
**3D MODELLING OF SHIVAJI UNIVERSITY CAMPUS
USING GOOGLE SKETCH UP**

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The Google SketchUp gives a very low cost and effective solution for Virtual 3D modeling. Google SketchUp is very simple and easy to use software for 3D mapping and modeling. It provides a lot of possibilities for users for mapping and designing. The Shivaji University is emerging as one of the significant seat of learning in Indian higher education. The campus is having total 345 hectares land in semi-urban area out of which 133077.55 sq. meter area is under built up. It is one of the regional education centers for South Maharashtra. Shivaji University campus is having mix bio-diversity as well as different structural designs in constructed buildings. The dimensional analysis is carried out here to create Virtual 3D model of university campus. The main aim of this study is to use Google SketchUp - 3D modeling software and create virtual design of Shivaji University campus.

Keywords: Shivaji University Campus, 3D Model and Mapping, Google SketchUp

1. INTRODUCTION

Google SketchUp is very simple and easy to use software for 3D mapping and modeling. It is applied to create virtual design of Shivaji University campus, Kolhapur Maharashtra. The 3D designing of various aspects present in campus area are developed systematically. Google SketchUp is a very powerful application having capability to design virtual campus. In its advance version there are several functions available to design the features and represent it on spatially referenced locations. In this study an attempt is made to make the 3D mapping of Shivaji University campus and create a virtual design of campus using Google SketchUp – 3D open source software. The Shivaji University is definitely emerging as one of the significant seat of learning in Indian higher education. The university has a comprehensive IT policy and the road map based on all inclusive perception of future developments and resource generation.

2. AIM AND OBJECTIVES

The main aim of this study is to use Google SketchUp - 3D modeling software and create virtual design of Shivaji University campus. The related objectives are:

- 1) To Make 3D designs for spatial features present at Shivaji University Campus
- 2) To create the virtual design for Shivaji University campus.

3. STUDY AREA

Shivaji University is established in year 1962, and named after the Great Maratha Warrior and founder of the Maratha Empire Chhatrapati Shivaji Maharaj. It was inaugurated on 18th November, 1962 by Dr. Radhakrishnan, the then President of India. One of the major objectives behind foundation of this University was to provide the regional education center for South Maharashtra. The campus is having total 345 hectares land in semi-urban area out of which 133077.55 sq. meter area is under built up.

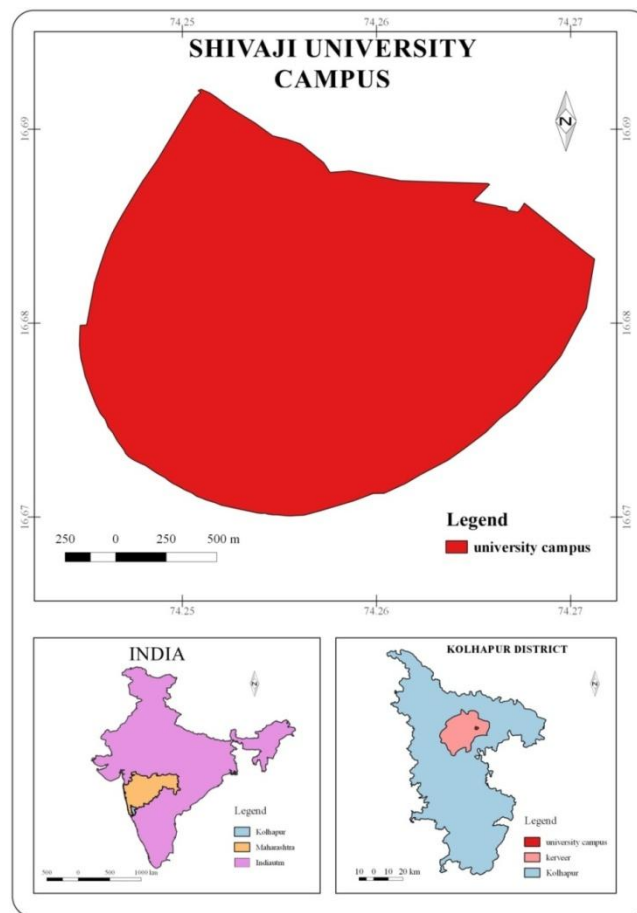


Fig.1 Location Map

4. DATA

This study is based on primary and secondary source of data. The primary data is collected by field work with photos. The secondary data like attribute information, high resolution satellite dataset, records, etc. are collected from various available sources.

5. METHODOLOGY

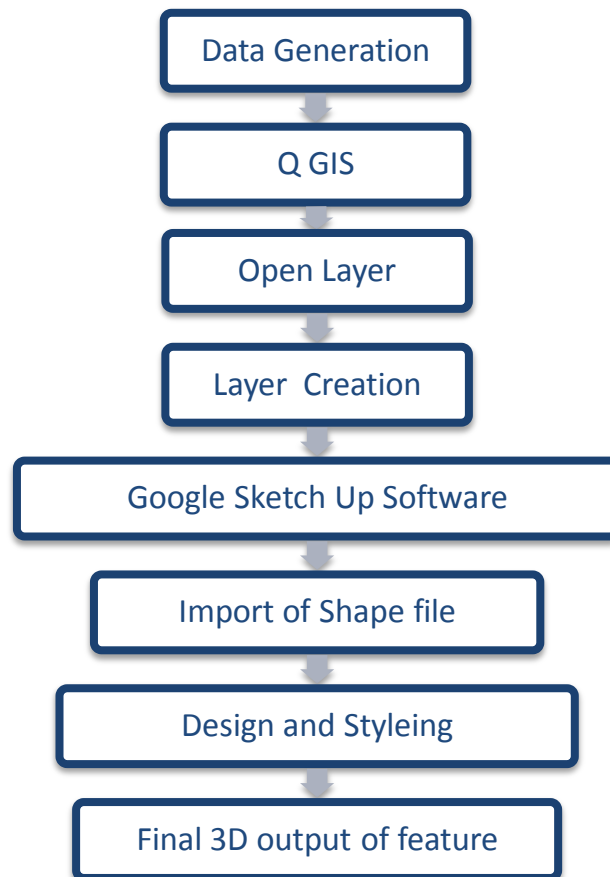


Fig.2 Flow Chart of Methodology

In first phase the spatial mapping is carried out using open layer plug-in of QGIS. The data generation is fulfilled by two ways i.e. shape file based as well as from snapshot or photo of respective buildings. The open source GIS software QGIS is used for data generation and digitization task. The generated shape file of spatial features is imported in Google SketchUp software. Then 3D representation of spatial features is carried out as per the real condition. The designing and styling of building, gardens, statues, and other features are generated in the form of 3D design. Finally the virtual design of campus is formed which become a duplicate copy of reality.

6. LITERATURE REVIEW

According to Panchal and Khan the world around us is three dimensional and it should understand better way by the application of 3D modeling. The geographical data is multidimensional and its environment can be depicted better using 3D modeling.

Baser, Laudien and Bareth worked on "Campus GIS routing – A web based LBS for the university of Cologne. The study carried by him shows that a web based application provides spatial visualization of campus more effectively. He has created pedestrian routing application which is embedded into the

latest version of campus GIS. The campus GIS geodatabase consist of different datasets like alphanumeric data, aerial and satellite images, geo referenced CAD, topographic data, surveyed data of buildings, etc. Also the integration of routing applications results in a great benefit for the campus along with real time navigation.

Fleron (2009) worked on "Google SketchUp8: A powerful tool for teaching, learning and applying geometry". According to him Google SketchUp is a powerful, sophisticated, user friendly computer Aided Design program with good capability.

7. SOFTWARE USED IN STUDY

This study is totally based on open source software. The open source software is free to use and one can make its best use in their work. Following software are applied to complete the present study.

- Quantum GIS (QGIS)
- Google Sketch Up

8. LIMITATION TO STUDY

The work might be any superior but there are some limitations to it. This task is time consuming and needs some sort of skill.

9. 3D MODELING OF UNIVERSITY CAMPUS

The Shivaji University campus is an educational campus spread over a vast area. It is the administrative head quarters of colleges in Sangli, Satara and Kolhapur district. It is having very rich geography along with natural environment. This section deals with the 3D mapping of university campus. The main benefit of 3D GIS mapping is that it represents the actual situation of infrastructure and existing features. The Google earth and Google SketchUp is very useful for 3D modeling. There are several natural (streams, vegetation, lakes, physiography, etc.) as well as manmade (Buildings, Statues, Gardens, Transportation facilities, etc.) features present in the university campus.

9.1 3D Modeling of Buildings

There are number of buildings constructed in university campus those are been utilized for different purpose. According to its use the buildings are categorized in to following groups:

- 1) Main Administrative Building

- 2) Departments
- 3) Examination Buildings
- 4) Library Building
- 5) Hostels and Others

9.2 Main Administrative Building

The 3D modeling of individual building at Shivaji University is started from main administrative building. The all administrative activities are been carried out from this place. Along with administrative importance it is having heritage importance as well.



Fig.3 Main Administrative Building

9.3 Post Graduate Departments

The post graduate departments are divided as per their disciplines i.e. Arts, Commerce and Science. As a sample few departments are selected and their 3D modeling is represented below.

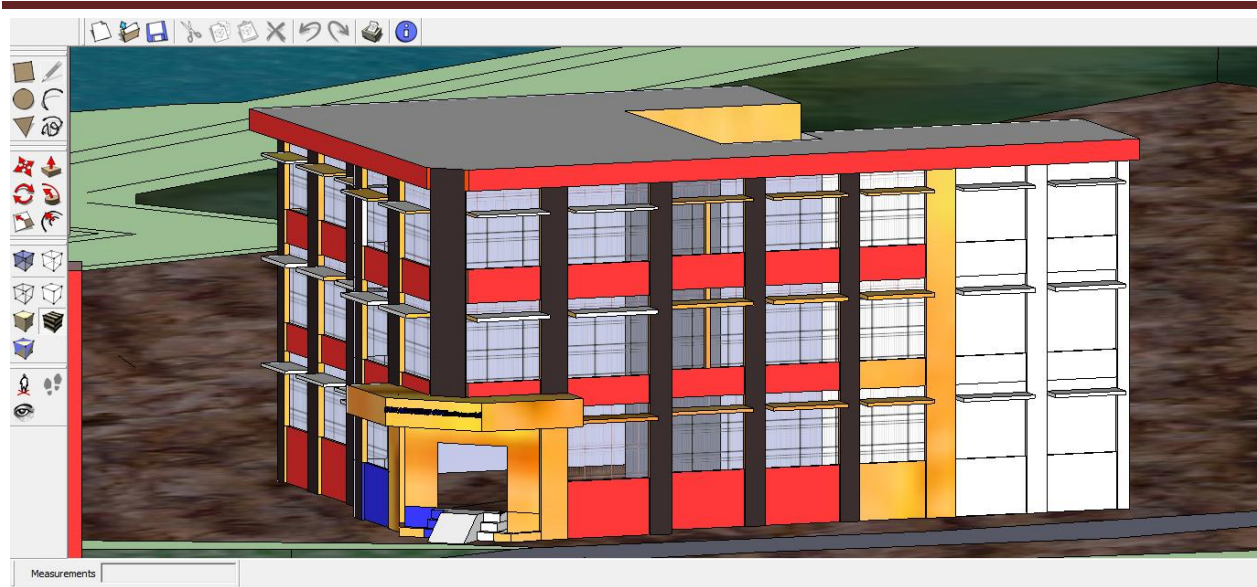


Fig.4 Department of Environment Science

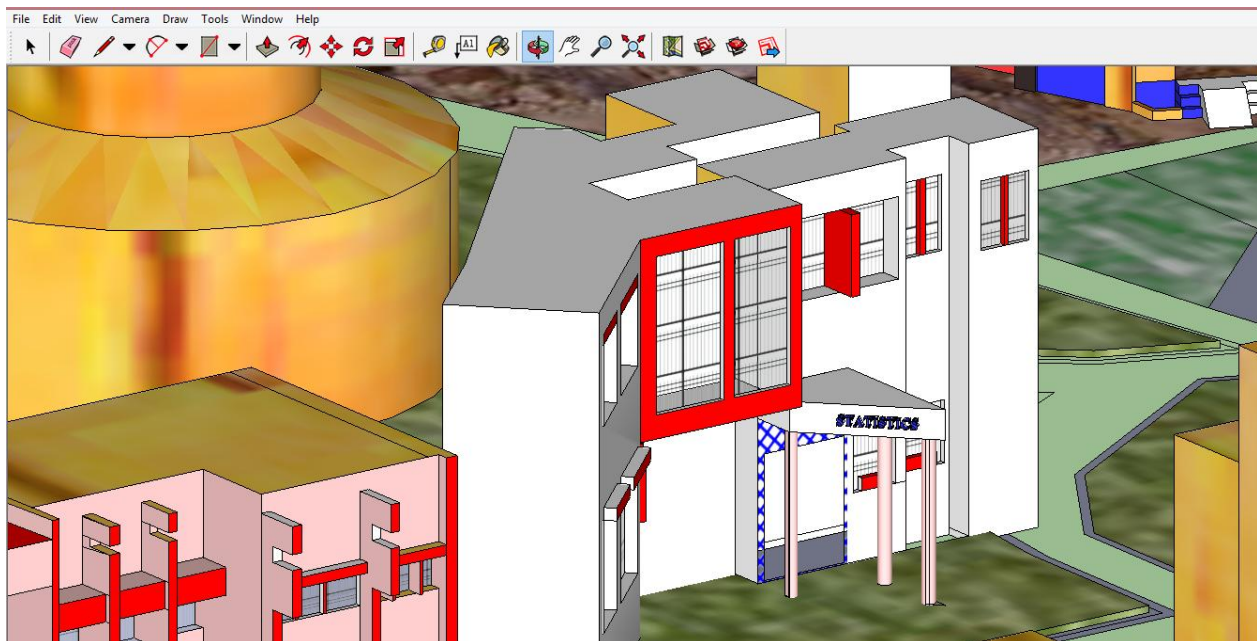


Fig.5 Department of Mathematics

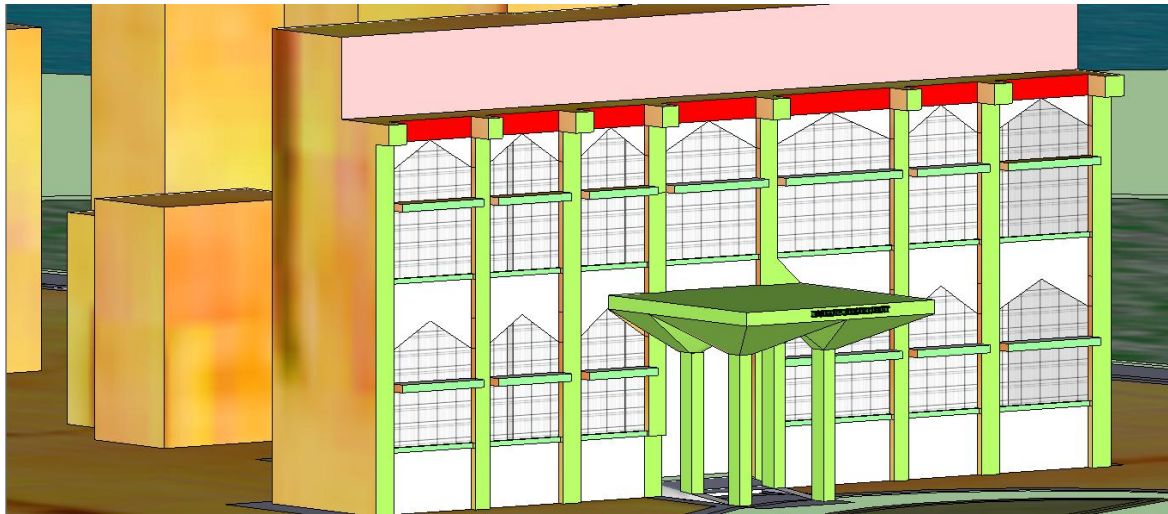


Fig.6 Department of Botany

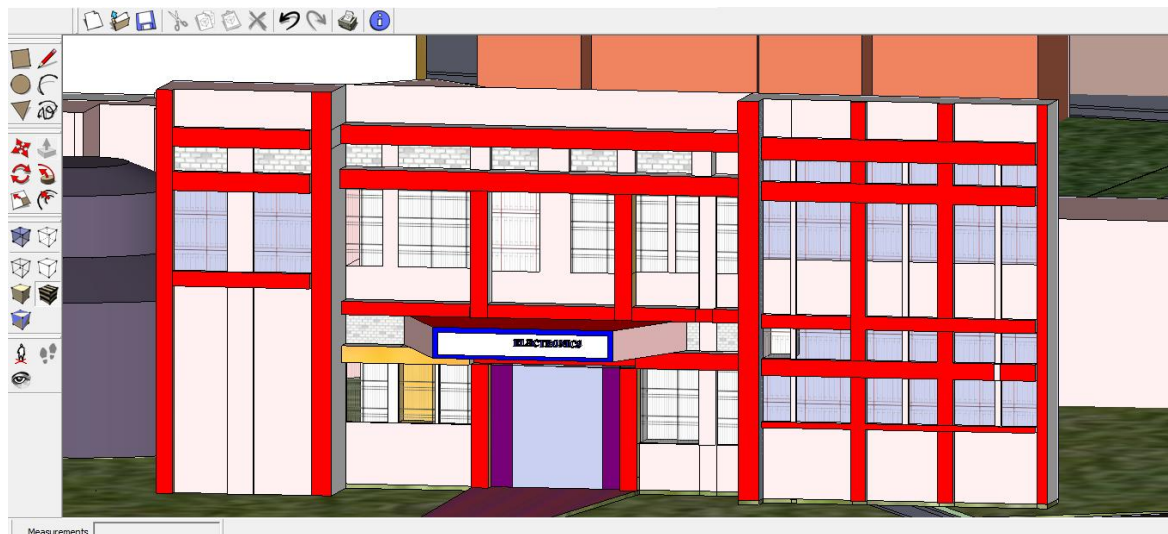


Fig.7 Department of Electronics



Fig.8 Department of Geography



Fig.9 Department of Physics

9.4 Examination Building

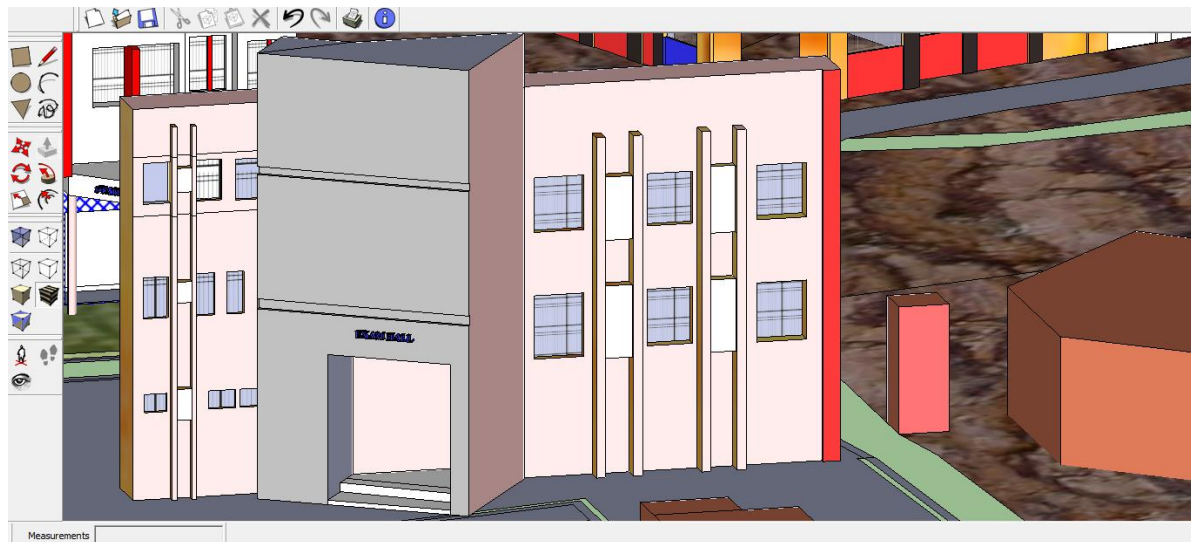


Fig.10 Central Examination Building

9.5 Hostels Buildings

The Shivaji University campus is having hostels for male and female students. There are total five hostels for male students and three hostels for females. Hostels have beautiful campus with 24 hours security. Hostels are surrounded by running track play grounds, gymkhana and Medical Centre.

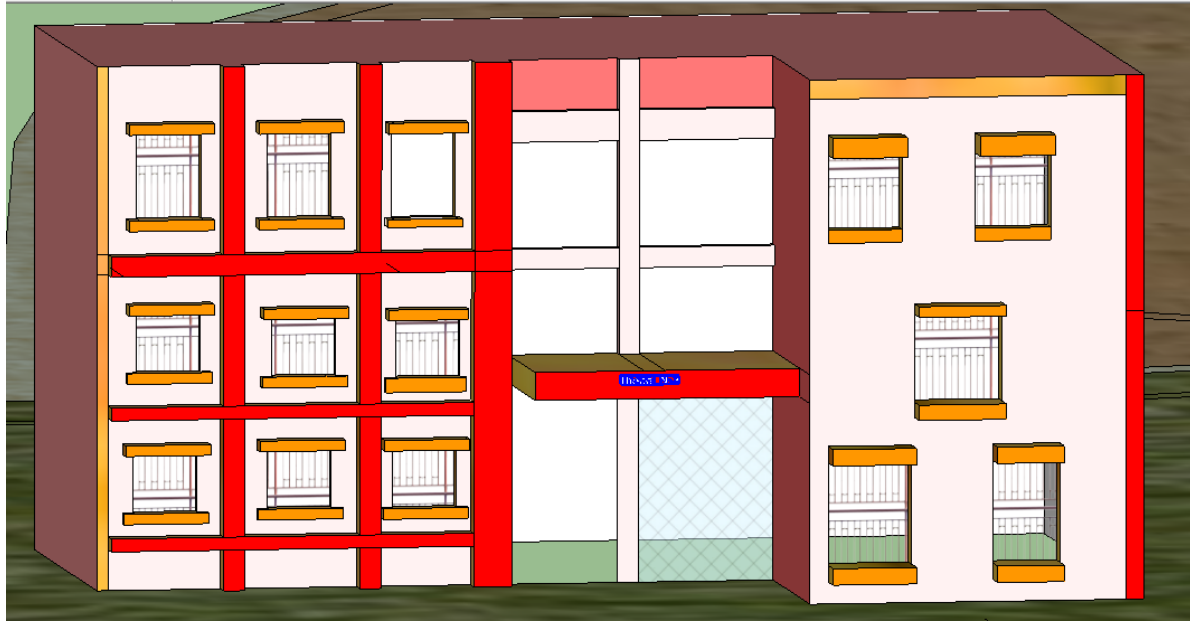


Fig.11 Boys Hostel No-3

9.6 Library Buildings

Shivaji University has very rich library which has collection of different books, journals and periodicals. It has special features and services like reference section, reading hall, e-resources, internet facilities, etc. The library section is of two type i.e. central library and study center plane building.

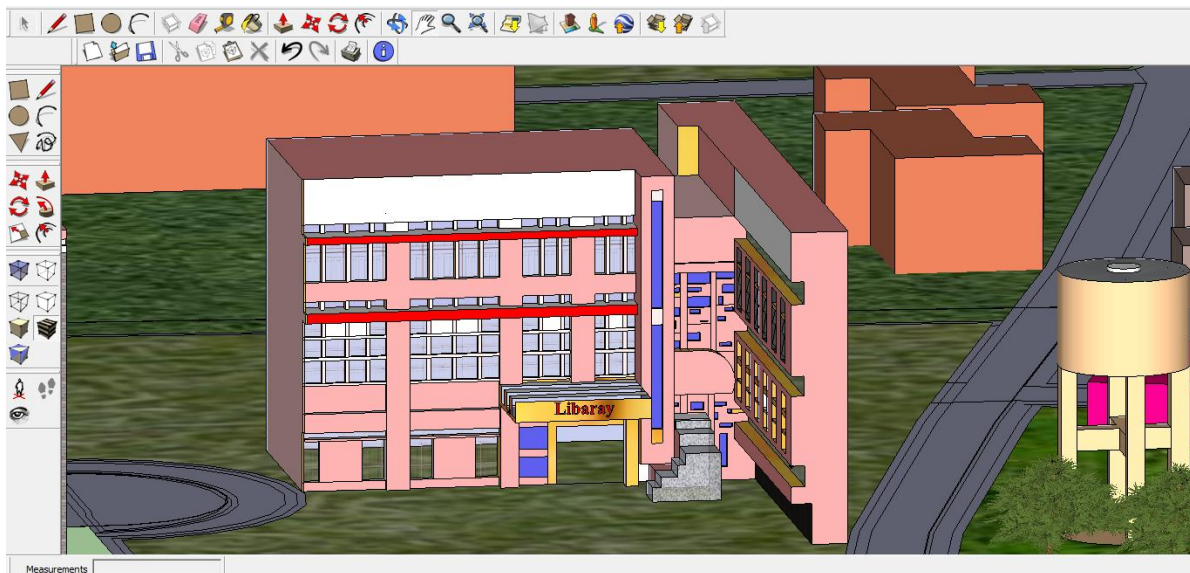


Fig.12 Central Library Building



Fig.13 Study Center : Plane Building

For hostel students study center is established and from morning 6.00 a.m. to late night 12.00 p.m. is open for students which are located in the hostel premises.

9.7 Statues and Momentous

Statues and momentous are acting as a beauty of particular locality same time it is inspiration for the coming generation. It acts as a motivational point. Shivaji University campus is having several statues of great personalities. Hence these are also incorporated in the 3D design as a part of campus.

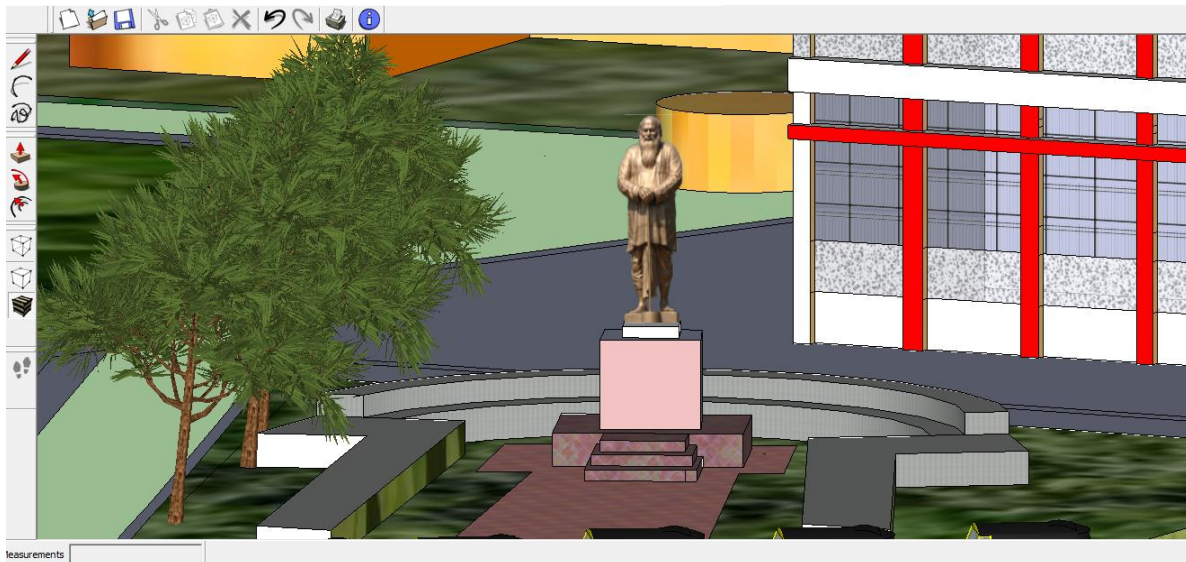


Fig.14 Karmaveer Bhaurao Patil Statue

9.8 SYNTHETIC TRACK

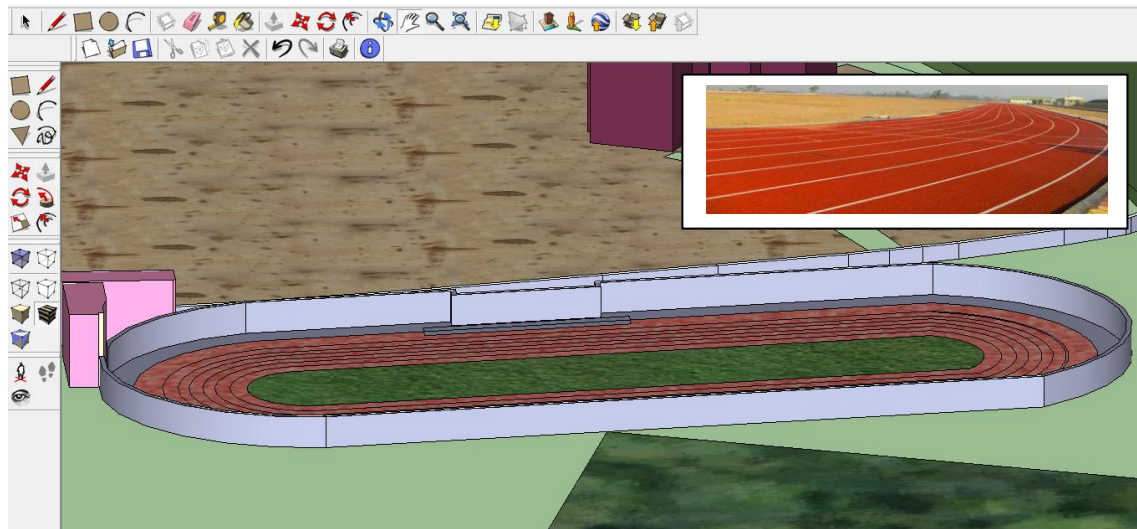


Fig.15 Synthetic Track

Shivaji University is having 400 metre Synthetic Athletic Track of International Standard, which is the first of its kind in the State.

9.9 PLAY GROUND

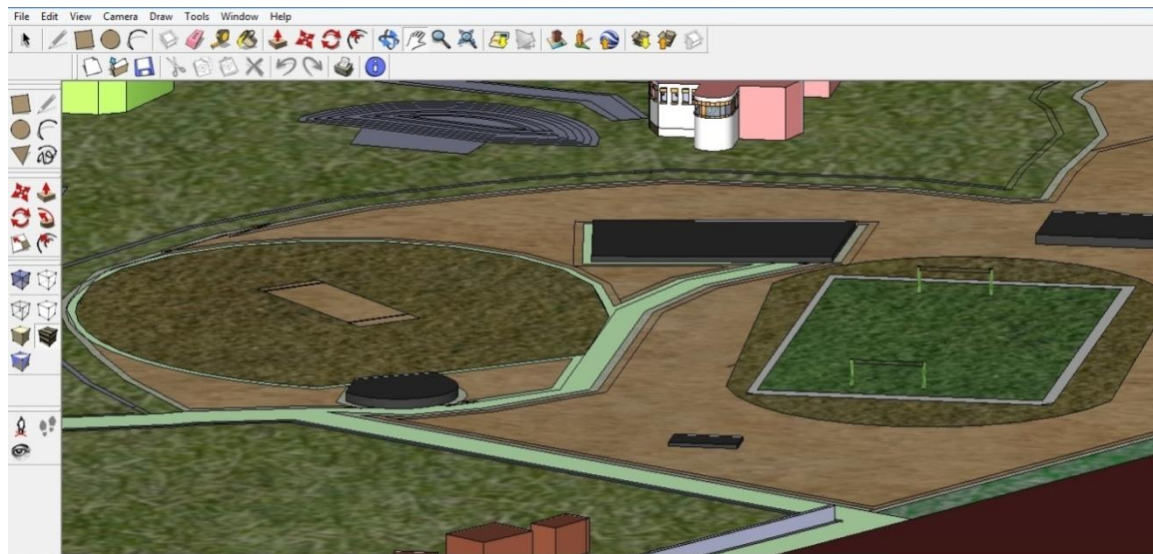


Fig.16 Play Grounds in University Campus

Krida Maharshi Meghnath Nageshkar Krida Sankul has been a very active sports hub right from early morning till late evening. The playgrounds and tracks are used to conduct games. It is used for several sports activities such as Volley Ball, Basket Ball, Kho-Kho, Cricket, Football, Badminton and Kabaddi.

9.10 TRANSPORTATION SERVICE

9.10.1 RICKSHAW STOP

The transportation services are well developed in University campus. There are two auto rickshaws stops and several bus stops providing service. Main auto rickshaw stop is front of geography department and near the KarmvirBhauraoPatil statue. In this study one bus stop and auto rickshaw created with the help of 3D tool in Google sketch up.

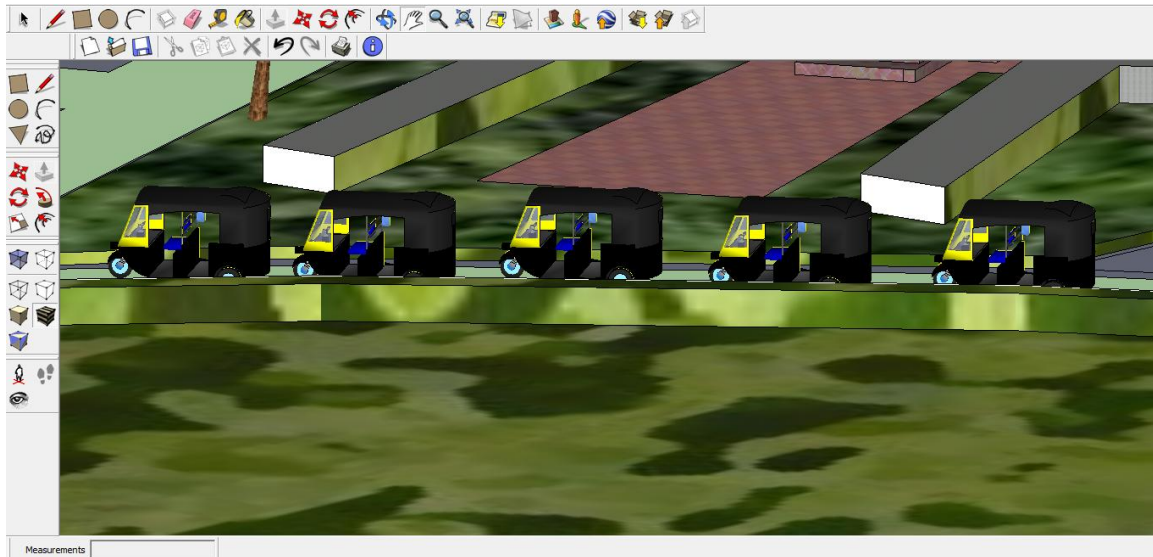


Fig.17 Rickshaws Stop

9.10.2 BUS STOP

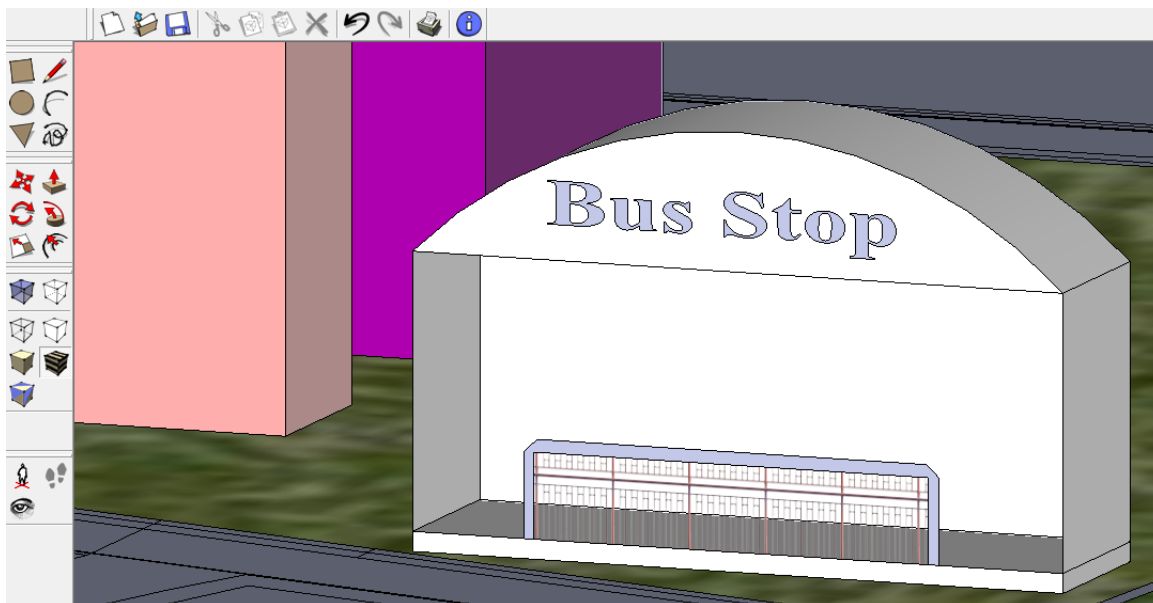


Fig.18 BusStop

9.11 COMPLETE UNIVERSITY CAMPUS

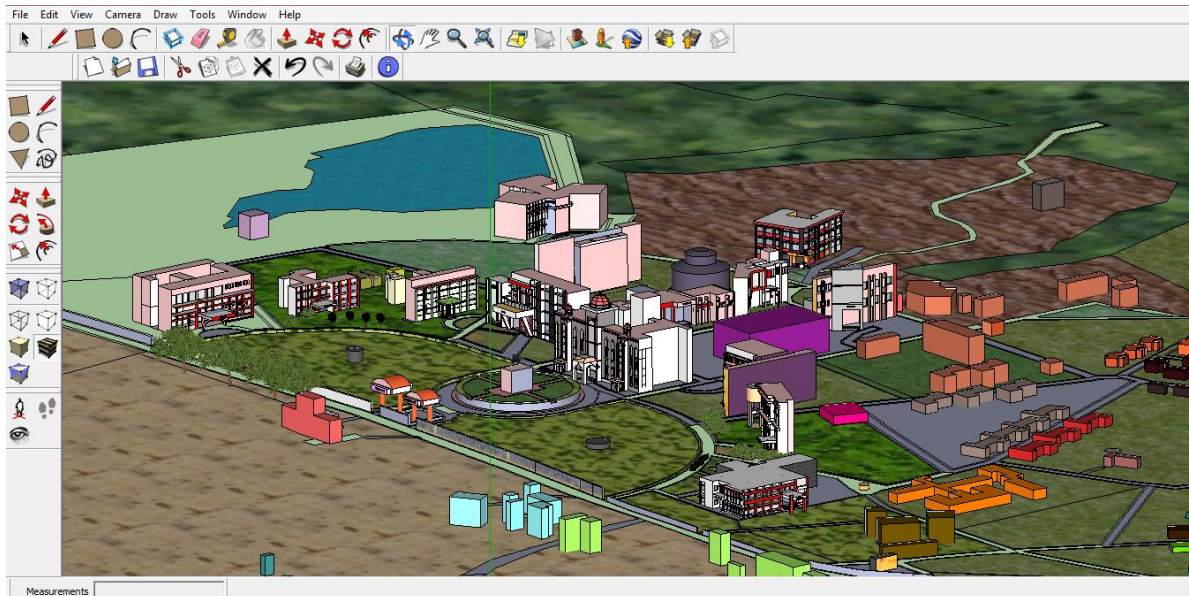


Fig.19 View of Built-Up In University Campus

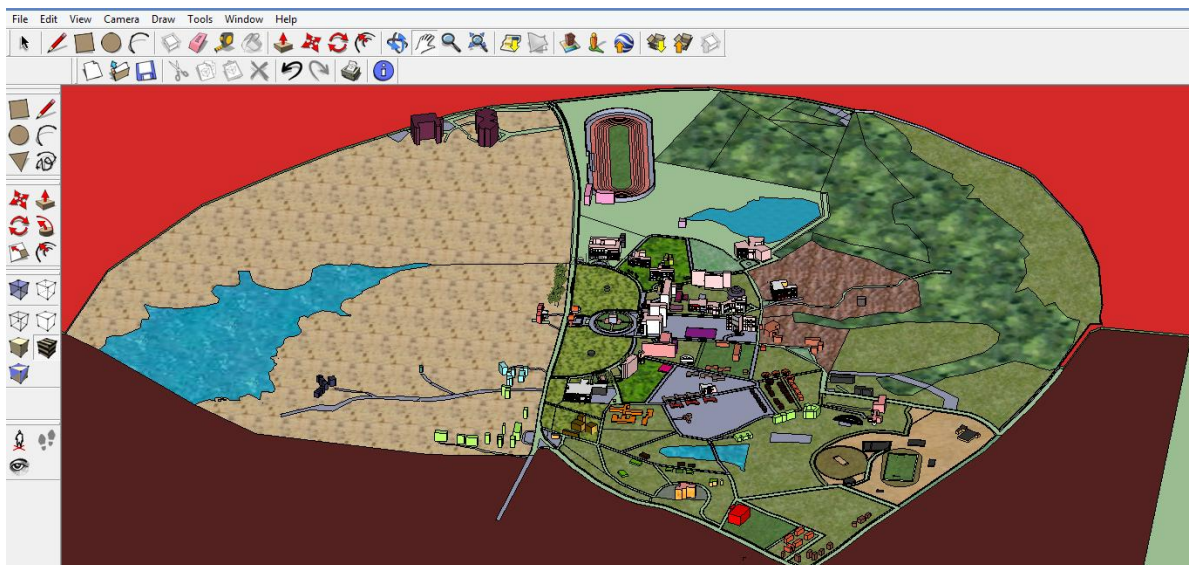


Fig.20 Entire View of University Campus

10. CONCLUSION

The main aim of this study is to provide a very simple and cost effective method for 3D modeling. The dimensional analysis is carried out here to create Virtual 3D model of university campus. The Google SketchUp gives a very low cost and effective solution for Virtual 3D modeling. Google SketchUp provides a lot of possibilities for users for mapping and designing. Generally 3D programs are very often difficult to understand but, Google SketchUp provides new possibilities and opportunities for these new users.

There have been significant additions to the infrastructural facilities of the University, such as New Library Building, Students Facility Centre, Women Facility Centre, Examination Building - 2, Boys Hostel Recreation Hall, Departments of Technology, etc.

Shivaji University campus is having mix bio-diversity as well as different structural designs in constructed buildings. The virtual design prepared with Google SketchUp is useful to understand the dimensions of spatial features with bird eye view. This was quite different experience to create 3D designs of spatial features. Although there are certain limitations in designing and mapping exercise but this was wonderful experience of mapping and creating virtual campus design. The Smart Campus concept can be useful in providing an information enabled infrastructure for users.

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