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# Tree Association and Research System

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## ABSTRACT

Thestudy/projectdealswiththeTREE ASSOCIATION AND REPRESENTATION SYSTEM. Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife. During the process of photosynthesis, trees take in carbon dioxide and produce the oxygen we breathe.The main reason we like trees is because they are both beautiful and majestic. No two are alike. Different species display a seemingly endless variety of shapes, forms, textures and vibrant colors. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal stature of trees give them a monument-like quality. Most of us react to the presence of trees with a pleasant, relaxed, comfortable feeling. In fact, many people plant trees as living memorials of life-changing events.

**KEYWORDS:** Amelioration, Photosynthesis, Climate, Wildlife

## INTRODUCTION

Organic life is extraordinarily beautiful because of its remarkable diversity. While trees might not have been the oldest sign of organic life, they undoubtedly had a strong impact. The earliest trees date back to 385 million years and since then, they have improved the lives of other living organisms while also making our planet a beautiful masterpiece.

Trees play a crucial role for people and the planet. Numerous studies have reported that the presence of trees and urban nature can improve one's mental and physical health. Not only this, but it also plays a critical role in combating climate change, providing clean air and fresh oxygen, cooling the overall temperature of a city and beyond.

Just to give you a picture, U.K.-size forests are lost every year. Mata Atlantica, which used to cover a whopping 1.3 million square kilometers of South America, is now 90% destroyed. According to a 2019 report, India's forest cover loss in 17 years is four times the size of Goa.

With our Tree Association and Representation System or TARS, we aim to contribute to the growing need for plantations. Through our system, we provide people a way to identify the trees in their surroundings and contribute the same to our database. Many houseplant owners tend to give their plants names. Some plant lovers think of their houseplants as part of the family. Using the same hypothesis, we encourage our users to give unique identities or names to the plants and trees that they will add to our database.

Using our database, we'll be able to have a documented record of how many plants and trees a particular region contains. With the record, we'll be able to compare the recorded figures to the desired statistic. To reach the desired goal, we'll host city and

nationwide plantation drives encouraging our users to participate in it. Another aspect of our system is the ability to identify plants and trees by simply taking a snapshot. Our comprehensive and accurate database will reverse search the image to give you detailed information such as species, family, genus, heat maps, and much more.

## DATA USED

**FIG1:TULSI**

**FIG2:NEEM LEAF**

**FIG3:APPLE LEAF**

## PROPOSED METHOLOGY

**Principal ComponentAnalysis**

The entire project can be implemented in multiple ways. While there are a lot of things going behind the scene, we need to implement a front-end user interface for the users to easily access various features surrounding our project.

**Comparison ofresults**

The results of the extrapolated data were compared to the original data.

**Applying on rest of thestations**

Now, this entire above-mentioned process was applied on other stations and the results were calculated.

## RESULT AND ANALYSIS

As our first prototype, we decided to keep things elementary, meaning focusing on the core aspect of our application. We implemented our plant identification and recognition system in the backend and created a simple front-end to utilize it. On our front end, you can see two options - the first one to identify the plant species and the second one to identify and add the same to our database.

The data of the plant species, genus, and more come straight from our backend that uses a bunch of technologies. When you select any of the options, you will get an option to choose files. Since it is a web app, we refrain from adding a camera feature. In the mobile app version, the camera feature will make more sense. Once the image is selected, it will pass to our backend where all the computations will happen.

The result of these computations is shown back to the user on the front-end of our application. As you can see in the screenshots, the result showcases various information related to the selected image. The rest of the features such as store, rewards, and donations will be added in the final version of our application.

In this version, we have successfully implemented our plant recognition and identification system using various popular technologies. We have implemented Firebase as our database, Node.js as our backend language with Express.js as our backend framework. Furthermore, we have used CNN-based pre-models to train our backend to recognize various plant species.

While we were researching various possible methods, we tried exploring each one of them and figured out the accuracies and compared them to select the best approach for our project.

## CONCLUSION AND FUTURE SCOPE

In our first iteration of TARS, we have successfully implemented a plant identification and recognition system that, as per our tests, works quite fine.

The core idea behind the app was to let users help us create an accurate database that can further be used to bring environmental changes.

We have a lot of impressive things planned for our TARS system.

To make this a fully-fledged program, we will keep on adding new features and once the final version is ready, we will bring the same to the market.

Once the app makes its way to the public, it will achieve various goals related to the betterment of our environmen

Users will be able to explore various plant species while also helping us create a database of their city or region.

This will help us determine the correct plantation density and if the stats are not satisfactory, we can aim to fix it by raising various plantation drives.

While doing so, we aim to bring communities together on a common purpose i.e. to save the environment piece by piece.

This would just be the beginning as we are planning to make TARS even much more powerful and helpful.

With the help of our database, we would like to explore more possibilities and ways to help make this world and environment a better place.

Approaching trends and technologies, such as augmented reality, data glasses, and 3D scans, give such applications a long-term research and application perspective.

Furthermore, large-character datasets can be generated automatically.

We cannot only derive more accurate descriptions of a species and its typical character expressions but also study the statistical distribution of each character, including variance and skew.

The image processing provides the possibility to extract not only the linear measurements typical of botanical descriptions (leaf length, leaf width, petal length, etc.) but also more sophisticated and precise descriptions such as mathematical models of leaf shapes.

It can be developed further to indicate the certain regions which are short of the required or minimum plant vegetation and urge more and more people to help reach the required density of plant vegetation.

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