Geo-visualisation of Land, Water, Ecology and Biodiversity of Western Ghats

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Introduction

- Visualization is any technique to create interactive visual interfaces to communicate a message. Geovisualization deals with the geospatial data.
- Geovisualization is a multidisciplinary task that integrates approaches from visualization to provide theory, methods and tools for visual exploration, analysis, synthesis, and presentation of geospatial data.
- Geovisualization is the use of visual geospatial displays

  » to explore data and through that exploration

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  » to generate hypotheses,

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  » develop solutions to a problem and construct knowledge.
- The purpose of visualization is insight not picture, Ben Sneiderman.

Introduction

- The Western Ghats region has unique floristic and faunal richness, their vastness, endemism, heterogeneity etc.
- There is a need to understand patterns and flows of information
- The biodiversity characteristics such as species richness and their spatial distribution, economic and the botanical importance is of great significance.
- Conservation of biodiversity requires data management and appropriate decision tools

Introduction

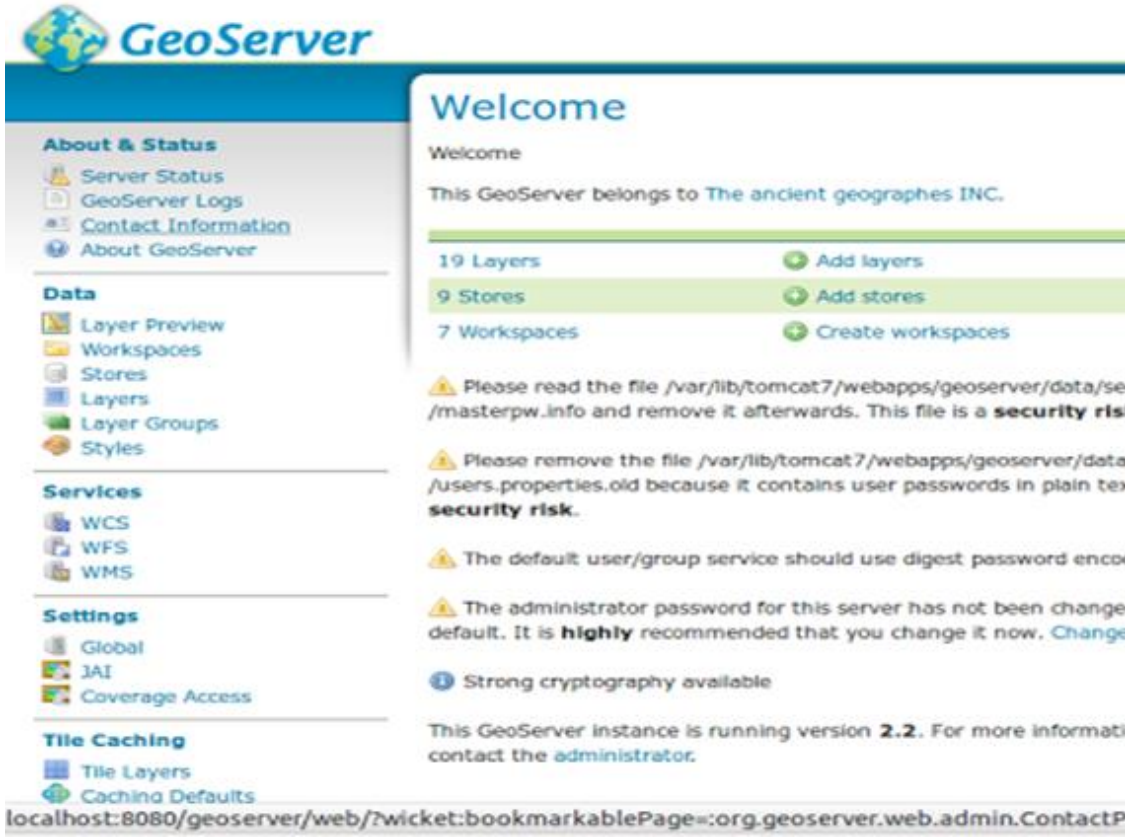
- Visualization
  - » Information visualization
  - » Scientific visualization
  - » Geographic visualization
- This information is essential to monitor, analyze and plan action oriented programs for conserving and preserving our biological wealth in the region.
- Scientifically stimulate insight into data:
  - detect the expected and discover the unexpected in massive, dynamic, ambiguous, and often conflicting data.
  - provide understandable assessments.
  - communicate assessments effectively.
- The Geospatial database helps in policy planning, operational management & biodiversity conservation.

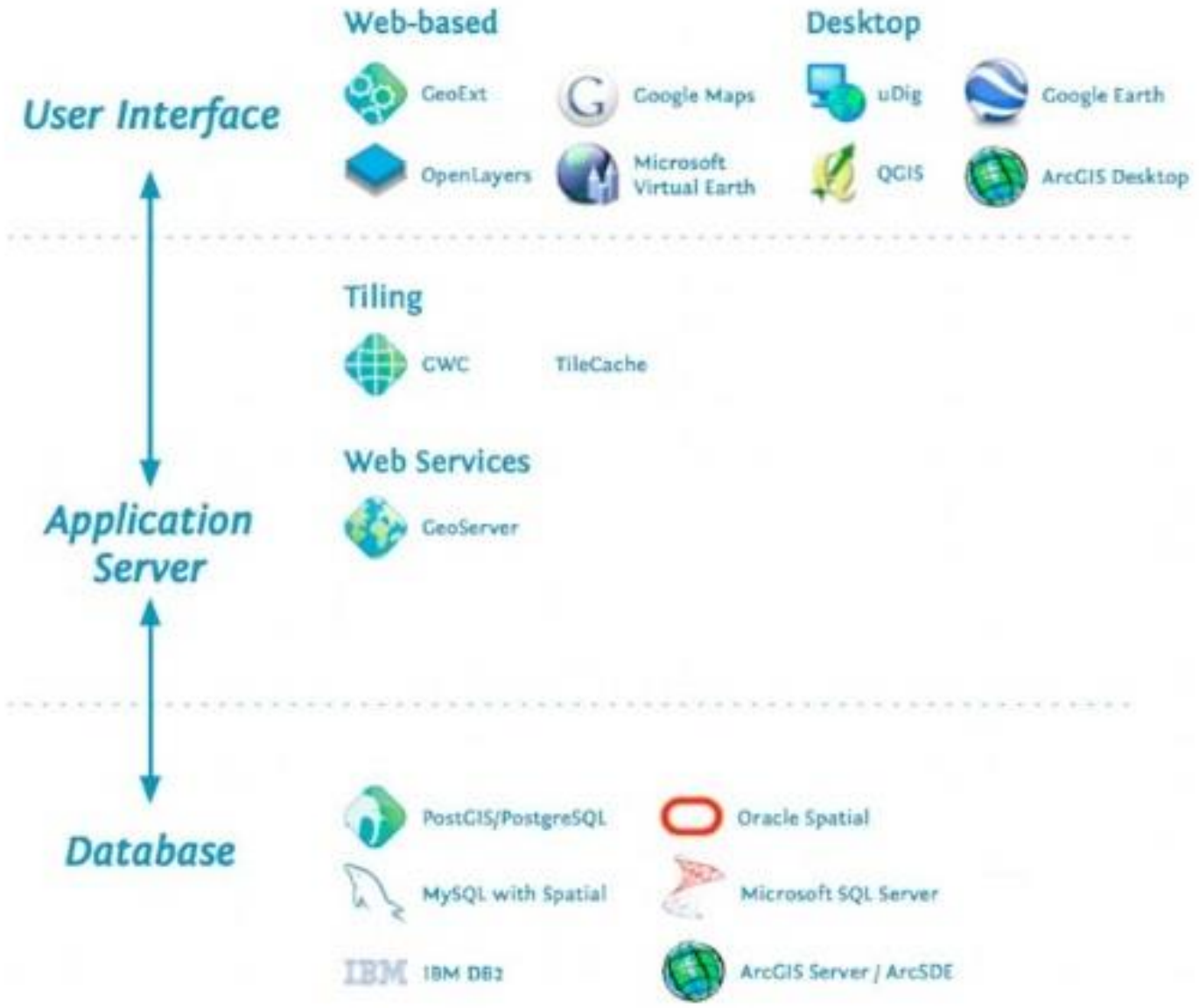
Objective

- The concept of a Spatial Decision Support System (SDSS) gives the spatial analysis of accessibility with a free and open source Web-based map service.
  - 1) to assess the spatial variation of region.
  - 2) to share this knowledge with potential users (citizens and local decision makers) in the form of a Web-based SDSS.

Method

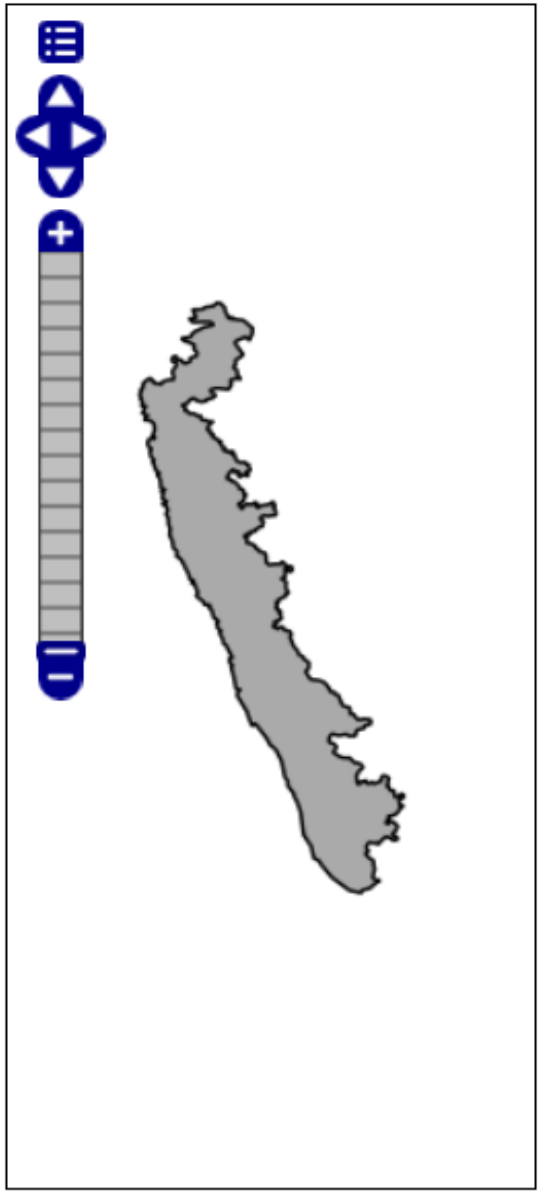
- The Web-SDSS will be a publicly available geoportal, created with the Geoserver, ExtJS, the GeoExt, and the OpenLayers frameworks.
- The web enabling comes through uploading the entire spatial and the non-spatial data at a common platform using the concept of Internet GIS.
- GeoServer is a open-source platform that allows the users to share and publish geographical information to the web.


GeoServer
Welcome
About & Status
Server Status
GeoServer Logs
Contact Information
About GeoServer
Data
Layer Preview
Workspaces
Stores
Layers
Layer Groups
Styles
Services
WCS
WFS
WMS
Settings
Global
JAI
Coverage Access
Tile Caching
Tile Layers
Caching Defaults
Welcome
This GeoServer belongs to The ancient geographes INC.
19 Layers
Add layers
9 Stores
Add stores
7 Workspaces
Create workspaces
Please read the file /var/lib/tomcat7/webapps/geoserver/data/se
/masterpw.info and remove it afterwards. This file is a security ris
Please remove the file /var/lib/tomcat7/webapps/geoserver/data
/users.properties.old because it contains user passwords in plain te
security risk.
The default user/group service should use digest password enco
The administrator password for this server has not been change
default. It is highly recommended that you change it now. Change
Strong cryptography available
This GeoServer instance is running version 2.2. For more informati
contact the administrator.
localhost:8080/geoserver/web/?wicket:bookmarkablePage=:org.geoserver.web.admin.ContactP


User Interface
Application Server
Database
Web-based
GeoExt
Google Maps
OpenLayers
Microsoft Virtual Earth
Desktop
uDig
Google Earth
QGIS
ArcGIS Desktop
Tiling
GWC
TileCache
Web Services
GeoServer
PostGIS/PostgreSQL
Oracle Spatial
MySQL with Spatial
Microsoft SQL Server
IBM DB2
ArcGIS Server / ArcSDE

Software Packages	Requirements	Purpose
Operating System	Ubuntu 13.10	Linux OS for the Server setup
Map/GIS server	Geoserver 2.5.1	Open Source Map data serving software
Web server	Apache2 Tomcat7 Web server	Apache Tomcat servlet engines supports the Web access control
Data server	Oracle, SQLServer, Postgresql 9.3 Server etc.	Provides interactive services between the web server and the database
Spatial database management system	Oracle, ESRI-ArcSDE, Postgresql + Postgis 2.0	Spatial data storage supporting database systems
Programming Language	Microsoft (.NET, ASP etc), SUN (Java), Open source (like PHP), Javascript.	Programming languages for achieving various GUI requirements
Applications/ Extensions	Geowebcache, Postgis, GeoRSS etc.	Applications providing essential service
Supporting Software	Java OpenJDK (Java Development Kit)	Backend Environment for all software's
CLI (Command Line) Tools	Shp2mysql, GDAL/ OGR, PDAL Tools	Tools for the conversion support
Other softwares	OpenJump, QGIS, Udig etc	For styling and presentation

Western Ghats Boundary

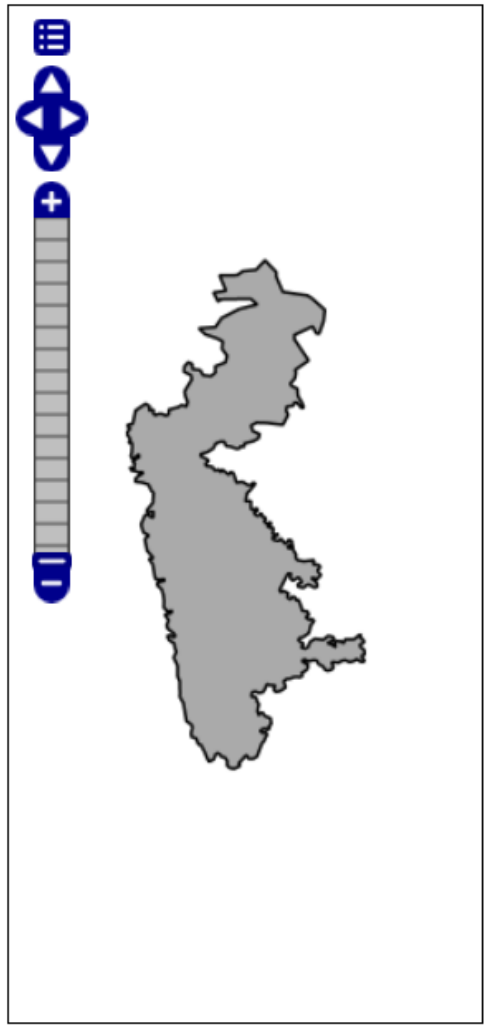


Scale = 1 : 196 74.77442, 15.15193

westernghats

fid	ID	GRIDCODE
westernghats.4	4	1

Northern Western Ghats



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northernwesternghats

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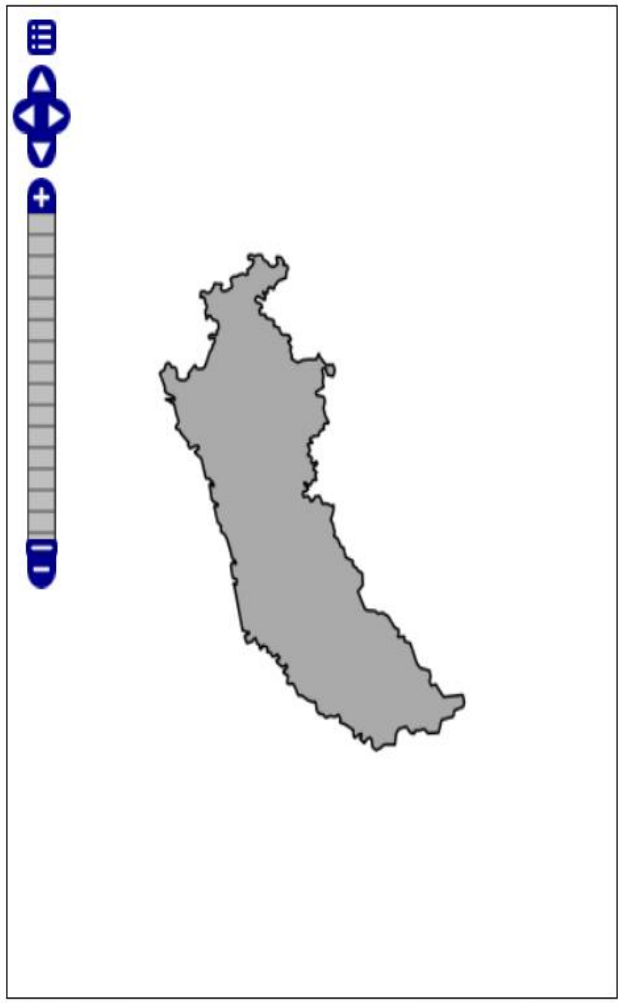
Central Western Ghats



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centralwesternghats

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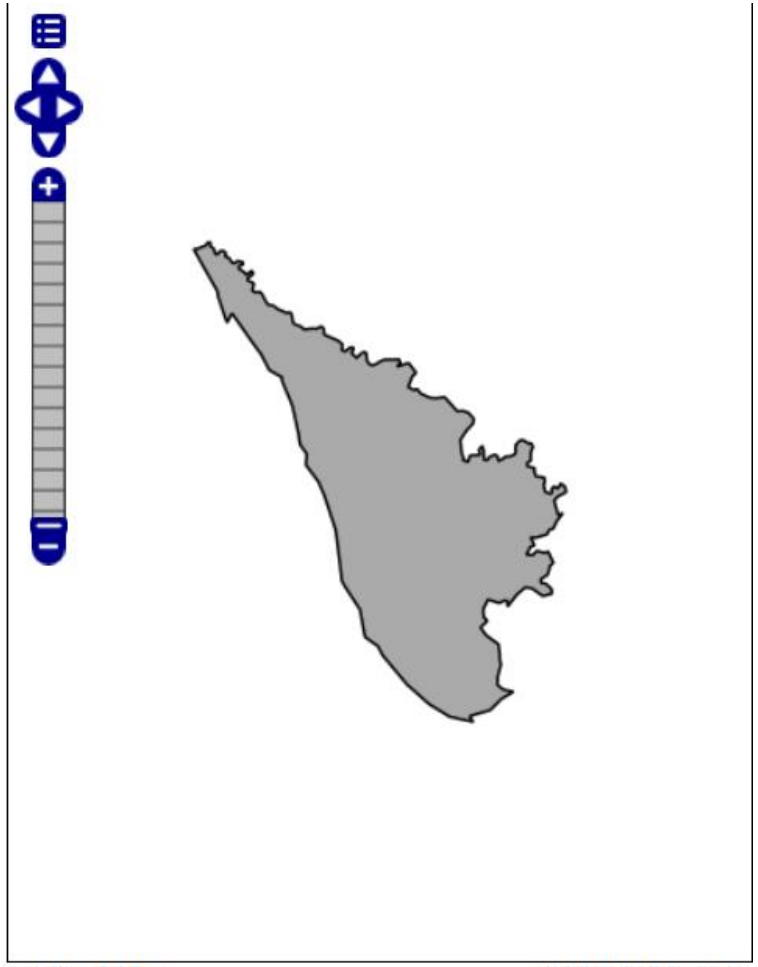
Southern Western Ghats



Scale = 1 : 67 77.21309, 12.79036

southernwesternghats

fid	ID	GRIDCODE
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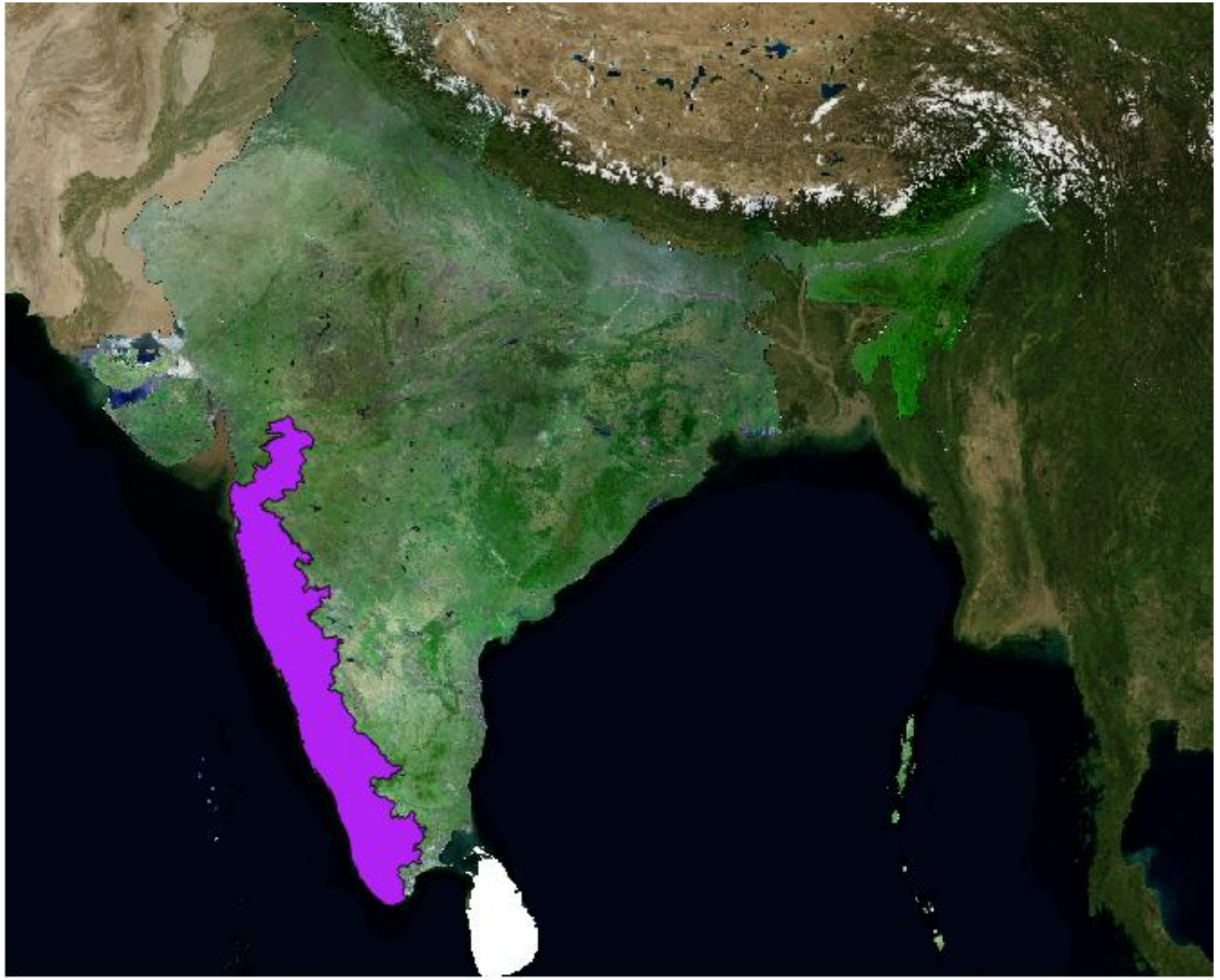
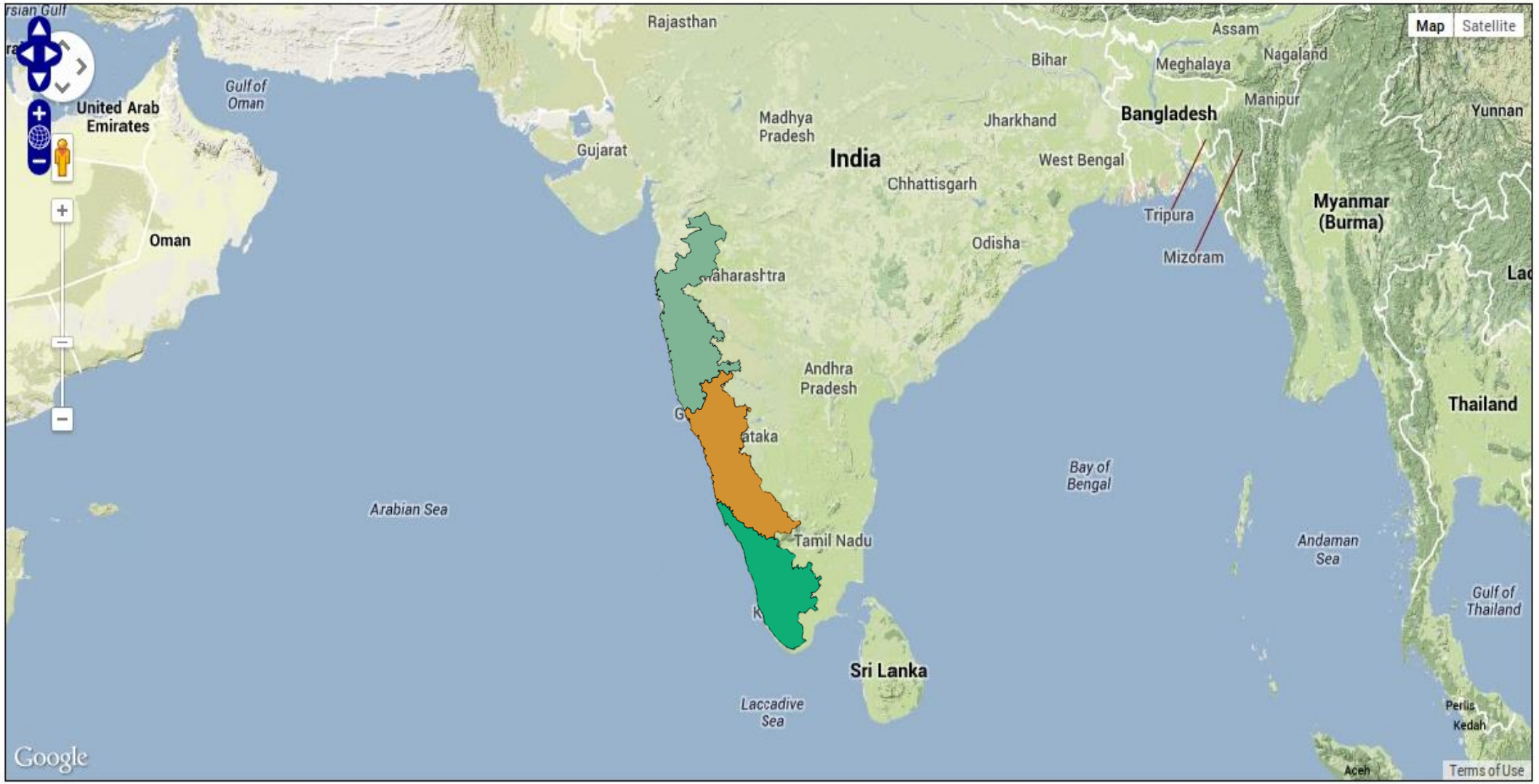
Openlayers – Bhuvan as Backend layer

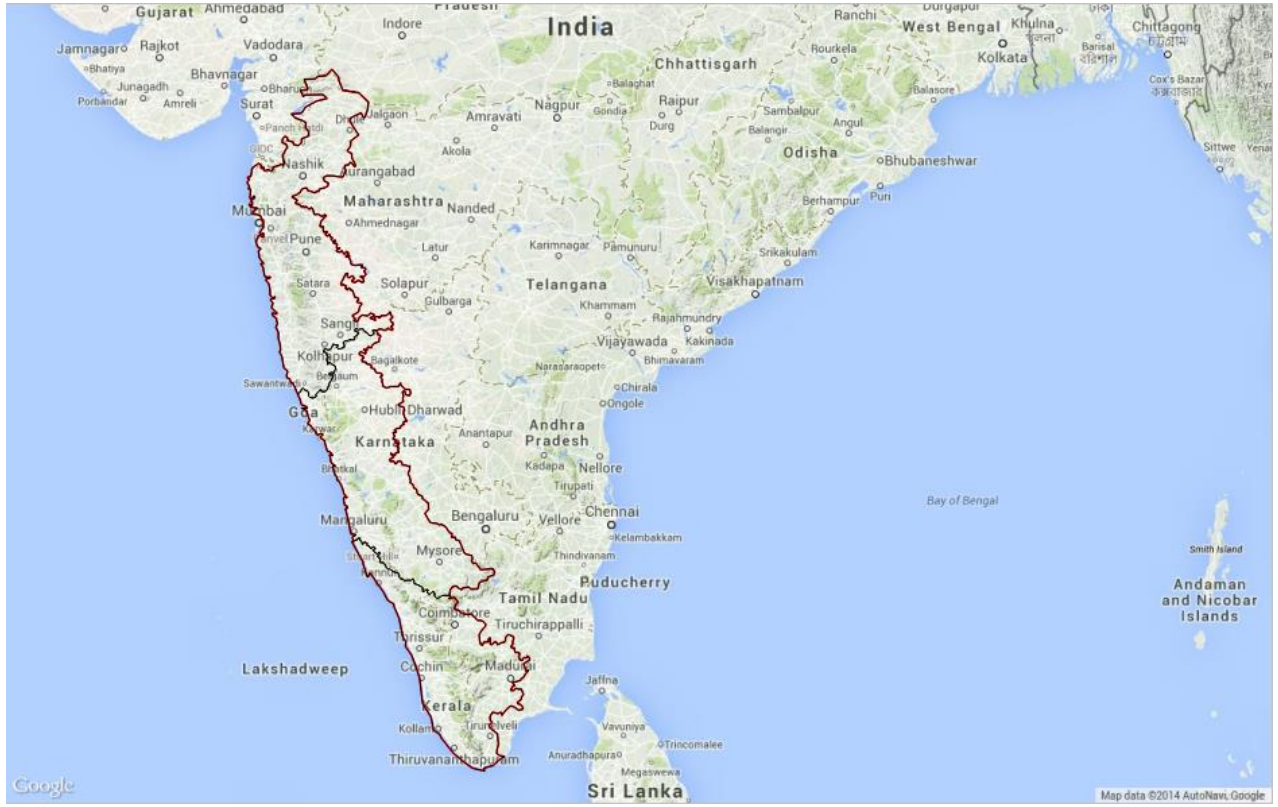


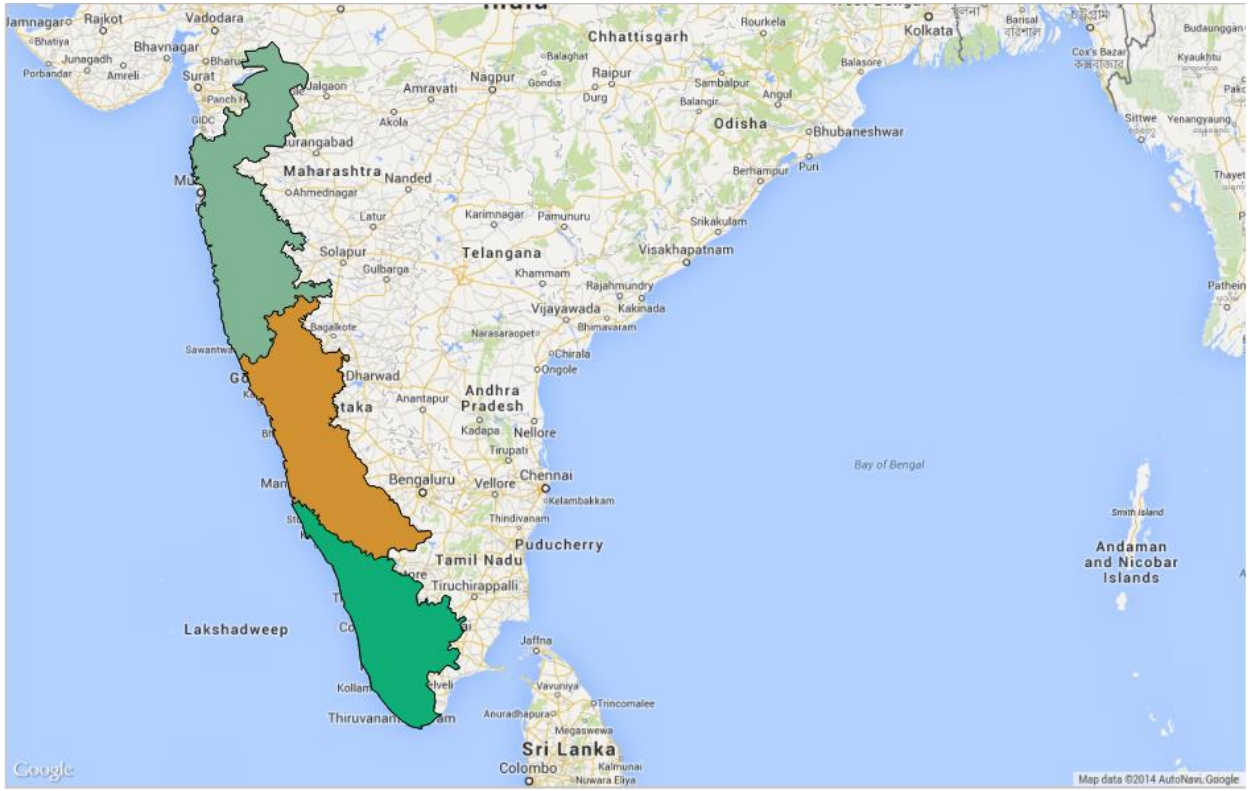
Openlayers – Bhuvan as Backend layer

OpenLayers WFS-T demo: Western Ghats Boundary

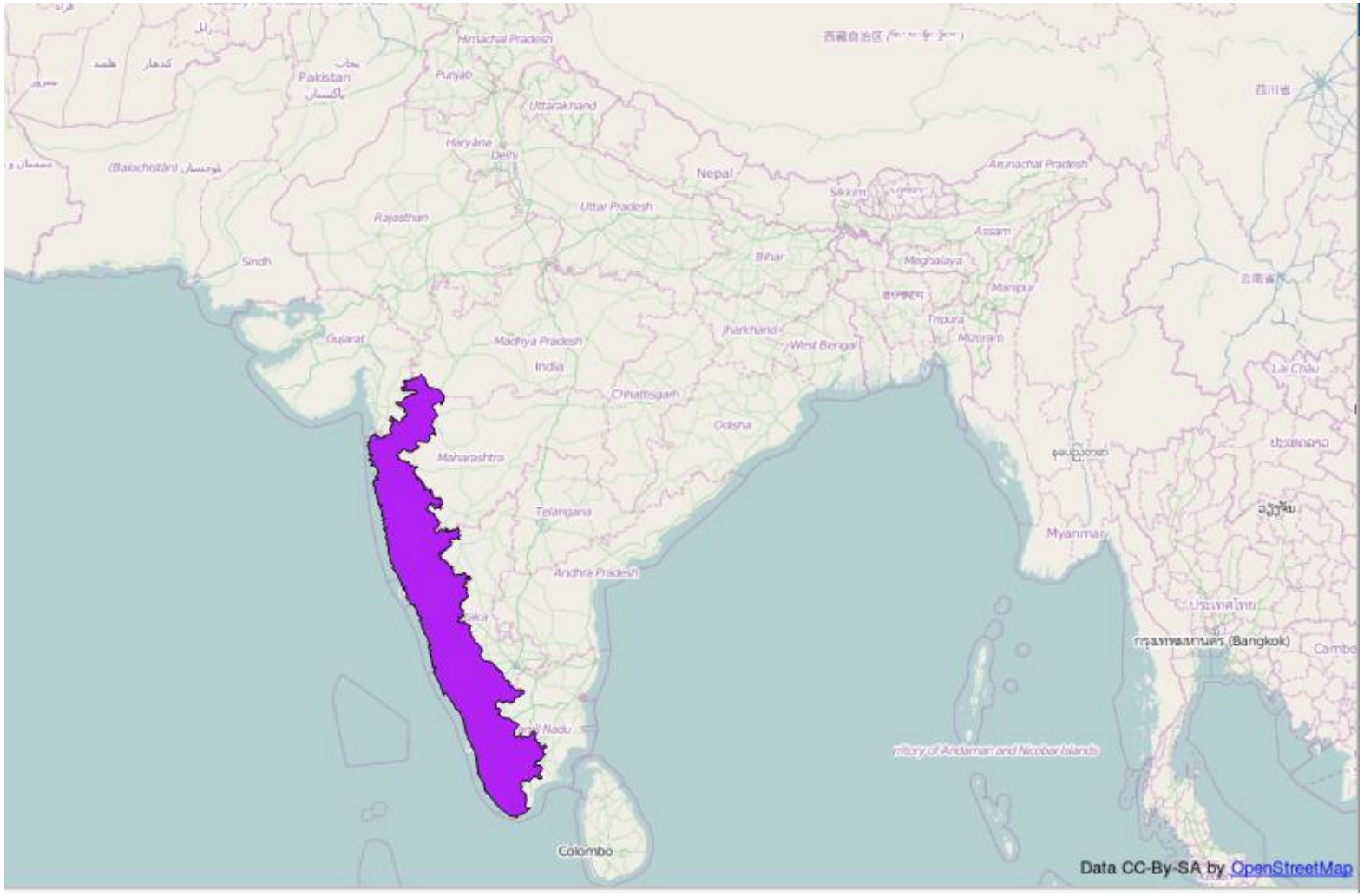


Openlayers – Google as Backend layer





Openlayers – Openstreetmap as Backend layer



Conclusion

- Sustainable management of natural resources has become a key issue for survival of planet earth.

- The SDSS aims to provide extensive baseline information and data on spatial distribution of the Western Ghats Region.

- A web-based GIS will assist the forest managers, government officials the national lead institutes involved in bioprospecting to take better decisions and to share the knowledge with potential users (citizens and local decision makers).

Conclusion

- It helps in Public Participation in GIS (PPGIS).
  - Making the growing complexity of land-use planning intelligible
  - Transforming the planning profession through use of new tools for community design and decision making.
  - Unlocking the potential of the digital data.
  - Helping communities shift land-use decisions from being more proactive and less reactive.
  - Improving community education about local environments
  - Improving the feed of information between public and government in emergency planning and management.