

# Framework for Community GIS for the Development Plan of City

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**Abstract:** Mumbai is currently one of the fastest developing cities in the world. This development has been possible due to a well thought and executed set of plans. The latest urban development plan was released by the BMC in 2015. This data was made available to the public. The format however, was not really in a manner that could be easily understood;or used. It was just raw data. Using GIS, this system aims at improving the quality of the provided data. The information will be digitized and added to the survey maps provided by the BMC. This mapping will be done over in several steps and will require various software such as QGIS, GeoNode, Cartoview, ODK, etc. This platform will provide a much better and understandable data format. In such a system, incorrect data can be checked as participation of the people leads to a better insight. The data provided was based on research from a foreign company and was not in complete sync with the actual state. All these issues can be resolved with this system and it will also help keep track of the development taking place and to check what tasks were promised, have been fulfilled, are being fulfilled or are being looked over. This technology could revolutionize the implementation of the urban development plan and could be a real change of scenario for a huge step towards realizing the goal that has been set out.

## I. INTRODUCTION

Geographic Information System(GIS)also known as Geo spatial Information System is used to design, store, retrieve, manage, display and analyze all types of geographical and spatial data. The benets of using GIS in urban planning are numerous, because GIS takes into consideration many different factors to help, build an efcient and organized city.

GIS helps to determine how seriously an issue affects an area or the community as a whole.The layering of several factors on a map can give you a clearer picture of, or new insight into,the nature, extent, and distribution of a condition, and make it easier to compare it with other issues in the same area. It can demonstrate how differently an issue affects different populations or geographical areas.This can be important information for a number of reasons. It can pinpoint problem areas or populations, give clues to the origin or cause of a condition, and suggest means of addressing the problem.

It helps to understand the area or community in which youre working. A GIS map can show a large amount of information all at once. It may, for instance, illustrate for a targeted neighborhood abandoned buildings, population density, and the age, income, ethnicity, and education level of the population. The ability to see all these factors together can

be a powerful tool for assessment and planning. It can also confrm or negate impressions or unsupported assumptions about an area, giving you a clearer and more objective view upon which to base conclusions.

It can allow you to isolate and examine individual aspects of the situation or area. By choosing layers to display, you can look at the interaction of various pairs of factors, or just look at the geographic spread of specic ones. It allows you to isolate and examine individual aspects of the situation or area. By choosing layers to display, you can look at the interaction of various pairs of factors, or just look at the geographic spread of specic ones.

GIS provides a picture of the community's or areas assets and weaknesses. Seeing these graphically can make clear just how many positive aspects there are to the community, and how much already exists that can be mobilized to address problems.It the sametime,it shows where assets are lacking, and can suggest ways to deal with that. It helps in designing, implementing, and evaluating interventions. GIS provides the evidence on which to base planning and implementation decisions, as well as a basis on which to justify those decisions to funders and policy makers.It shows change over time. Comparing two maps, one showing the incidence of a condition two years ago and the other current, can help to understand where and how your efforts are succeeding and where and how they are not. By the same token, by using GIS maps you can compare your work to that of others, and consult with others if they seem more successful.

GIS is by far the quickest and most efcient method of creating maps and similar graphics that provide a picture of not only the geographic, but of the social, demographic, environmental, political, and other aspects of an area as well. GIS systems can gather and present information graphically in a variety of ways,change it at command with just a few mouse clicks or keystrokes, reorganize it, and manipulate it, creating each time a graphic representation that clarifies conditions and relationships. If you need this kind of information (and not everyone does), GIS is the best way to produce it.

As GIS maps make powerful presentation tools. For most people,visual representations are easier to grasp than columns of gures or oral presentations. GIS maps can provide simple, understandable explanations of sometimes complex situations and issues, and make strong arguments for courses of action.

Perhaps most important, GIS maps can help inuence policy. Policy makers, particularly elected ofcials, often know relatively little about the issues their decisions affect. Because they are so powerful at representing conditions in an area, GIS maps can help policymakers understand issues

more clearly, and lead to policies that address reality in rational ways.

## II. MANAGEMENT REQUIREMENTS AND SYSTEM GOALS

### A. GIS FOR URBAN PLANNING

Urban planning requires including many layers of detail on a single map, and one of the features of a GIS is multilayered mapping. Each of these layers has different types of information and data associated with it. The municipal corporation planning committee can use GIS based system to see a variety of different things, including prime agricultural land, surface water, high flood frequency, and highly erodible land. This multilayered capability can make a big difference when developing an area, for example places with high flood frequency could lead to high flood insurance premiums for residents, which may detract from people wanting to live there. Also in places that are already developed or had been previously developed and are being revamped, the GIS may have the area covered already. This means the GIS can provide information about permits issued in the past, including permit type, when permits were issued, and what type of development they were for.[1]

### B. MANAGEMENT REQUIREMENTS

The problem of urbanization is the lack of input and public participation in the design of the city's master development plans. It is mandatory by Maharashtra Regional and Town Planning Act, 1966 section 38 to revise cities development plan at least once in 20 years.[2][3]

Development plan must have following in it:

- 1) Proposals for land use and zoning.
- 2) Proposals for designation for public purposes.
- 3) Proposals of open spaces, playground etc.
- 4) Transportations.
- 5) Water supply and sewerage.
- 6) Reservation of lands.
- 7) Service industries, industrial estates, and extensive development.
- 8) Conservation of areas of natural scenery and landscapes preservation of historic places, heritage buildings.
- 9) Proposals for flood control and prevention of river pollution.
- 10) Proposals of central or state Govt.
- 11) Land reclamation proposals.
- 12) Regulations for controlling development plan.[4]

As per Maharashtra development plans rules 1970, if any suggestions objections are received, the same shall be considered while preparing the draft DP. This makes peoples participation necessary for the development of the city plan.

Also, bureaucrats are often reluctant to share information but due to the law, they are required to share the master plan and take input from citizens. Often due to the lack of the understanding of geographical maps given in the pdf files, it's difficult to give the suggestions. This creates the main issue of how to get input from the users. The problem can be

resolved if we have a community based open infrastructure where people can view the proposed development plan and give suggestions. This becomes easy due to inbuilt GPS devices in the modern mobile phone, to upload geotagged data. If the community can contribute to the map and give accurate information about the land use or at least verify it, possible land misuse can be avoided and permits can be verified.[5]

### C. SYSTEM GOALS

To develop a community based GIS infrastructure which consists of the following:

- 1) Consume the information created based on government and community data.
- 2) To contribute to the information such inputs which are only known to the local citizens.
- 3) To report grievances of a specific area to authorities.
- 4) To collaborate among citizens on several common issues.

## III. SYSTEM ARCHITECTURE AND COMPOSITION

### IV. KEY ELEMENTS AND IMPLEMENTATION

#### A. GEO PROCESSING TOOLS

1) *CONVEX HULL*: A convex hull is the smallest polygon that bounds a set of features such that a line between any two interior points will always be completely within the polygon. It objects points, lines or polygon layer. It is completely based on an input layer or an ID field.

2) *BUFFER*: It creates buffers around features or on fixed distance or based on distant field. It objects points, lines or polygon layer.

3) *Intersect*: It Overlay layers such that output contains areas where both layers intersect. Intersect tools allow you to exclude the area that is not overlapping.

4) *Union*: It allows to merge two layer into one layer but it doesn't remove the boundary line. It overlays layers such that it contain both intersecting and non-intersecting layers.

5) *Symmetrical difference*: Symmetrical Difference is opposite to intersect, it removes area that is overlapping.

6) *Clip*: Clipping allows you to clip the feature with the defined boundary line. It is similar to intersection tools, only difference is input layer attributes are copied.

7) *Difference*: Difference layers allows to create area of input layer that is not overlapped i.e area that is not intersecting the clip layer

8) *Dissolve*: Dissolve layer is similar to union but in this everything is merged by the common field and it works on single layer. In other words, All features with identical input values are combined to form one single features.[6][7]

## V. CONCLUSIONS

Thus we will be successfully developing and open source system which could help in development of community through GIS

## APPENDIX

Appendixes should appear before the acknowledgment.

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