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Bhubaneswar Smart City by Using GIS

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Abstract: ***Smart City Bhubaneswar: A Citizen-Centered Approach for Smart Growth. Bhubaneswar is the capital of the state of Odisha in India. Known as "The Temple City", it is an emerging hub for education, health and information technology, as well as a popular tourist destination.***
The projects detects the origins of Bhubaneswar Smart Cities Mission is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes. Hereby in the project, The transition towards greater smartness is an emerging trend in the development of modern cities. Urban Sprawl, also called Sprawl or Suburban Sprawl, the rapid expansion of the geographic extent of cities and towns, often characterized by low-density residential housing, single-use zoning, and increased reliance on the private automobile for transportation.
Urban sprawl is caused in part by the need to accommodate a rising urban population; however, in many metropolitan areas it results from a desire for increased living space and other residential amenities. Urban sprawl has been correlated with increased energy use, pollution, and traffic congestion and a decline in community distinctiveness and cohesiveness. The proposed system is applied to several major cities across the globe to demonstrate its use and usefulness.
Keywords: Smart city; Criteria; Systematic literature survey.

I. INTRODUCTION

A. Smart Cities Mission

National Smart Cities Mission is an urban renewal and retrofitting program by the Government of India with the mission to develop smart cities across the country, making them citizen friendly and sustainable. The Union Ministry of Urban Development is responsible for implementing the mission in collaboration with the state governments of the respective cities. The mission initially included 100 cities, with the deadline for completion of the projects set between 2019 and 2023. The effective combined completion of all projects as of 2019 is at 11%. As of March 2022, 3577 projects out of total 6939 tendered projects have been completed, utilizing ₹60,073 crore out of total tendered amount of ₹191,294 crore.

B. Description

Smart Cities Mission envisions developing an area within the cities in the country as model areas based on an area development plan, which is expected to have a rub-off effect on other parts of the city, and nearby cities and towns. Cities will be selected based on the Smart Cities challenge, where cities will compete in a countrywide competition to obtain the benefits from this mission. As of January 2018, 99 cities have been selected to be upgraded as part of the Smart Cities Mission after they defeated other cities in the challenge.It is a five-year program in which, except for West Bengal, all of the Indian states and Union territories are participating by nominating at least one city for the Smart Cities challenge. Financial aid will be given by the central and state governments between 2017–2022 to the cities, and the mission will start showing results from 2022 onwards.Each city will create a Special Purpose Vehicle (SPV), headed by a full-time CEO, to implement the Smart Cities Mission. Centre and state government will provide ₹1,000 crore (US$130 million) funding to the company, as equal contribution of ₹500 crore (US$63 million) each. The company has to raise additional funds from the financial markets.

C. Bhubaneswar Smart City

Government of Odisha vide Notification No. 4741 dated 23/02/2016 constituted a Special Purpose Vehicle (SPV) company named "Bhubaneswar Smart City Limited" for implementation of Smart City Proposal of Bhubaneswar selected under Smart City Mission programme.Bhubaneswar Smart City Limited (BSCL) is the nodal agency to plan, implement, manage and operate the Smart City Development Projects in the city. In accordance with the mission guidelines, the implementation will be undertaken in the area falling under jurisdiction of Bhubaneswar Municipal Corporation.

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1) To promote Bhubaneswar as a livable city that gives a better quality of life to its citizens with a clean and sustainable environment.
2) To enter into contracts, partnerships and service delivery arrangements with Indian as well as foreign firms, as may be required for the implementation of the Smart Cities Mission.
3) To undertake comprehensive development by promoting mixed land use, provision of housing for all, the creation of walkable localities, preserving and developing open spaces, promoting a variety of transport options including transit-oriented development, public transport & last mile para-transport connectivity, making governance, citizen friendly and cost effective, giving identity to the city and applying smart solutions to infrastructure and services in order to make them better.
4) To undertake comprehensive development by promoting mixed land use, provision of housing for all, the creation of walkable localities, preserving and developing open spaces, promoting a variety of transport options including transit-oriented development, public transport & last mile para-transport connectivity, making governance, citizen friendly and cost effective, giving identity to the city and applying smart solutions to infrastructure and services in order to make them better.

II. GIS USED FOR SMART CITY PLANNING

The applications of GIS in smart city planning are countless. The city always has a dense population & more infrastructure but the IGiS tools help the planners to understand the needs of such a city. Also, the planners can adapt to examining smaller towns and slum or informal settlements. IGiS has the capability of performing a variety of queries hence experts can analyze how new planning activities will fit in with the current/ infrastructure and meet regulatory demands.

IGiS offers powerful mapping and advanced visualization tools which are enabling planners to create 3D view of city. The environmental and socioeconomic data can be used to create maps & can perform tasks like:

1) Land Acquisition & New Area Development Planning
2) Slum Rehabilitation Development Planning
3) Development Planning (Residential, Commercial, Industrial, Park, Garden, Health, Education, Vehicle Parking)
4) Utility Development Planning (Water, Sewerage, Solid waste, Road, Footpath, Streetlight)

A. Road and Traffic Network Analysis using GIS

The smart technology adoption for transportation systems is now available everywhere with automated signaling, live status of vehicle, live location tracking platform, and many others. Alternative or cost-effective routes can be analysed in case of traffics, emergencies or certain festivals and etc.

B. Water Supply Network using GIS

GIS technology is used to view information related to water supply:
Mains, Distribution Line, Wells, Over Head Tanks, Water Supply Pipeline, Waste Water Supply.
Public Taps, Storage, Street Taps, Ground Level Dump Reservoir, Direction of Flow, Meters, Consumer.
In addition to this, the water source of the city can be easily identified from different water bodies such as lakes, open wells, bore wells, etc. The shortest route from the particular pumping station to the different distribution networks of water pipelines can be assessed. Using GIS one can plan and track the maintenance schedule of water supply pipes.

C. Sewerages Network Analysis using GIS

Similar to water supply network analysis, GIS technology is used to plan and track the maintenance schedule of sewerage lines. It is also used to identify the information spatially by query analysis based on many factors (diameter of the pipeline, material of construction, flow capacity, depth of the pipeline). Also, details such as status of pumping mains, current capacity of sewers, dumping sites, transfer stations and waste handling facilities can be digitally ascertained.
The Sewer Network Analysis module graphically displays information on:
Septic Tanks, House Hold Connection, Pits, Manholes, Open Drainage
Derivation line of underground pipes using manhole and well locations
Connectivity of House Hold Network, Flow Direction to be taken up to STP
Disposal Sites

D. Solid Waste Analysis using GIS

Using GIS technology, we can optimize the route for the waste collection process. It enhances the collection efficiency & officials can track the waste collection process and transportation vehicles. Additionally, we can use the GIS technology for future resource requirements like vehicles & human resources for planning and monitoring of solid waste. In the IGiS Solid Waste Analysis module, officers can plan Dustbin Locations, Garbage Collection, etc.

E. Estate Management using GIS

GIS has the ability to digitally view municipal plot details along with plot dimensions, leading to quick access to information for all. It helps in the proper management of land by highlighting the significant features of a property. In addition, it gives information about slums and the location of ULB (Urban Local Bodies) owned vacant lands & and encroachment, ward boundaries, and so on.

III. ANALYSIS

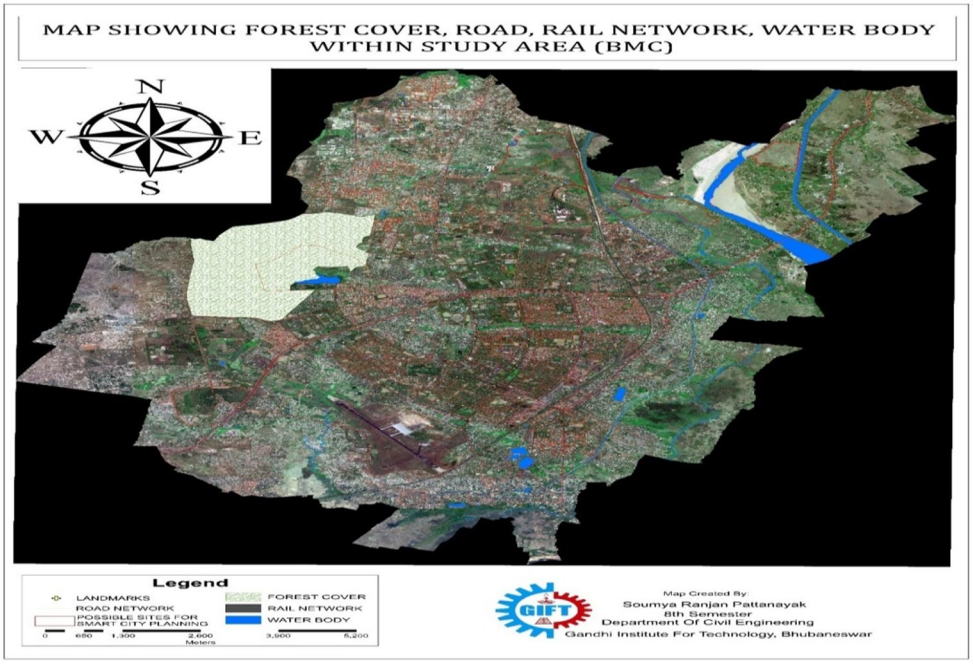

Figure1 Map showing, forest cover, road network, Water body with in study area

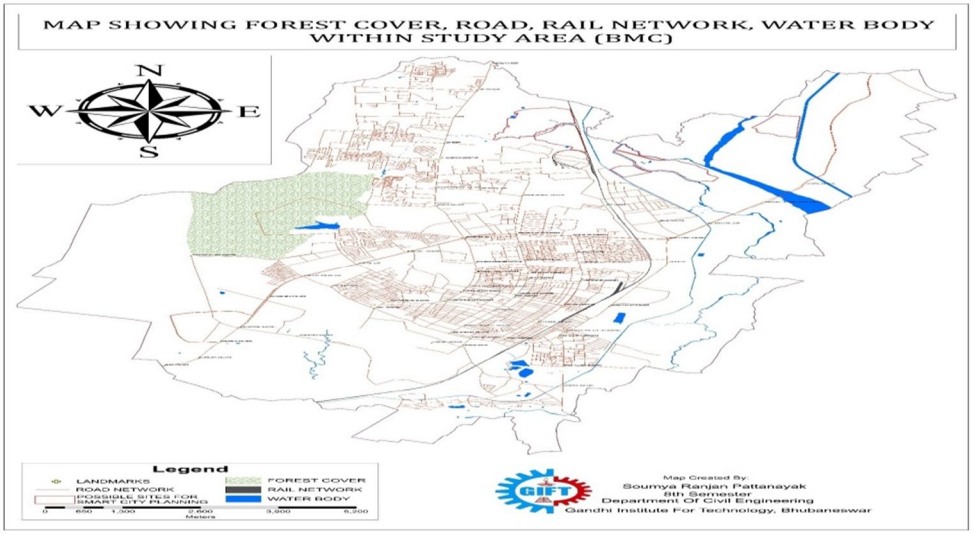

Figure 2 Vector Map showing , forest cover , road network, Water body with in study area

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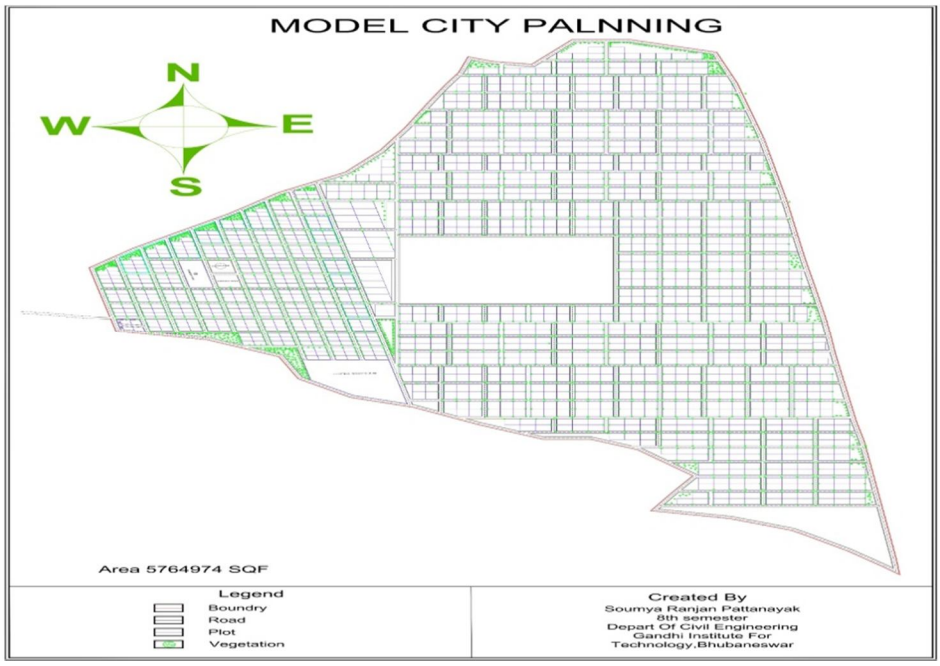

Figure 3 Model city planning

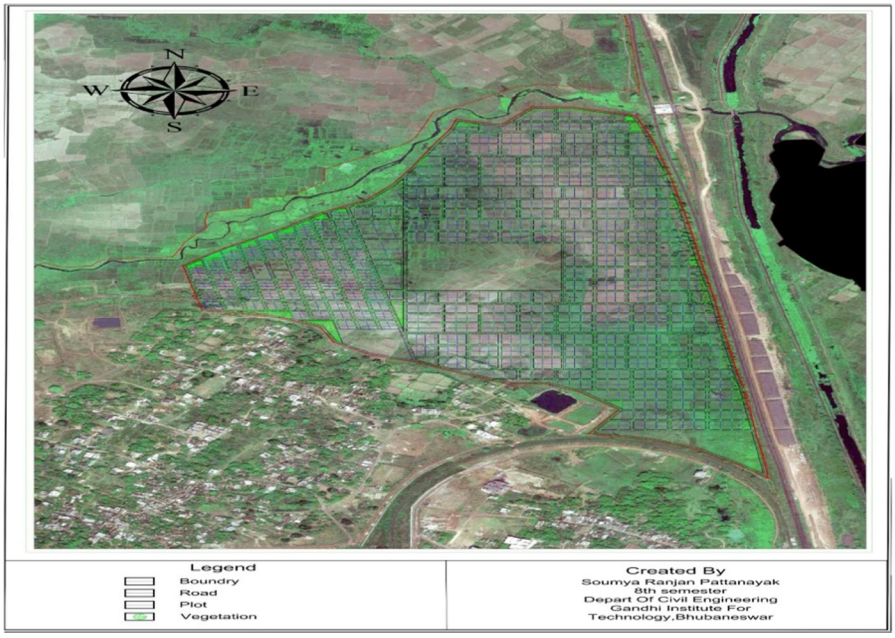

Figure 4 Model city planning with satellite image

IV. CONCLUSION

This project depicts how the GIS could discover its applications in different part of structural building alongside a couple of cases of keen urban communities in India. GIS has risen up out of the logical research centers, customary cartographer table into the core of urban and provincial organizers, arrangement creators. GIS is a rising procedure which can be adequately utilized for making the ideal utilization of assets in everyday life accordingly it is a basic instrument for changing the urban areas to Smart urban communities. Savvy city has different overpowering advantages for both, government and the residents. The mindfulness and specialized know-what about the GIS is vital for its perpetual utilize GPS into another store of steady, precise data, which is then exhibited in different.

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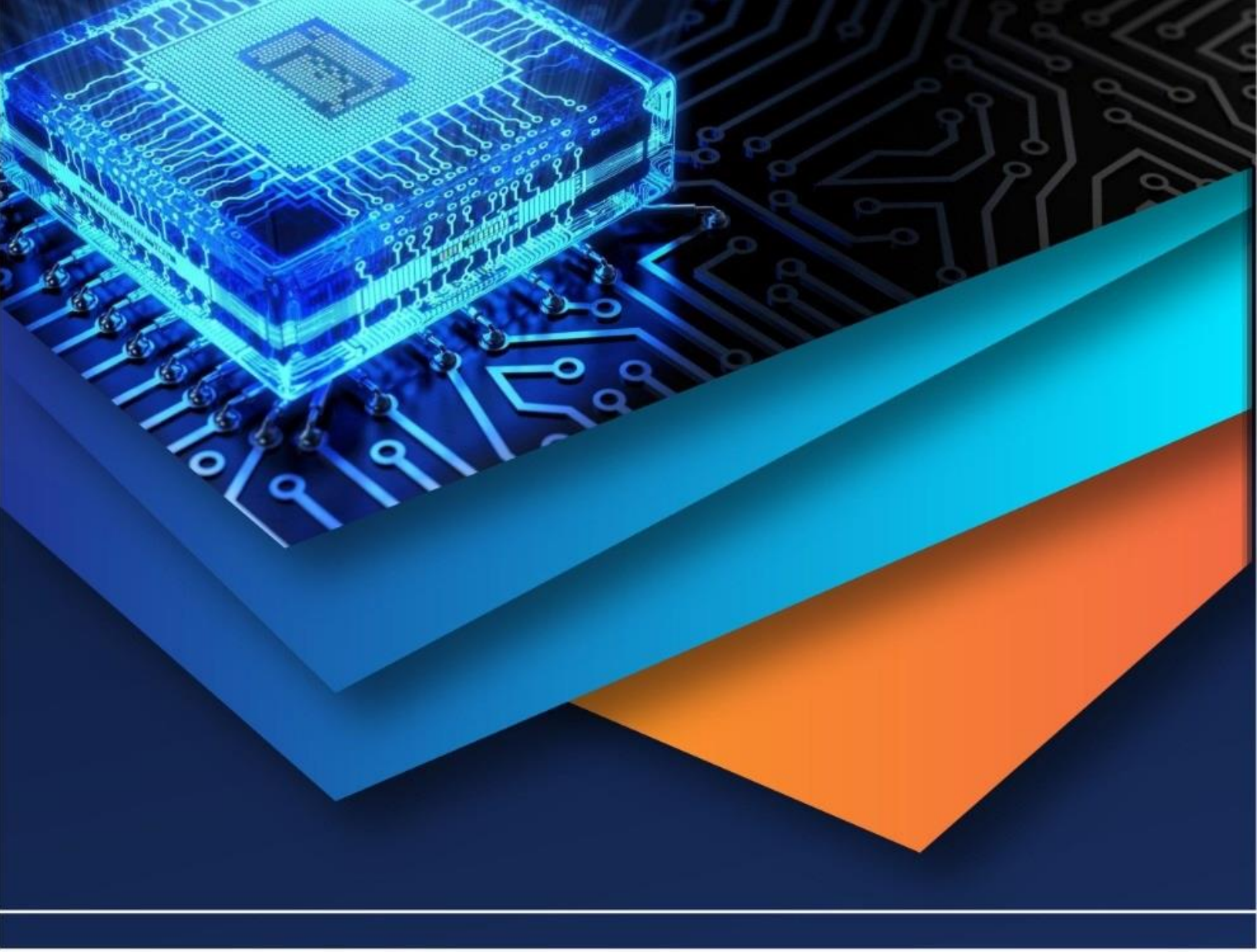

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