

Making Earth More Green and Healthy using Data mining Techniques

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Abstract

Trees are vital. As the biggest plants on the planet, they give us oxygen, store carbon, stabilize the soil and give life to the world's wildlife. A study from 2017 reveals the information that more than 150 acres lost every minute of every day, and 78 million acres lost every year!, yet there is no proper technical solution to identify the places of deforestation and to plant trees on those places. This may lead to a dangerous future. But on the other hand the growth of technology in our day-to-day life is immeasurable and uncontrollable. So the technology can be used to control this scenario. This project is all about afforestation, which is one of the important things to save our future generations. This project is an innovative idea for making earth more green and healthy. Of course, it is a long term project of finding the places with fewer trees and sowing seeds on those places either manually or using drone. Those seeds are selected based on the place and the current monsoon on that place so that trees could grow well by adopting themselves to the surroundings. In this paper we present a better solution to prevent the loss of trees.

Keywords: *Data mining techniques, Deforestation, Afforestation*

INTRODUCTION

Deforestation or felling trees has become a favorite activity of man to extract assorted

needs- be it medicines or precious paper to waste, though trees give us oxygen to breath, rainfall, reduce soil erosion. It is

human responsible to plant trees from which he extract many resources on the other hand the technology have seen a major development from Artificial intelligence to man to mars. So our idea makes the best use of this technology to solve the burning social issue. We propose an idea that immense use of technology to plant trees at the places with fewer trees. Our idea is all about afforestation that is locating the places with fewer trees using satellite map and sowing seeds on those places either manually or using drone. Those seeds are selected based on the place and the current monsoon on that place so that trees could grow well by adopting themselves to the surroundings. This idea is explained briefly in this paper. We have chosen our system name as "ERVAMATIN FOR MOTHER EARTH" because it the solution for growing trees on this earth and fits well our goal in making the mother earth greener.

NEED FOR THIS PROJECT

Trees are the only natural machine that converts carbon dioxide to oxygen. This project's idea is all about afforestation. Environment has been exploited by the human and there is much dangerous impact like global warming, deforestation is waiting for the future and this idea can

prevent such dangerous future. Basic objectives of this project is given below,

- To hold the earth young and green.
- To grow trees in necessary place.
- To achieve afforestation efficiently.
- To reduce global warming.
- To reduce soil erosion.
- To increase renewable resources.
- To increase rainfall.
- To provide life for many wildlife.
- To reduce surface temperature.
- To increase renewable resources.
- To increase the content of fresh air to breath
- To reduce air pollution.
- To reduce noise pollution (trees can absorb sound).

To address these needs our project will be developed.

IDEA BEHIND THE PROJECT

Our idea is all about afforestation that is locating the places with fewer trees using satellite map and sowing seeds on those places either manually or using drone. Those seeds are selected based on the place and the current monsoon on that place so that trees could grow well by adopting themselves to the surroundings.



Figure 1.1 *Satellite map showing places with fewer trees.*

The above Fig 1.1 shows the place with fewer trees and the idea of our project is to extract these locations from the satellite map using some techniques. There are two ways to extract the location from satellite map,

- **Segmentation**

Segmentation is the method of separating the satellite images into different segments using which we can segregate the locations where the trees density is less in number.

- **Classification**

Classification is the method of classifying the satellite images into different objects using which we can segregate the locations where the trees density is less in number by considering trees as an object.



Figure 1.2 *Satellite map showing places with more trees.*

This above Fig 1.2 clearly depicts our idea of separating image with trees populated area.

After extracting the location from the satellite map, the appropriate seeds are selected with the help of data mining. After the seeds are selected the desired monsoon for sowing those seeds is also obtained by the concept of data mining. After all the requirements are gathered the seeds are sowed on those places either manually or using drone. Then the maintenance can be handover to the nature.

IMPLEMENTATION

The implementation of this paper involved in main of five steps that will play a

critical role, and then the steps are given below,

- Location Extraction
- Algorithm Employed
- Desired Seed Selection
- Desired Monsoon Selection
- Effective Seed Sowing

These are the steps involved in the implementation perspective. Lets we see the detailed explanation about each and every steps in the following passages.

Location Extraction:

The extraction of the location from satellite map where the trees density is less in number is somewhat a risky stage of implementation. Then, the study of satellite image processing have some solution for these kind of risky module that it have some techniques for getting the required location from the satellite image. Then, those techniques are given below as follows,

- Classification
- Segmentation

These are the techniques used to extract the location from the satellite image. Lets we see the brief introduction about these techniques.

Classification

Satellite image classification is a process of grouping pixels into meaningful classes. It is a multi-step workflow. Satellite image classification can also be referred as extracting information from satellite images. Satellite image classification is not complex, but the analyst has to take many decisions and choices in satellite image classification process. Satellite image classification plays a major role in extract and interpretation of valuable information from massive satellite images.

There are several methods and techniques for satellite image classification. Satellite image classification methods can be broadly classified into three categories:

- Automated
- Manual
- Hybrid

Automated

Automated satellite image classification methods uses algorithms that applied systematically the entire satellite image to group pixels into meaningful categories.

Manual

Manual satellite image classification methods are robust, effective and efficient methods. But manual methods consume more time. In manual methods the analyst

must be familiar with the area covered by the satellite image. Efficiency and accuracy of the classification, depends on analyst knowledge and familiarity towards the field of study.

Hybrid

Hybrid satellite image classification methods combines the advantages of automated and manual methods. Hybrid approach uses automated satellite image classification methods to do initial classification, further manual methods are used to refine classification and correct errors.

Segmentation

The step of segmentation is to verify which region is a possible road region based on the central pixels. Central pixels contain not only the centerline information of a region, but also the information of its overall geometric shape. For example, a perfect square will only have one central pixel at its center. A long narrow strip region will have large number of central pixels. Therefore, the ratio of total number of central pixels to the average radius of their reference circles is a good indicator for the shape of region. Only regions with ratios above certain thresholds are considered to be candidate regions. Then,

the region can be making into segments and that can be used to exact the location.

Effective Algorithms

There are different algorithms that will make the exaction of location from the satellite map in more efficient way. Then, the different algorithms are described as follows,

K-means algorithm

This algorithm deals with defining the k centers for k clusters. These centers should be placed in a unique way as different location results in different output. So, it's better to place them as far as possible from each other. In the next step the new centers are computed with the new clusters. When no point is free, the first step is completed. These two steps are repeated until all the points have been clustered.

KFCM Algorithm

The algorithm is obtained by modifying the main function in the primitive fuzzy c-means algorithm using a kernel. Experimental results show that the proposed algorithm is more prone to noise than the conventional fuzzy image segmentation algorithms. KFCM confines the prototypes in the kernel space that are actually mapped from the original data space. The different types of image pixels

with different information are combined in the kernel space are combined using different kernel functions Here $1 - k(x_j, o_i)$ can be considered as a direct measure for measuring the distance between the kernel space.

MKFCM Algorithm

Moving KFCM is used to improve the object segmentation in satellite images. During the clustering process, the distance between the centre and each cluster is constantly checked and if the center fails to satisfy a specified criterion the center will be moved to the region that has the most active center.

Desired Seed Selection

After identifying the location using the above algorithms we are in position to sow the seeds effectively, for this task data mining comes into the picture. Using this technique we are extracting the seeds for the extracted location.

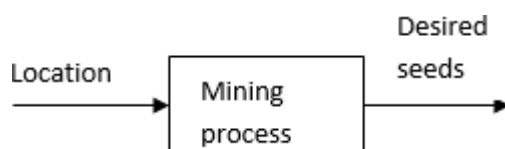


Figure 1.3 Block diagram shows mining process for seed selection.

Desired Monsoon Selection

After identifying the location and seeds for that location we are in position to sow the seeds at the desired monsoon to provide good environmental surrounding for the effective growth of the trees, for this task we use data mining. Using this technique we extract the appropriate monsoon of the location for deploying our project.

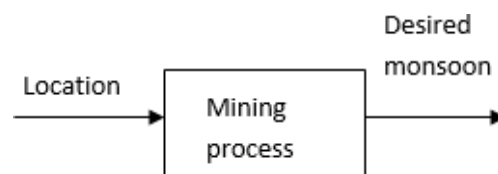


Figure 1.3 Block diagram shows mining process for Monsoon selection.

Seed Sowing

The last part of the implementation is that sowing the seeds. Using the above steps, we got the Location, desired seed and desired monsoon were exacted and the final step of these project is that seed sowing that can be done in many way, but we are dealing with two kind of approaches that is given below,

- Seed Sowing Manually
- Seed Sowing using Drones

These are the two things that is going to take part for sowing the seed to the desired

location. Let's see a brief explanation about these methods.

Seed Sowing Manually

Due to the constraint of making effective seed sowing and to reduce to cost of seed sowing process, we go for the manual work of sowing seeds. The outcome from the above steps gives us the location i.e. altitude and longitude: of the location where the trees density is less in number. The need for manual seed sowing is to reduce the cost of the project and in order to avoid the complexity of the project. Using the location, the worker sows the seed manual that is the process of this step.

Seed Sowing Using Drones

These method is used for the location were the human cannot reach like forest, etc. Millions of acres of forestland are currently under-utilized. The availability

of dependable workers, and the safety concerns of rough terrain, prevents trees from being planted and cared for. Drone Seed is a scalable solution to addressing this problem. This is the future of forestry - faster, safer, and more efficient.

The drones have two jobs in the planting. First, they fly over the land, mapping the terrain and collecting information about its topography and soil. This data is then processed by an algorithm to determine where to plant and what species of tree would thrive. Then, another set of drones is each given a batch of specially designed seed pods and sent out. Flying low over the ground, the planter drones follow instructions determined by the data on where to go and when to fire a seed pod into the ground. They're accurate to within centimeters.



Figure 1.4-Seed Sowing Drone

The above figure 1.4 is the structural picture of seed sowing drone. The drones are more than 10 times faster than human planters, at half the cost, that is why we are going for these kinds of technology.

THINGS REQUIRED

The things that are required for this project are listed below as follows,

- Spectral Satellite map.
- Program for handling Satellite map.
- Efficient Algorithm for extracting location.
- Drones or man power for sowing the seeds.
- Program for desired seed selection.
- Program for desired monsoon selection.

These are the things that needed for the implementation of this project.

RESULT OBTAINED

Though, this project is a long-term process but the outcome is somewhat important one to the society. The outcome of this project is a healthy and evergreen earth that will gives us 100% oxygen to breathe and all other thing that it can offer to the society. Then, the ecosystem will be improved and the global temperature will be reduced. Trees improve our air quality

by filtering harmful dust and pollutants such as ozone, carbon monoxide, and sulfur dioxide from the air we breathe. Trees reduce the amount of storm water runoff, which reduces erosion and pollution in our waterways and may reduce the effects of flooding. Trees create an ecosystem to provide habitat and food for birds and other animals. Trees absorb carbon dioxide and potentially harmful gasses, such as sulfur dioxide, carbon monoxide, from the air and release oxygen. One large tree can supply a day's supply of oxygen for four people. Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife. Trees are very important to the environment. They produce oxygen using light, water and carbon dioxide through a process called photosynthesis. Through this process they produce fuel that is used by many animals as food.so, keeping the above outcomes in mind going green is the best way to protect our society.

DEPLOYMENT

In this Project, we are depending on nature as a maintainer for the seeds. Nature are in responsible to grow the seeds into trees for this reason only we go for data mining to get the desired monsoon to sow the seeds.

Then, the monsoon takes care of the seeds to grow up to the level and then from there the plants itself take the responsibility to grown.

There is no need for any special kind of deployment to this project. If the outcome from the desired monsoon selection is perfect then, we don't even monitor the growth of the tree. Desired seed selection all plays a vital role in the deployment of this project why because if the seed is not suitable for the condition of the land then, the seed cannot preside its growth over the soil. The monitoring of growth of the trees is not mandatory for the developer due to the effective implementation of the project at different levels.

CONCLUSION

Being a human, saving the natural resource is everyone's responsibility. Achieving green earth is a long-term vision. Planting more trees is the first step towards that. We conclude here, that this project will make technical support in the evolution of afforestation.

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