

# **SMART ODISHA HACKATHON**

## **PLANT LOCATOR- PLACATOR**

**(Documentation)**

*Submitted by*

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## **ACKNOWLEDGEMENT**

We wish to express our heartfelt gratitude to ***Skill Development and Technical Education Department, Government of Odisha*** and organizers of the Smart Odisha Hackathon'22 for providing this unique opportunity to understand Odisha's policy and regulatory environment. It will help us showcase our skills by harnessing the power of technology to solve some of Odisha's toughest problems.

## **ABSTRACT**

The annual death rate of newly planted trees in the Odisha city is high. Odisha forest department's tree plantation activities did not lead to an improvement of degraded forest area or forest cover to its full potential due to the lack of a database of degraded forest and non-forest land, according to the department's performance audit by the Comptroller and Auditor General of India (CAG). The lack of coordination and care led to degradation of planted saplings. The year wise growth and survival percentages could not be confirmed, which is the sole factor for assessing the success of the plantations. This indicated deficiency in monitoring and evaluation of plantations, the audit report said.

The district, which was once known for its vast variety of flora and fauna, now presents a very disappointing picture of receding green cover and loss of faunal beauty, many of which have disappeared permanently. The trees to be planted in the district would empower the tribals to regain a steady source of income and reduce the dependency on their landlords.

## **PROBLEM STATEMENT:**

Every year saplings are planted across Odisha during different events with a lot of enthusiasm. However, most of them die untimely death due to lack of care and maintenance. A sapling needs attention and protection against grazing, dry conditions, and hazards of other biotic and abiotic factors. They also need watering and manure from time to time. However, due to lack of care and support many of these saplings die long before they become a tree.

Many initiatives were taken by the government to promote farm forestry to reduce soil erosion and other environmental effects on the plants. But due to lack of care and attention to each planted saplings led to its degradation. During the first season, many trees perish. The first year of living at the new location is crucial. The root structure of the tree is disrupted regardless of whether it is planted bare-root, in a container.

## **MOTIVATION FOR WORK:**

Most of the area was covered by thick forest until a few years ago. The Odisha District Gazetteers report that between 1931 and 2008, there was a drop of 23.1% in the amount of forest cover, indicating significant deforestation in the region as a result of urbanization, industrialization, and natural disasters. The population are forced to migrate as a forced survival strategy as a result of the effects of deforestation. Additionally, this has caused climatic changes in the area, resulting in erratic rain patterns and having a detrimental effect on the local population's economy.

The deforestation problem faced by Odisha motivated us to find a solution which would reduce the degradation of planted saplings thus increasing the forest are and economy indirectly.

## **SOLUTION**

### **(Project introduction and proposed techniques)**

- We have attempted to tackle this problem by building a *web application - **PLACATOR** which would detect the location* of the new saplings planted in the area. It will help you track its location.

- The application (PLACATOR) not only provides the location but it *also states the condition of plant at that moment*. This helps us to take care of planted saplings in more efficient way by *easily tracing them and monitoring their condition* so that their water and manure requirements are fulfilled in time.
- This *helps us to reduce the degradation* and taking care of newly planted saplings become easier. It *promotes farm forestry* as use of our application makes it easy to take care of saplings thus motivating people to plant more. This lends a *helping hand in reducing soil erosion* and other adverse environmental effects on plants.
- *Placator also creates a database* of planted saplings/trees with geo-spatial references.

## **NOVELTY:**

- PLACATOR not only provides the *location of the plant* but it also helps in analyzing the plant by using *Computer Vision* which assist farmer to grater extent by providing useful insights about entire plantation process, *facilitating real time operational decision making, enhancing plantation* practices by introducing on field smart sensors and devices.
- *Our application would include AI plant monitoring, visual quality control*, automated inspection of quality. It would consist a unique feature which could tell if the plant needs

manure or watering based on its condition. It can also provide the basic and advance information of the plant such as the *diseases and requirement by capturing the image and processing it.*

- Placator also contains functionality for the creation of multiple databases for different plants.
- ***GPS Navigation facility*** that provides location of the plant.
- Placator includes *features that allow owners to record and manage* information of every plant which can include disease, manure required, water and other information.

## **METHODOLOGY:**

The agriculture sector has witnessed a lot of contribution when it comes to artificial intelligence. Numerous smart agricultures use cases impact the complete food supply chain by providing useful insights about the entire agriculture process.

The process involved in Plant monitoring technique.

1. acquiring the image/video from a camera
2. processing the image
3. understanding the image.

***Deep learning algorithm*** helps in accurate real time image recognition, thus using such technology in this web application will enhance the entire process.

Computer Vision systems monitor plants with cameras. Neural network is used in this to analyze video feeds in real time. The advantage of computer vision system root in automatic, non-invasive and ***low-cost plant monitoring***.

### *Computer Vision in Plant Monitoring*

· ***Computer Vision*** is therefore used in this application for data ***collection, analysis, and decision making in plantation process***. The insights to improve the welfare, environment and management of plants through evidence-based facility design. Plant monitoring systems provide continuous real time monitoring and assist producer in management process. They also provide early detection of disease and production inefficiencies.

- Placator uses *neural networks and image processing* to process the data acquired by plant monitoring using computer Vision and provide an efficient solution about the plant requirement thus helping the owner in decision making process.

It becomes really difficult to store all the data of a huge amount of saplings like where it was planted, whether they have grown or not etc.

- *Placator uses MongoDB to maintain the database* of all the saplings and connect it to our web application for ease of the user.