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Python coding for geospatial processing in web-based mapping applications

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INTRODUCTION

- Web-based mapping applications are effective in providing simple and accessible interfaces for geospatial information, and often include large spatial databases and advanced analytical capabilities.
- Perhaps the most familiar is Google Maps [Ggl] which provides access to terabytes of maps, aerial imagery, street address data, and point-to-point routing capabilities.
- Descriptions are included herein of several Web-based applications that focus on energy and environmental data and how their back-end geoprocessing services were built with Python.

- In today's world there is a lot of issues regarding proper navigation at a much efficient and cost affordable manner.
- That is,the usage of maps in our daily lives may cost a lot of data and a big data usage for storage.
- So by using libraries that are built with Python ArcGIS, we are able to build a mapping system that helps us to provide the same mapping system but at a more improved and efficient manner.
- Hence the work done is completely based on Web based tools that is available for all.

A non-GPS based location tracking of public buses using Bluetooth proximity beacons

- Tracking of public bus location requires a GPS device to be installed and many bus operators in developing countries do not have such a solution in place provide an accurate estimation of bus arrival (ETA).
- Without ETA info, it is very difficult for the general public to plan their journey effectively.
- This paper proposes an innovative IoT solution to track the location of buses without requiring the deployment of GPS device.
- It uses Bluetooth Low Energy(BLE) proximity beacon to track the journey of a bus by deploying an estimate location beacon on the bus.

Double lane line edge detection method based on constraint condition Hough Transform

- The proposed lane detection method is based on Hough Transform double edge extraction.
- This lane line detection method is used in many self driving autonomous vehicles as well as line following robots.
- There are two kinds of lane line detection methods proposed by scholars at home and abroad: Model based and feature based.
- For the straight lane line, the Hough Transform based on polar angle an polar radius constraints is used to obtain the double edges of lane lines and straight line points are used to determine the end points and starting points of straight lane lines to complete straight line fitting.

EXISTING SYSTEM

- The current system used for navigation includes usage of high amounts of data and usage of a lot of storage space.
- Apart from that, there exists various model websites which showcase the ArcGIS framework on a public level. But it is only available as a paid tool.
- Also this model works in a complex manner and hence has trouble in implementation as it requires subject knowledge for the same.
- There are multiple web-based applications that provide the necessary resources for building the structure for geospatial mapping using python.

PROPOSED SYSTEM

- To build a website that acts as a host for geospatial mapping using the ArcGIS framework.
- The system would be able to display the current location and destination locations of the user and provide a map for the same.
- The proposed system is completely based on the ArcGIS framework and will be implemented as a website using the Jupyter python library for code development.

CONCLUSION

- Python is the de-facto standard scripting language in both the open source and proprietary GIS world.
- Most, if not all, of the major GIS software systems provide Python libraries for system integration, analysis, and automation, including ArcGIS, GeoPandas [GeoP], geoDjango [geoD], GeoServer, GRASS, PostGIS, pySAL [pySAL], and Shapely [Shp].
- Some of these systems, such as ArcGIS and geoDJango, provide frameworks for web-based mapping applications different from the approach we had mentioned.
- All examples are written in Python and run within the OGC-compliant WPS framework provided by PyWPS.

📄 Argonne National Laboratory, Energy Zones Study: A Comprehen-sive Web-Based Mapping Tool to Identify and Analyze Clean EnergyZones in the Eastern Interconnection, ANL/DIS-13/09, September2013. Available at https://eispctools.anl.gov/document/21/file

📄 http://getbootstrap.com U.S. Department of the Interior, Bureau of Land Management,and U.S. Department of Energy, Final Programmatic EnvironmentalImpact Statement for Solar Energy Development in Six SouthwesternStates, FES 12-24, DOE/EIS-0403, July 2012. Available at http://solareis.anl.gov/documents/fpeis Kuiper, J., Ames, D., Koehler, D., Lee, R., and Quinby, T., webBased Mapping Applications for Solar Energy Project Planning inProceedings of the American Solar Energy Society, Solar 2013 Conference.