A Geographical Information System

Name

Institution

Date
References


References


7.Yeo, I., Yoon, S., and Yee, J. (2013). Development of an Environment and energy
Geographical Information System (E-GIS) construction model to support environmentally

system-based morphometric analysis of Bharathapuzha river basin, Kerala, India. Appl

in Indonesia using artificial neural network and geographical information system.
Renewable and Sustainable Energy Reviews 16, 1437-1449.

delineation and morphometric analysis using geographical information system. Water
Science & Technology 72, 1168.

Abstract

This study was conducted in Finland around three major companies that manage waste. It analyzed distribution and how much biomass feedstock was available for production of biomethane. This study also focused on the number and size of biogas plants around these major waste management companies. The methodology used was geographical information system (GIS) that sought to optimize the transportation of biomass which came from different sources. The concentration of biomass was calculated using Kernel Density maps. According to the results, biomass is equivalent to about 3 TWh of energy with 90% being agro materials. About 50 biogas plants could be set up around the three case studies and transport the feedstock a maximum of about 40km. Production capacities increase as transportation distance increases to produce 16.8MW at 40km. The study shows GIS is a good method to identify places where to set up biogas plants.


Abstract

Biomass is a renewable resource dependent on geographical location and is a good source of fuel. This study is conducted in Alberta where GIS is used to determine suitable places to set up
facilities that depend on biomass. The methodology puts into consideration the road network and availability of biomass. Different challenges and environmental factors are studied to come up with a good working theory for identifying suitable places. After coming up with a good working theory it was determined that 13 plants could be set up in the province of Alberta with a maximum transportation cost of $33 per tonne. Pellent plants cost an average of $115 producing a maximum of 250000 tonnes per year.


Abstract

The main aim of this paper is to come up with a model to identify the suitable facility locations for biogas plants using the GIS method to measure the necessary attributes based on a certain criteria. Measurements are taken at intervals and the FWOD procedure is used to aggregate and manipulate the data and determine how suitable the alternatives are. Criteria weights are necessary for the FWOD procedure is done through AHP and LLSM AHP to determine the upper and lower limits. The combination of the FWOD and AHP procedures allows the researcher to come up with the most suitable locations for biogas plants. The methodology used takes into account the social, economic, and political dimensions to come up with the most suitable place that a biogas plant can work at its optimum level.

Kaundinya, D., Balachandra, P., Ravindranath, N. and Ashok, V. (2013). A GIS (geographical information system)-based spatial data mining approach for optimal location and capacity

Abstract

The main aim of this paper is to build GIS based data mining approach that will eventually select the best locations and determine the resources required to set up distributed biomass power plants in a bid to decentralize energy in the rural areas. The best locations that will best serve the community are chosen based on population and the need for power in the area. This helps in cutting power distribution costs and transportation of biomass from the various sources to the power generation plant. This methodology was used to develop an optimal plan for the installing of biomass power generation plants to meet the rural electrification needs of 2700 villages in Tumkur district in India. The methodology uses a k-medoid clustering algorithm to break down the total area into clusters of villages and also find the best location of a biomass power generation plant at every medoid. K is a value that changes in every iteration after running the algorithm based on demand and supply matching constraints. The optimal value of k is the one that minimizes costs such installation of the plant, distributing of the power, and transportation of the biomass. A small region of 293 villages was chosen to see how sensitive the results were based on varying demand and also supply parameters then the results are represented on a GIS map.

Abstract

Poland came up with legal regulations to promote the development of biogas plants. This brought up the need to assess the rural areas for the environmental and economic constraints that would come up in case biogas pants were to be installed. This would ensure that biogas plants are installed at the places where they are needed and accepted the most. This paper uses both spatial and non-spatial data integrated on a GIS model to enable the researchers locate the optimal sites where they can install anaerobic digesters. The country is blessed with cattle and pig in large numbers and these were used as the main sources of animal manure supported by crop silage. This paper looks into the costs involved in setting up the biogas plants and the availability and cost of feedstock to determine the viability of the investment. The assessment was carried out for combined heat and power generation and also the injection of bio-methane into the gas grid. The methodology was applied to Kujawsko-Pomorskie Viovodeship.


Abstract

There is a sudden rise in interest in the production of biofuels using biomass from wood. Identifying the optimal location of a biogas plant is the key secret to the success of the project. The location matters a lot since transportation costs of woody biomass and distribution of electricity can be so high if the location is wrong. This study uses a two stage method in order to pinpoint the optimal location for a production plant considering several attributes. The first stage of the methodology uses a geographical information system approach to identify a potential
location. The approach puts several things into consideration including county boundaries, road and railway networks, population, and pulpwood distribution. A total transportation cost model is used in the second stage of the methodology to identify the optimal location. This model is applied to a particular place at the Upper Peninsula of Michigan to locate the optimal location. The two stage methodology identified the village of L’anse situated in Baraga county as the optimal location of a biofuel facility. Major variables such as transportation costs are studied since they are very sensitive in determining the optimal location. Additional variables sensitive to the location were transportation distance, availability of pulpwood, and fuel price. The city of Ishpeming was also found to be a viable location for a biofuel plant after considering sensitivity of other key variables.


Abstract

This study suggests a method that would create an urban planning support model using necessary information from the environment and energy GIS database that is in the urban life cycle to minimize the use of energy for planning that considers the environment. The results of this study are tabled in a systematic manner. The proposed model consists of three different models, the urban GIS integration, an E-GIS DB model, and a visualization model. The first model is able to integrate urban GIS constructs and also visualize and connect urban planning, the environment, and energy in a three dimensional space. The E-GIS DB model combines 2 Dimensional and 3 Dimensional information used in the planning of a city considering energy and the environment.
A Korean city that is currently under the urban planning process is used as a case study to validate the E-GIS construction model. An E-GIS DB section under the study was constructed in 2 Dimensions and 3 Dimensions and the key variables compared.


Abstract

Geoprocessing techniques in GIS have been used to carry out a morphometric analysis of Bharathapuzha river basin. It is a relevant technique for river basin extraction and all its drainage networks. The drainage network that was extracted was classified based on Strahler’s classification system revealing that the terrain exhibits dendritic drainage pattern and in some cases sub-dendritic. This drainage runs over an area of about 5988 square kilometers. The area of study was named a seventh order basin where lower order streams dominate most of the basin running on a drainage density of about 1.07 kilometers per square kilometer. The basin sloped at an angle between 0 and 70 degrees controlled by the geology and erosion cycles of the local soil. The study area is elongated with steep slopes and moderate relief evidenced by the elongation ratio of 0.57. an intermediate texture exists all over the region shown by a drainage texture of 7.78. the study concluded that remote sensing data combined with geoprocessing techniques are a key tool in morphometric analysis. This data can be of greater use in basin management and further research in future.

Abstract

The first objective of this study is to determine the theoretical potential of solar irradiation in Indonesia by using artificial neural networks (ANNs) method. The second objective is to visualize the solar irradiation by province as solar map for the entire of Indonesia. The geographical and meteorological data of 25 locations that were obtained from NASA database are used for training the neural networks and the data from 5 locations were used for testing the estimated values. The testing data were not used in the training of the network in order to give an indication of the performance of the system at unknown locations. In this study, the multi layer perceptron ANNs model, with 9 inputs variables i.e. average temperature, average relative humidity, average sunshine duration, average wind speed, average precipitation, longitude, latitude, and month of the year were proposed to estimate the monthly solar irradiation as the output. Statistical error analysis in terms of mean absolute percentage error (MAPE) was conducted for testing data to evaluate the performance of ANN model. The best result of MAPE was found to be 3.4% when 9 neurons were set up in the hidden layer. As developing country and wide islands area, Indonesia has the limitation on the number of meteorological station to record the solar irradiation availability; this study shows the ANN method can be an alternative option to estimate solar irradiation data. Monthly solar mapping by province for the entire of Indonesia are developed in GIS environment by putting the location and solar irradiation value in...
polygon format. Solar irradiation map can provide useful information about the profile of solar energy resource as the input for the solar energy system implementation.


**Abstract**

The geographical information system (GIS) has emerged as an efficient tool in delineation of drainage patterns of watershed planning and management. The morphometric parameters of basins can address linear, areal and relief aspects. The study deals with the integrated watershed management of Baliya micro-watersheds, located in the Udaipur district of Rajasthan, India. Morphometric analysis in hydrological investigation is an important aspect and it is inevitable in the development and management of drainage basins. The determination of linear, areal and relief parameters indicate fairly good significance. The low value of the bifurcation ratio of 4.19 revealed that the drainage pattern has not been distorted by structural disturbance. The high value of the elongation ratio (0.68) compared to the circulatory ratio (0.27) indicates an elongated shape of the watershed. The high value of drainage density (5.39 km/km²) and stream frequency (12.32) shows that the region has impermeable subsoil material under poor vegetative cover with a low relief factor. The morphometric parameters of relief ratio (0.041) and relative relief (0.99%) show that the watershed can be treated using GIS techniques to determine the morphometric presence of dendritic drainage pattern, with a view to selecting the soil and water conservation measures and water harvesting.
Scientific Publication Analysis

(a) Summarize the overall structure of scientific papers

The research papers had a common outline which is shown below.

1. Title – This is the topic of what the study is all about.

2. Abstract – This is a special summary of the major findings of the research and at times shows the methodology used.

3. Introduction – This is meant to capture the attention of the reader and give a general direction the research took.

4. Methodology- this explains in details the methods and instruments used to collect data.

5. Results and Discussion – this is an analysis of the data collected during the experimentation part.

6. Conclusion – this is a summary of the researcher’s findings.

7. Recommendations for further research- this gives general guidance to any researchers who might want to conduct research on the same topic in future.

8. References – This part outlines the sources used throughout the research.

b) How closely does the abstract in each of the 10 papers you are analyzing meet the “golden rule”? How well does each abstract convey the essential information and would it motivate you to read it?

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<thead>
<tr>
<th>Paper</th>
<th>Authors</th>
<th>Meets Golden Rule?</th>
<th>Abstract made me want to read paper</th>
<th>Abstract conveyed all essential info from paper</th>
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<th>Column 2</th>
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<td>2</td>
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<td>3</td>
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<td>10</td>
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</table>
c) What formal peer review process did one of your chosen papers go through?
d) How does the peer review process contribute to the scientific integrity?

Peer review is the process of subjecting newly written scholarly work or research under the scrutiny of experts who have been in the field for a long time before the work is published in a book or journal. This helps in maintaining scientific integrity since all published works are vetted
by qualified personnel. If the work does not meet a certain standard then it cannot be published at all or until it is corrected. This highly contributes to the integrity of scientific research.

e) Discuss whether unreferred conference presentations and online materials are good scientific references? In particular, consider the transient nature of much internet content.

Unreferred work is not good for scientific reference. This is because the information written in this work is not vetted by experts and could be misleading. One can never be sure that the information is correct.

f) Percentage of unreliable references are included in the reference list

Most of the references on the list that I chose are relevant for this study. The studies show how GIS can be used to analyze geographical data and most of them agree in the findings. They are different studies but they demonstrate how GIS can be used to analyze different types of geographical data.

g) What is DOI and what are the criteria for documents to get DOI’s? How does it differ from an ISBN?

A Digital Object Identifier (DOI) is a unique identification number assigned to published articles by the DOI foundation once the article is available electronically. It is different from an ISBN in that it is assigned to online published articles and an ISBN is assigned to all books to control publishing activities.