**Web Based Geographic Information System Development Using Django Framework**

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**Abstract:** The aim of this review paper is to provide a basic understanding of web based Geographical Information Systems and also giving possible strategies for implementing Geographic Information System. There is a growing necessity for web based GIS .Web GIS application developed by using various frameworks .Django framework is a open source framework. It is used for making various web applications. Web based GIS is a web Geographic Information System is also very much useful in decision making and also visualizing and analyzing spatial data.

**Introduction:** Web GIS is one of the type of Geospatial Information System .Web GIS is growing necessity of today’s world. Web GIS can used for various purposes. Web GIS applications area unit the tools which allow user to create queries and analyzes geospatial information also edit information in maps and finally present the results of all these operations.

Web GIS has brief history .GIS which is also known as Geographic Information System is developed by lan McHarg (1920-1981) .lan McHarg is known as father of Geographic Information System and Map Overlays. GIS applications can be using Django framework .Also the database used by web GIS application is PostgreSQL.

Another important concept of Web GIS is Web GIS and Web Mapping. Web Mapping is the process of make use of the maps delivered by geographic information systems (GIS) on server. A web map on the server is both served and followed, thus web mapping is more than just web applications, and it is a service by which client may choose what the map will going to show.

**A Web Application:** A Web application provides a software interface and a platform to a client .A web application can be of any type .Web applications used for various purposes .A web application can be anything running on mobile known as mobile application or may be an application that run on web browsers.

 **GIS Mapping:** Mapping is actually presentation of spatial data.GIS mapping is also called as Geographic Information System .It is called that because there is information behind the map.



Figure 1 : GIS Mapping

**Technological Growth and Trends in Web GIS:** Since its initiation, Web GIS has been evolving with geosciences.

In Early times Web GIS applications were developed as independent. These independent websites were outlying from each other. It was very difficult to share any of information and functions between them, and also difficult to cover the websites for creating new applications. In 1990s, web applications services technology was evolved. Web application services can be thought of as building blocks that can be shared and cover in versatile ways for building web applications.

Because of the vast contents and functions available from cloud GIS, the flexible pay-as-you-go or subscription pricing model, and the reduced complexity and increased availability of services, cloud GIS, such as Arc GIS Online, has penetrated organizations that have not used GIS before or been able to afford GIS on their own.

**Various Frameworks used in Geographic Information System:**

There are several Django web frameworks like (1)Zend, (2)Symfony, (3)Phpdevshell ,(4)Django, (5)web2py, (6)Cherrypy , (7)Struts, (8)Spring, (9)Tapestry, (10)GWT, (11)Ruby on rails, (12)Catalyst, (13)Mason, (14)JavaScript MVC are obtainable whereas internet GIS victimization Django framework is straightforward and appropriate platform . Django framework may be a python framework , whereas Python may be a high level language encompass apothegmatic syntax and simple to be told , conjointly it's giant and growing developer community .It is transportable on most platforms . Django may be a python artificial language based mostly framework [4]. It's open supply project, conjointly giant and growing community. It's well documented and encompasses giant collections of apps. It's having sensible debugging feedbacks. As compared to alternative techniques internet GIS victimization Django consists of the many blessings and simple to be told (4).

**The Technologies employed in internet GIS:**

**Geo Django**: Geo Django is geographic internet framework. It makes as straightforward as doable to create internet GIS applications [4].
**Python**: Python may be a scripting language incorporated into several GIS applications.
**PostgreSQL**: PostgreSQL, also called as Postgres, is a free and open-source RDBMS providing extensibility. GIS development using Django. The research component will be predictive analytics. Using historic time series geospatial data we can use predictive analytics to predict future land surface temperature maps will try to predict future land surface patterns.

**Problem Statement**: Web GIS and traditionally designed maps represents the real world. One way of thinking about it is that the GIS is the data while the map is the picture. Once created, a traditional map cannot be changed. However, as an integrated system, a Web GIS allows users to ask new questions of a database and visualize answers.

**Literature Survey:**

1**] Fanon Ananda, Prof. David Kuria and Dr. Moses Ngigi (July 2016)**, “Towards A New Methodology For Web GIS Development” In Department of Geomatic Engineering and Geospatial Information Systems, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya.

 In this paper Methodologies used for development GIS applied to Web GIS development. The paper outlines in details the phases of the methodology.

2] **Aparna Kulkarni (March 2016)**, “Geo web application for species association with vegetation type and climatic regimes in western Himalaya of Indian landscape” In The University of Twente, nEnschede Netherlands.

According to this paper, The objective of this research was to identify actual and potential plant functional types and change in these types for 1 km x 1km grid. This type of Web GIS application which is first of its kind helps to study the effects climate change on vegetation and take necessary measures to protect the natural assets of the country. In this paper, Geo web application is limited only for western Himalaya region.

3**] Dr Alberto Cardoso and Dr Driss (September 2016)**, “Web geographic information systems (web GIS) for smart campus and facility management. ” In the University of Cambria.

 In this paper, this project intends to show the importance of Web Geographic Information Systems applied to smart campus and facilities management through the implementation. These devices can be, for instance, cameras, sensors, solar panels, air conditioning, and lamps. Web GIS is limited only for campus and faculty management.

**4]LeslieH.Morgan(April2015),**“DjangoYourWebmaps”InPh.D.Leslie.Morgan@GISuts.com .

 According to this paper, Django is a python language based framework .this framework is used in various GIS based and other projects.

**5]** **Dr. Sridhar Vadlapudi (January 2009), “**Development of Weather Processing System by Integrating Weather Data into GIS” **In** Research Scholar, Center for Environmental Remote Sensing , Chiba University, Japan. vadlapudi@hotmail.com .

 According to this paper, the theme of the study is to integrate weather data into Geographic Information System by converting weather data into GIS negotiable formats to develop a sophisticated Weather Processing System (WPS).

**6] O. Ozdilek, D. Z. Seker (2005)**, “A Web- based application for Real-Time GIS” In ITU, Civil Engineering Faculty, 80626 Maslak Istanbul, Turkey.

 In this paper, to create a weather processing system by integrating weather data with different structures collected from different sources in various formats, in a web-based real-time GIS.

**7] Ezekiel Kuria Mwangi , Stephen Kimani , Agness Mindila ( November 2017 )** , “A Review Of Web-Based GIS Usability Elements ” In Research journal’s Journal of Information Technology , [www.researchjournali.com](http://www.researchjournali.com) .

 According to this paper, the application of Web GIS has increased tremendously during the last decades. This paper mainly focuses on some early work on explaining the contents of Web GIS, and shows how elements have been used in GIS.

**8] Wikipedia free encyclopedia by Eric Friedman (2005)** “Geographic Information System”

GIS also known as Geosciences and also most of the times called as [geographic information science](https://en.wikipedia.org/wiki/Geographic_information_science) , the science underlying geographic concepts, applications, and systems.

**9] Arc GIS “A framework for deploying web GIS applications**”

GIS web applications can make spatial data and maps accessible to users. Thus this paper describes elements that must be assembling as part of each web GIS application.

10**]** [**Anastasia Sarelli**](https://medium.com/%40anastasiasarelli?source=post_page-----f0ee2e93bab6----------------------) **(16 June 2018)** “Geoserver: from geospatial datasets to Web Services” In [GEO University Home](https://www.geo.university/?source=post_page-----f0ee2e93bab6----------------------) .

 The scope of this tutorial is to familiarize beginners and newcomers to the Web GIS industry about Web GIS development frameworks.

**Django Architecture:**

Geographical data systems have 3 necessary components-computer hardware, sets of application package modules, and a correct organizational context together with delicate people-which have to be compelled to be in balance [4]. Django may be a Python based mostly net framework that produces speedy development and conjointly well unionized style. It becomes easier using Django to make web apps quickly and with less coding. MCV pattern is created from 3 components: Model, Controller and view. MVT model conjointly called The Model-View-Template is completely different from MVC. Django takes care of the Controller part (Software Code that controls the interactions between the Model and View), leaving with the template. The template is a part of the HTML file that includes in Django Template Language.



 Figure 2: Django Framework

Model View Template has been provided by developer then maps it to a URL then Django provide it to the user.

Steps:

1. Installation of Python: Django is written in 100% pure Python code, thus have to be compelled to install Python in your system.
2. Installation of Django: Installation of Django is extremely straightforward, however the steps are needed for putting in Django depends on form of in operation system we've got.
3. Database Setup
4. Web Server: Django comes with an online server to develop and check applications.

**4. Conclusions:**

GIS is a useful tool in visualizing and analyzing of spatial data. It is also very much useful in decision making. Web GIS extends the usability of GIS by allowing users to access the GIS functionality in their browsers or in mobile through internet. Web GIS relies on web based services to provide functionality.

**5. References:**

1] Fanon Ananda, Prof. David Kuria and Dr. Moses Ngigi (July 2016) , “Towards A New Methodology For Web GIS Development” In Department of Geomatic Engineering and Geospatial Information Systems, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya .

2] AparnaKulkarni (March 2016), “Geoweb application for species association with vegetation type and climatic regimes in western Himalaya of Indian landscape” In the University of Twenty, nEnschede Netherlands.

3] Dr Alberto Cardoso and Dr Driss (September 2016), “Web geographic information systems(web GIS) for smart campus and facility management . ” In the University of Cambria.

4]LeslieH.Morgan(April2015),“DjangoYourWebmaps”InPh.D.Leslie.Morgan@GISNuts.com .

5] Dr**. Sridhar Vadlapudi (January 2009) , “**Development of Weather Processing System by Integrating Weather Data into GIS **” In** Research Scholar , Center for Environmental Remote Sensing, Chiba University, Japan.
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6] O. Ozdilek, D. Z. Seker (2005) , “A Web-Based Application For Real-Time GIS ” In ITU, Civil Engineering Faculty, 80626 Maslak Istanbul, Turkey .

7] Ezekiel Kuria Mwangi , Stephen Kimani , Agness Mindila ( November 2017 ) , “A Review Of Web-Based GIS Usability Elements ” In Research journal’s Journal of Information Technology , [www.researchjournali.com](http://www.researchjournali.com) .

8] Wikipedia free encyclopedia by Eric Friedman (2005) “Geographic Information System”

9] Arc GIS “A framework for deploying web GIS applications”

10] [Anastasia Sarelli](https://medium.com/%40anastasiasarelli?source=post_page-----f0ee2e93bab6----------------------) (16 June 2018) “Geoserver: from geospatial datasets to Web Services” In [GEO University Home](https://www.geo.university/?source=post_page-----f0ee2e93bab6----------------------) .