

# GIS Application for Planned Development of Infrastructure of an Engineering College for NBA Accreditation

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**Abstract—** Architecture is one of the most common fields where GIS not only applies well but adds immense value to GIS has been applied in the field of architecture in many ways. Below are some of the applications of GIS in Architecture.

**Keywords—** Accreditation, Development Planning, Crowd Simulation, BIM, Landscape, GIS, Architecture, NBA.

## **1. Introduction**

The construction industry faced serious local shortage in construction materials such as cement, sand, electrical resources, transport routes and the sewage networks. The object of this project is to assess the waste performance regarding the resources such as location, material, water conversation, energy uses and greener materials are effectively utilized by considering the population growth. It is done by considering the spatial relationships for social, economic and natural resources available.

The Geographical Information System (GIS) is a tool used to gather, display, analyse and output data related to the construction site environment, can provide planners with certain data sets, in order to manage the resources in construction industry.

GIS is participatory context, of providing valuable tool is capable to make it possible to create, analyse and process different scenarios, using the information stored in the computer (Jordan & shrestha, 1999) and the geographic

location to create meaningful, clear and attractive maps that can be applied to development needs. Due to the spatial nature of resources, the GIS technology can facilitates the inclusion of resources in decision making process.

This present paper reviews the work carried out to date by various researchers were utilized the numerous resources for the building and shows the system facility to prevent the over allocation of resources through help of Geographical Information System.

GIS technology can give accurate result for analysis by interlinking the various resources in present study area. The geomorphic resources, population census, traffic survey details and the land use land cover resources are the important parameters are playing the deterministic role in allocating various resources in the study area.

## **2. Geographical Information System (GIS)**

Geographical information system is computer-assisted system for acquisition, storage, analysis and display of graphical data. This system consists of a set of computerized tools and procedures that can be effectively encode, store, retrieve, overlay, correlate, manipulate, analyze, query, and many more. System has the ability to control over both the spatial and non-spatial data. This in terms helped to differentiate the different data feed into the system. GIS is a technology fed by data. Raw data are transformed into information through initial processing. This implies that the data, as the basic components of a library of data – a data bank – are in the form that is useable by computers. When the

data is converted into machine-readable form, invariably as a set of digits, they become digital data. The raw data may come in a variety of numeric scales of measurement-nominal, ordinal, interval and ratio. The use of word GIS suggests an analogy to an organism as an adaptive system, speaking of system boundaries, articulation with the environment, homeostasis (stability), equilibrium and regulation.

### **3. Current Status of GIS in India**

There is increasing recognition that no development programmes can be economically and socially viable unless natural biological systems are preserved. In the Indian context, a number of national agencies are in the process of implementing GIS projects, mostly oriented towards ecological development at district levels. An example of this emphasis is in land management. 'Wastelands' refers to degraded land comprising more than 25 percent of the total area of India - this is a high priority area in national development. The Planning Commission of India has recognised GIS as "an invaluable planning tool in land use and wastelands development.., for identifying treatment areas and models, making trade-off calculations in choosing from competing land uses, and carrying out simulations and impact assessments. Since the late 1980s, a number of similar GIS projects have been initiated. In addition, other agencies are playing facilitating roles, for example, the Survey of India is establishing the digital cartographic database for the country, and the National Remote Sensing Agency is collecting and disseminating satellite imagery. Other government agencies are using GIS to address domain specific applications - for example, the forest wing of the MOEF, The Census Department, Geological Survey of India, Town and Country Planning Organization, Bombay Metropolitan Development Authority, Wildlife Institute of India, and the Coast Guards. A few private sector firms like Hindustan Levers are using GIS as a tool for decision support. Recently, a national Geomatics society was established to provide professionals interested in the issue of spatial location with a common platform for interaction.

### **4. Resource Management Process**

In organizational studies, resource management is the efficient and effective deployment of an organization's resources when they are needed. Such resources may include financial resources, inventory, human skills, or production resources. In the realm of project management, processes, techniques and philosophies as to the best approach for allocating resources have been developed. These include discussions on functional vs. cross-functional resource allocation as well as processes espoused by organizations like the Project Management Institute (PMI) through their Project Management Body of Knowledge (PMBOK) methodology of project management. Resource management is a key element to activity resource estimating and project human resource management. Both are essential components of a comprehensive project management plan to execute and monitor a project successfully. As is the case with the larger discipline of project management, there are resource management software tools available that automate and assist the process of resource allocation to projects and portfolio resource transparency including supply and demand of resources. The goal of these tools typically is to ensure that: (i) there are employees within our organization with required specific skill set and desired profile required for a project, (ii) decide the number and skill sets of new employees to hire, and (iii) allocate the workforce to various projects.

Some of the resources used in buildings:

- Location
- Materials
- Greener materials
- Water conservation
- Air quality
- Energy uses

### **5. National Board of Accreditation (NBA)**

National Board of Accreditation (NBA) was established by AICTE in 1994 and became an independent body in 2010 and in 2014 India has become permanent signatory to the Washington Accord (WA) which recognizes global equivalence of engineering degrees. NBA accredited Tier I

engineering institutions degrees are now valid in 20 nations. NAAC certifies institutions whereas NBA accredits the programmes run by the institutions. NBA is more specific that it expects that the graduating engineers should have the graduate attributes as defined in Washington accord. It can happen that an institute may have a mix of excellent programmes as well as some average programmes. And students are unable to differentiate between the departments if the institute is accredited by NAAC but NBA accredited programme means that the said programme meets all the ten criteria's and thus is very specific.

**NBA**, or the **National Board of Accreditation**, is an autonomous government body that is responsible for the accreditation various technical and professional programs of institutions across the country. They also monitor and suggest necessary progressive changes both in and around the curriculum. The **NBA** is responsible for assuring the quality of education especially of the professional programmes like engineering and technology, management, architecture, pharmacy and hospitality.

#### **6. Authorities & Committees of NBA**

NBA is empowered by its Memorandum of Association (MoA). The governance of NBA is effected through the following three statutory committees enshrined in its MoA:

- The General Council (GC)
- The Executive Committee(EC)
- The Academic Advisory Committee (AAC)

#### **7. Objectives of NBA**

Major objectives of the NBA are as follows:

- To assess and accredit the technical education programs.
- To evolve standards and parameters for assessment and accreditation in line with the parameters laid down by the appropriate statutory regulatory authority for co-ordination, determination and regulation of standards in the concerned field of technical education.
- To promote excellence through a benchmarking process, which is helpful in

determining whether or not an institution is able to achieve its mission and broad based goals, and in interpreting the results of the outcomes assessment process.

- To promote quality conscious system of technical education where excellence, relevance to market needs and participation by all stakeholders are prime and major determinants. To build a technical education system as facilitator of human resources, that will match the national goals of growth by competence, contribution to economy through competitiveness and compatibility with societal development.
- To set the quality benchmarks targeted at global and national stockpile of human capital in all fields of technical education.
- To conduct evaluation of self-assessment of technical institutions and/or programs offered by them on the basis of guidelines, norms and standards specified by it.
- To contribute to the domain of knowledge in quality parameters, assessment and evaluation.

#### **8. Applications of GIS in Architecture.**

- A. *Line of Sight*
- B. *Exposure to Noise*
- C. *Development Planning*
- D. *Crowd Simulation*
- E. *Solar Exposure*
- F. *City Engine*
- G. *Pedestrian Behavior*
- H. *Shadow Analysis*

##### **A. Line of Sight**

Planning high-rise buildings so they don't obstruct the view of the mountains in Portland using line of sight. GIS helps architects plan the line of sight perfectly so that the buildings do not obstruct important features in the horizon.

##### **B. Exposure to Noise**

Orchestrating urban mobility plans with special consideration for the impact of environmental noise using Orbis GIS. GIS helps urban high rise buildings to be designed and positioned in areas that have little or no interference to the environment.

### ***C. Development Planning***

Making citizens happy through smart development planning and understanding the bigger picture. GIS helps in planning various development projects in urban areas and helping citizens understand the importance of urban development holistically.

### ***D. Crowd Simulation***

Mastering the collective dynamics of interacting objects in urban phenomena at the scale of individual households, people, and units of real estate and at time-scales approaching “real time”.

### ***E. Solar Exposure***

Harvesting light to assess the suitability of installing solar (photovoltaic) panels on roofs using 3D city models and geometric information such as the tilt, orientation and area of the roof.

### ***F. City Engine***

Assessing feasibility and plan implementation using Esri’s City Engine improving urban planning, architecture, and overall design. GIS helps to improve the overall urban plan by assessing the overall feasibility of any project yet to be implemented.

### ***G. Pedestrian Behavior***

Discerning the movements of pedestrians and urban behavior throughout the city. GIS can help discern the possible movement of pedestrians and vehicles and help in creating artistic impressions of cities.

### ***H. Shadow Analysis***

Diagnosing how much shadow will be casted in the pre-construction phase onto its surrounding using Bentley Map. GIS helps create exact impressions of shadows that would be cast during every preconstruction phase of a project.

## **CONCLUSION**

As GIS is one of the fast emerging fields being utilised in various engineering projects, its complete potential to the construction industry has not been

realised yet. GIS is generally not being associated with construction industry, therefore, professionals need education and training on the use of GIS technologies in construction.

The field of architecture, both in terms of practice and research, may be heavily benefited by GIS. This paper tries to introduce the construction of a knowledge base on the broad range of GIS principles and applications in the domain of architectural research. It may contribute as an eye opener towards a discussion which is crucial in the reform and restructuring of architectural education in the changed context of thinking and practice. Architecture education has long been criticized for not having enough research contents in its curriculum. New courses should be developed to address this lacking. Incorporating GIS courses may contribute towards the structuring of a new genre in architectural research.

## **REFERENCES**

- [1] H., P.B. Shah, M.Schmidt, and G. Kennedy, 1989. “Himalayan-scale problems and micro-GIS solutions”, In A Wider Perspective, GIS ’89 Symposium Proceedings, Vancouver, Canada, March 7-10, 1989. Vancouver, BC: Forestry Canada, 179-184.
- [2] Sheffield, R.M. and L.A. Royer, 1989. “GIS: A broad-scale inventory perspective”, In Proceedings, Society of American Foresters National Convention, Spokane, Washington, September 24-27, 1989. 38-42.
- [3] M.L. and D.E. McKinsey, 1991. “Using a Geographic Information System for Prescribed Fire Management at Cuyamaca Rancho State Park, California”, In GIS Applications in Natural Resources, M. Heit and A. Shortreid, ed. Fort Collins, Colorado: GIS World.
- [4] Woodwell, G.M. and T.A. Stone, 1990. “The global forest inventory:
- [5] C. Prakasam1 and Biplab Biswas, 2012. “Evaluation of Geomorphic Resources Using Gis Technology: A case study of selected villages in ausgram block, burdwan district, West bengal, India”. Department of Geography

- [6] Miller, R. C., D. P. Guertin and P. Heilman (2004) Information Technology in Watershed Management Decision Making. Journal of the American Water Resources Association, 40(2): 347-358.
- [7] Obermeyer, N. (1995) The Hidden GIS Technocracy. Cartography and Geographic Information Systems, 22(1): 78-83.
- [8] Parkes, M. and R. Panelli (2001) Integrating Catchment, Ecosystems and Community Health: The Value of Participatory Action Research. Ecosystem Health, 7(2): 85-106.

- [9] Rambaldi, G., P. A. K. Kyem, P. Mbile, M. McCall and D. Weiner (2005) Participatory Spatial Information Management and Communication in Developing Countries. Mapping for Social Change International Conference, Nairobi, Kenya.
- [10] Robinson, A. and B. Petchenik (1976) The Nature of Maps: Essays Towards Understanding Maps and Mapping. Chicago: University of Chicago Press.
- [11] Sahay, S. (1998) Implementing GIS Technology in India: Some Issues of Time and Space. Accounting, Management, and Information Technologies, 8: 147-188.