizens can contribute content to projects where 'these contributions are facilitated unobtrusively, casually, or, even calmly. That the current one-size-fits-all software interfaces for crowdsourcing spatial data may alienate new, inexperienced contributors and expert veteran contributors in equal measure [9]. Geo servers provided access to satellite images to the general public and allowed entertainment, education and exploration of new findings [3, 4]. Mobile phones with integrated with advanced navigation features' for geospatial information service's with mobile Web browsers promotes active as well as passive crowdsourcing. There is now a general acceptance from the public administrators that data are state assets to be shared freely with citizens, civil society organisations and the private sector for the developmental projects [12].

4. Comparison between open and closed VGI

The comparison between the Google Maps (closed) and OSM (open) cannot conclude which one is better, both have many similarities and differences, but their

design based on different fundamentals, but both provide the geographical information. The critical difference between OSM and Google Maps are on their philosophy of "Open" vs. "Closed" approach, concerning data collection and distribution. In OSM that the user and the community own every edit user make, while every change user makes to Google Maps is owned by Google. The OSM has over 2.2 million registered users who are updating the detailed map of the entire world which makes the project successful. Every update is instantaneously visible to all other users and is version controlled. There are no corporate map release cycle and approvals that are typical to large organisations. Altruism, professional interests, intellectual stimulation, protection or enhancement of personal investment, social reward, enhanced own reputation, provides an opportunity for creative and independent self-presentation; and finally pride of place [12]. However, some negative motivations can also be seen, which could preclude the automation of contributions into a system, and these are mischief, an agenda that can bias contributions, and malice and criminal intent [12]. Long-term VGI sustainability is possible if citizens can contribute to the contents of the projects were these contributions facilitated unobtrusively, casually, or, even calmly [12, 13]. The argument that OpenStreetMap vulnerable to mapping vandalism, subsided by a rapid response of correcting errors, even closed source maps are also equally vulnerable.

5. The response of volunteered geographers during an emergency

The actively registered members of OSM mapping community are responding quickly to the situations of emergency by educating users and converting them into resources. The power of the OSM community is visible especially during the humanitarian crisis of natural disasters. When the Haiti island suffered 7.0 Mw magnitude earthquake on 12 January 2010, the OSM community within a couple of hours created the map of the whole island from satellite imagery, which helped relief workers to properly coordinate rescue missions and save many lives, while commercial maps were not able to respond in such a short duration. The more recent Nepal Earthquake on 25 April 2015 with a magnitude of 7.8 Mw witnessed over 2000 volunteers map contributions responding to the emergency within 48 hours. These maps helped rescue operators in rendering the helping hand to victims, clearing the debris and providing necessary food and shelter for the affected persons.

6. Challenges of VGI

The difficulties with crowdsourcing are the generation of interference and the redundancy of data. The crowdsourced spatial information is very economical, and at the same time, the question of completeness is also significant. The VGI created data mainly focus on places of importance, and sometimes it may be void trivial remote areas. The personalised data uploaded by volunteers are mostly of advertisement in nature instead of information. However, there is a little difference between the advertising and information contents, as distinguishing them in service matters cannot be bifurcated easily. The time-stamped (metadata) attribute data is equally essential in respect of spatial data for temporal analysis. Primary virtual globe software performs similar functionalities such as spatial querying providing satellite/aerial images, topographic maps, GPS, spatial quarry, integration, distance, area measurement, movie makers, 3D graphics and topography and Wikipedia integration [3]. Currently, the usable information will be up to street level and the

data at the floor level if available through crowdsourcing makes the complete GIS of citizen charter. The spatial information can facilitate E-Governess and decision support system.

7. Why is VGI required?

Any single organisation cannot generate the significant spatial data. The developed nations are also striving hard to update the national maps saving forbidding them to be obsolete. The Volunteered Geographic Information (VGI) is becoming popular in this regard as the origin of spatial data. This technology still being in its amateur stage, refinement of the protocols of the data model structure and the standardisation is under continuous evaluation. The purpose of spatial information also invites the citizens for volunteered contribution. Introduction and encouragement for spatial data utilisation in school curriculum become a significant achievement in systematic learning. There has already been a drive for environmental awareness and its protection. They can further be augmented by smartphone-based apps to explore and protect the natural resources leading to sustainable development.

The urge for reliable information is growing day by day. No single organisation could provide the domain information at pace with the dynamics of spatial data; hence the VGI system becomes an indispensable component. The well-distributed crowd as access to all the geographical locations and chances of omission becomes remote. The web servers that provide the information instantly by crowdsourcing methods the chance of visiting all the places is high; thereby updating the maps available on the web to be the latest is the best possible solution. There is an ever-increasing demand for reliable geospatial information among the public. The expenditure of surveying and spatial data collection is becoming very expensive. The availability of map/digital data in national mapping agency is obsolete; to keep the map updated in real time the option of crowd editing seems to be the only solutions. The governmental mapping agency used to embrace the strict methods of extensive surveying and mapping with the modern engineering science of mathematical function. The update and refresh rates of data for urban areas are often rapid in OSM. However, in many developing countries The citizen-based mapping using the satellite imageries are usually far superior to the mapping products generated by the national mapping agency in those countries [9].

8. Data structure

The advantages of the on fly transformations have become accessible to mash-up spatial data from different sources and integrate them. The scale-free digital data in ground terms have the advantage of displaying on various scales.

The open street maps, wiki maps have provided a platform for volunteers to enter/edit/delete any geospatial element thus providing a broad range of tools for editing. Web 2.0 has changed the internet from a passive to an active experience where users can participate [11]. With the advent of web 2.0, the user can actively participate in the live mode and upload and download data comment share and even compose maps online.

Moreover, the beauty of the system is that multiple persons can update the map simultaneously by sitting at various locations. Some of its outstanding contributions are Crowdsourcing, collective intelligence, web service, data sovereignty and design for flexibility. The mashup can combine a map source with reliable information,

and people can create a latest interactive map on the Geoweb using an Application Programming Interface (API) with little or no programming knowledge [11].

Intelligence drives the semantic web, and it delivers the information which the person needs and precisely for the observers requested location. The report of the flood, weather, and traffic information is shared instantly for the location of the user. The user likes and needs like restaurants; tourist place enroot of the journey is displayed with voice responses.

Geographical features grouped into point, line, area and volume features. Geographical names of location displayed as text features. Some of the descriptive remarks also shown as text. Some attributes highlighted as tooltips upon pointer location. The point and area features are interchangeable depending upon the scale displayed. The line features generally depict the continues features like the roads and railway and rivers. The linear features are communicative they are also used for network analysis (for finding the shortest path or shortest duration). The surface features depicted as contours and hillside. The boundary lines and contour lines are imaginary lines which will not be visible on the ground and extracted by different means. Boundary lines are surveyed by locating the existing pillars and interpolating the remaining portions from the sketch. The contours are stereo photogrammetrically plotted using overlapped aerial photos or by scanning through the RAdio Detection and Ranging (RADAR) or Light Detection and Ranging (LiDAR) sensors. The point features are a symbolic representation of features for visual communication. The area features have a commendable geographical extent. The forests, cultivable area, artificial lakes and town limits shown as area features. For visualisation purposes, the line features are classified based on styles, thickness and colour. For area features like water bodies and forest, natural colours blue and green used. The point symbols are cartographic symbols used similar to the profile and planned symbols, the plan symbols like the well and huts appear as displayed from the zenith, the profile symbols are as it appears from the observer's position like the temple and trees. More or less of the conventional symbols are utilised by the institutes like the hospital and police station are used in the maps.

The data model structure of the spatial database for national mapping depended on the publication scale of the map. The scale-free digital data, there will be ambiguity while determining features. However, the standardisation of symbols with data model structure can resolve many issues.

While displaying, it should be carefully generalised, emphasising the important while removing the unimportant, group the information both thematically and perceptually with attention to visual hierarchy. The good cartographic design principles to adhere to modern interaction design paradigms [14, 15]. Furthermore, researchers in the cartography and geo visualisation domain have taken a keen interest in cognitive, and usability issues and much progress has been made to understand how human capacity can enhance or limit our experiences with visual displays [16–20].

9. Data quality, redundancy and challenges

The topological relations are crucial for the spatial data avoiding Dangles, Overshoots, and Slivers creates an error-free spatial data. Proper snapping and registration between neighbouring features assure topologically clean data. The relations like neighbourhood adjacency should be the thought in high schools like the logical gates and regular mathematics by adding to the curriculum. However, video lectures training helps amateurs in generating a topologically clean data. Such acts of necessary learning create interests and increase volunteered contribution. The use

of structured query language helps to extract the information. Some of the tools like auto snapping and continuation tools correct the errors automatically. Citizens, experts, and non-experts alike are increasingly participating in the process of creating seamless spatial information and collaborating with others management skills in problem-solving tasks [9]. We have active citizens effectively engaged in the sharing of information, amateurs preferably depict the places of public importance, where the transformation occurs. The location app on the smartphone enables them to acquire the spatial details. The VGI created by amateurs may have minor identification and positional errors, but in large they give the latest information. Upon use of GPS positional errors are negligible regarding the location-based applications. However, they can opt in a drop-down menu to choose the skill set of the user.

The most faced challenges are the redundancy of Information. The prominent, easily accessible features crowded with the multiple entries shall optimistically view as the confirmation of information and also instigate the community waking of the public towards urban ecology. Like the Wikipedia, the, if the hierarchal system of data checking and accepting entries and edits adheres, along with data validation eliminates the noise. The geospatial information, thus generated can serve the humanity. The quarry based data collection and verification from registered active volunteers near the incidence aims at the protection and building awareness by the participatory public and ascertaining through physical verification in case of violations. Web published maps are reliable; real-time updated latest information is a modern gadget in everybody hand for geospatial information.

The reluctance showed on the part of contemporary governments to accept, use and disseminate crowd-sourced data for some valid reasons, such as data accuracy, reliability, and authenticity; technological and human resource limitations; and because they do not source from 'authoritative' organisation [12, 21]. Many countries launched their national virtual globes in the web portal for national spatial data; some example is French-Geoportal (http://www.geoportail.fr/) and India-Bhuvan (http://bhuvan.nrsc.gov.in/). With the progress in science technology and data infrastructures, policies of the open government, the public sector is no longer contemplate to be the sole arbiter and producer of state knowledge, and it no longer maintains an institutional monopoly [12, 22].

10. Relative spatial data sharing from other agencies

Adopting data exchange and interoperability specifications allow the fusion of heterogeneous systems and different data in one platform. The rapidly developing study of 3D mapping and modelling of the Earth holds commitment for implementation at the planetary scale [3]. Easy-to-use and intuitive virtual globe technologies have distinct advantages over conventional GIS [3]. Designing a user-friendly application for mash-up and API for determining the violations of natural resources. Descriptive information about the migratory water folks, the growth of aquatic weeds and quality and table of underground water should be web published every year to ensure the very existence of lakes in its state of health. The dissemination of knowledge and data for the end user will create a geospatial database by volunteers that serve the entire world.

The topographical information like the hydrology, land cover and hypsography are difficult for amateurs in representing as they require skill, training and experience in depicting the data. The imaginary lines like the political/administrative/revenue boundaries are useful if appended to the crowd-sourced digital data. The kilometre stones and kilometre numbers/bridges which associates itself with corresponding details of road and railway, and canals, lamp post numbers, pillar

numbers they become the identification marks in identifying the relative location of the concerned space. Well, identifiable places should be made mandatory by the concerned road and railway department to share in the public domain. It is essential to integrate real-time in situ field data, remotely sensed data and geo-information system data for processing and analysis tools into a systematic framework aiming at handling complex geospatial data at the global scale [3]. The integration of remotely sensed environmental (thermal, normalized difference vegetation index (NDVI)) data into a GIS platform can aid in a better understanding of the spatial–temporal dynamics of a wide range of Earth/ecological/disease systems, especially those with spatial/environmental correlates [3, 23].

11. Visual reporting

The geo-tagged spatial information like the pictures, videos through modern smartphones and camera becomes first information report to have the ground truth. Photos and videos are all cameras with drones are an added advantage to access the damage happened, and also they give a hint to the rescue team in assists. Digital signatures and geotagged photos confirm the prompt delivery of goods. The natural resources that are of aesthetic, cultural and economic value can also be published for its best use while giving impetus to local tourism and revenue generation.

12. Location-based service

The broad sector of services that can be thought off rely on users' location information, although the E-markets are finding their way. The main point is to remember that location is the useful bit of data that can be used to extract access to many types of geographical information and services. There are numerous ways to capitalise on location to provide more relevant, useful information, or derive new services. It can be particularly compelling when combined with other user profile to offer personalised, and location sensitive responses to customers [24, 25] differentiates emergency services, mobile operator services, and value-added services (VAS), focusing on the latter category as an opportunity in the expansion of E-Commerce.

Location-based application areas identified: communication, fleet management, routing, safety, security, and entertainment. Their services classified according to whether they apply to consumers, business customers, or employees in a firm as described in **Table 1** which are customary. Most likely, LBS can provide combinations of available revenue models. The customers may be offered the choice between the advertiser and non-advertiser-supported services, with the former provided free of cost and the latter charged for service.

Existing proposals from operators and standardisation bodies specify a priority scheme whereby the core network elements (e.g.. Home Location Registers) have master control on location information. The disclosure of such information to other agencies (e.g., location servers, LBS serving nodes, Application Service Provider (ASP) is subject to subscriber needs (e.g., registration information) and regulatory frameworks.

The heterogeneity in user service needs is likely to be a feature of location-based events. It is crucial to develop suitably flexible middleware to support application developers in a 'pick-and-mix' approach to combining devices, networks and sensors. Upon entering the business, a local Wireless Fidelity (WiFi) network may

Mapping, discovery and infotainment	Searching places and location information	Finding places, friends, maps, add location to posts.
Tracking	Tracking of the cab movement for safety (Single lady passenger). 	Vehicle & Fleet, Supply chain & Inventory
Advertising	 Amusement parks, Malls, cinema hall, restaurants 	Mobile coupons, ads, deal finders
Location Based Games	 	Real life games like Google Ingress, Pokemon, apps
Analytics	Deploying solutions for asset tracking and management.	Business Intelligence, sales and distribution.
Emergency support	 	Emergency, Disaster recovery services.

Table 1.
Location-based service applications.

provide additional information, and guide the consumer to their desired product. Some method for handover of such applications is needed, without requiring the consumer to re-input product preferences. The GIS area of potential future directions, it is evident that location is merely a starting point for personalisation and context-aware services that use other relevant information when constructing service offers. Moreover, the rapid deployment of alternative wireless technologies, such as WiFi (802.11) is an opportunity and threat for cellular operators, and will likely shape the future development of LBS. Some of the business giants are offering free WiFi service with the advertisement, and even telecom operators are also in this line.

13. Types of location-based services

Pull: In the case of a pull service the user issues a request and access the LBS he/she wants. The requirements or interest of the user is displayed. For, e.g., a tourist roams in a strange city and wants to obtain information about the closest restaurants to his current position.

Push: in the case of a push service, the service provider issues request to the user. For, e.g., location-based advertising, which informs users about the merchandise of their interest located at nearby shops.

Tracking: In a tracking service, the primary thought is that someone (user or service) puts out a request to place the other mobile station (users, vehicles, fleet). Courier tracking, tourist vehicle tracking, With the entire fleet on the central map, the solution led to the best use of the fleet through route optimisation, resource utilisation reports, intelligent trip analytics, online and SMS-based data management. The solution provided has made it efficient and productive also making the vehicles safe for transportation. School Bus Tracking is designed to manage the fleet of buses effortlessly by transforming them into Smart Buses. It guarantees the safety of a minor. Parents stay aware of the whereabouts of children at all times. Parents also kept updated using this service.

14. Opportunities with LBS and VGI technology

Availability of cheaper GPS enabled devices, the combination of GIS and GPS and internet has revolutionised the thinking and the service sector. The GPS provides the location data, and the GIS provides the connection regarding service availability. The Cab service which used the M-Commerce technology was able to provide the economical service as the nearest cab gets a ping for the request and upon the acceptance, the service rendered within a short duration. Likewise, even the user can ascertain the availability of cabby observing the position of the taxi. The beauty of the service was even commuters are pooled en route, thereby providing economic service, saving time and conserving environmental resources. The larger cities are having the issue of parking people prefer to use the service at doorsteps; the eateries are now come up with a solution to supply to their doors the Swiggy, Ubereats and Zomato are helping in this regard. The E-Commerce is also utilising the tracking service for the movement of commodities. The consumers and supplier chains are discovering the solutions by establishing in ideal locations. These service sector work opportunities are engaging a prominent figure of the younger contemporaries in their startups. The travel time is helpful in city environments for estimation and trip plan this provision will help even the workers save time and energy with optimal planning and performance. As pervasive and ubiquitous computing concept becomes more and more popular, accurate positioning plays a vital role in the scenario, embedded GPS in smartphones with assisted-GPS-marked a significant improvement in obtaining quick, precise positioning. While location-based applications usually need precise geographic coordinates. Upon the precise position on the map then LBS is requested. The medicine and diagnostic labs are provided services at doorsteps by the pharmaceutical shops and diagnostic laboratories. Some of the non-critical patients can avail the limited service from the doctors and nurses at their residence without visiting the hospital. These services have saved energy, money, time of patient and caretakers.

15. LBS in real estate

The initiative like the E-Governance, E-Commerce to publish the spatial information of property details of Government/public lands along with land use restrictions for private properties. Thus, by saving time and money spent on legal proceedings. Thus mitigates the property encroachments. The crowdsourcing and the civil policing can fetch the latest information on incidences of encroachments, thus reducing the patrolling cost for the authorities.

Fast actions in cases of reports can be persuaded, thus reducing requisition and demolition costs drastically. Crowdsourcing and publication of spatial information on government properties and land use restrictions can prevent the further land encroachments. The data collected from healthy group volunteers will always be in quantitatively and qualitatively massive comparison with the one organisation and will lead towards big data in the future course. With the GIS the facility there is increased, refinement in the search. The geographical search for buildings can base on the criteria of school transport facility, sports complex, health aspects will narrow down to the required information. With the help of VGI service providers have come up for LBS of regular property visits with detailed reports including photo and video coverage(upon the long absence), collecting mail, water and electric bills and their payments with payment confirmation reports, collecting rents, assisting in insurance plans and claims, legal service regarding the documentation and encumbrances.

16. Conclusion

The roadside assistance from the vehicle companies with web-GIS support becomes a reality. The E-Commerce has captured the market because of the quick supply, competitive rates, easy returns and quicker installation and service. The E-market software has established a link between the suppliers and consumers; the manufacturer also started supplying goods to consumers as the delivery part is taken care of by courier companies. Manufacturers should ensure a continuous supply of materials for supplying the consumer demands. The geographical relation where these transaction is happening is related, this location-based information helps in indicating the overall consumer needs. The geographical information is necessary while estimating the travel time, apart from this E-Commerce; the health sector got an advantage from the VGI. The movement of the emergency vehicle with an allotment to duty to the nearest the vehicle for service has saved many lives. The dedicated sensors can provide the latest information and can be assisted with General Packet Radio Service (GPRS) technology to send the information at regular intervals. The temperature, pressure, wind speed, humidity, rainfall and traffic updates monitored at base stations send the information for recording and processing. Forecasted weather information sent to the entire available user (subscribers) based on the user's location. The artificial intelligence which uses the latest sensor information in the background guides us about the all possible opportunities (upon low fuel indicator in the car it informs about nearest fuel filling station).

The bio-information and geo-information combined to become the gateway to new possibilities to explore. The gadgets becoming more and more personal possessed with all the personal documentation, the necessity of bio- authentication and geographical tracking becomes a necessity. The bio-authentication at specific geographical location reduces crime rates. The accurate GIS data used for delivery of goods by drone is in the experimental stage.

Automated driving with the GPS, GIS and sensors are also gradually under progress with navigation and guidance, driving and safety, with performance. However, more and more information adding to big data the possibility of automation in all fields is replacing the human intervention, thereby reducing human exploitation. With time scale many opportunities are explored simultaneously. The commercial space which is very expensive for business establishment, entrepreneurs using VGI and LBS technologies in their business models established warehouse in remote less expensive areas.

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