

A vibrant, high-contrast photograph of various tropical plants, including large monstera leaves and palm fronds, in shades of green and yellow. The image is used as a background for the top half of the cover.

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# Report for Project Green Future

Deep Learning

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## 1. Introduction

**At the beginning, we will introduce you to the concept of the most important points in our project:**

### ❖ **Plants**

A plant is a living organism that consists of many cells that make its own food through the process of photosynthesis, which is responsible for producing the chemical energy needed for its growth.

### ❖ **Benefits of plants**

- It helps in improving the human ability to focus and pay attention, so it is recommended to have plants inside homes and workplaces to spread positive energy and calm those in the place. Healing through the plant is not limited to eating it only, but the plant may be a direct reason to achieve health and mental safety.
- Both types of plants: vegetables and fruits, are an important part of a healthy balanced diet for the human body, and most vegetarians enjoy good health and low levels of chronic diseases.
- Preserving the atmosphere, as it is an important source of oxygen in the atmosphere, and in turn, removes carbon dioxide from the atmosphere.
- Manufacture of many products, such as: firewood, fibers, medicines, dyes, oils, rubber, and others.

One of the goals of Vision 2030: Afforestation, where many projects were launched, including Green Riyadh, Green Neighborhoods, King Salman Park, etc...

## 2. Project Description

We are a data science community that aims to develop the field of plant data analysis in the Kingdom of Saudi Arabia in cooperation with the Ministry of Agriculture.

We created a website consisting of two categories of users: the first is the volunteers who are (botanists, farmers, and data analysts), and the other category is the people who benefit from the services provided by the volunteers.

Of course, we belong to the first type as a team of data scientists. We will do studies on the data related to botany, and we would like to show you one of the studies we have done:

### 2.1 Dataset Description:

Column	Description
<b>image_id</b>	The foreign key for image
<b>Healthy</b>	The plant is health
<b>Rust</b>	The plant is infected Rust
<b>Scab</b>	The plant is infected scab
<b>Multiple diseases</b>	The plant is infected multiple diseases



### 3. Tools

- Jupyter Notebook
- Python Libraries(pandas, numpy, scipy, tensorflow, keras, matplotlib, plotly)

### 4. Execution Steps

We used Deep Learning Techniques to the implementation the project,  
Steps:

- Import libraries
- load Data
- Read Data Files
- Load Images with Extension jpg in load\_imag Function
- Visualize the target (health, scab, rust, multi diseases )
- Visualize the Health leaf
- Visualize the Scab leaf
- Visualize the Rust leaf
- Visualize the multi diseases leaf
- Visualize the pie chart
- Visualize the parallel chart
- Image processing and augmentation
  - Flipping
  - Canny edge detection
  - Convolution
  - Blurring
- Build model by used DenseNet 121
- Train model with 20 epochs
- Evaluation model
- Prediction model



## 5. Conclusion

A human cannot give up plants, as they are the main source of food for him, and they are also one of the sources of obtaining medicine, and plants play an important role in human mental health.

A People in the Kingdom of Saudi Arabia their interest in the acquisition and cultivation of plants increases, and the interest of the Kingdom of Saudi Arabia in this field, especially the Ministry of Environment, Water and Agriculture. We built this website that will provide them with many services, one of which we have provided for you is the classification and diagnosis of plants.

## 6. Future Work

The website that was established will have studies on data for local plants such as palms, dates, faqaa, and others.

and it will also be a website for educating people about plants and their importance in their life, such as make a big event for adults and children like trips to planting and getting to know the types of plants and others.