AI For Always Improving(Maryem chakroun & Refka Mechri**)**

Introduction:

Es9ini is a mobile application designed to help farmers optimize their water usage for irrigation. The app uses the user's location to analyze soil characteristics and is connected to weather data for real-time, customized recommendations. Farmers can input the types of plants they are growing, and Es9ini will calculate the optimal amount of water needed and the best time to water, reducing waste and promoting efficient irrigation. This contributes to water conservation and sustainable agriculture.

Why ES9INY ?

In Tunisia, erratic weather—such as unexpected summer rains and winter heat waves—often leads to overwatering, making plant care increasingly difficult and causing significant water waste.

ES9INY is here to help:

- Save Water
- Save Time
- Save Energy
- Save Money
- Healthier Plants

Experience efficient plant care and water conservation with ES9INY.

<u>Here's how it works:</u>

1. **Launching the application:** When a farmer launches the ES9INYapplication, he is greeted by a user-friendly interface designed specifically for farm

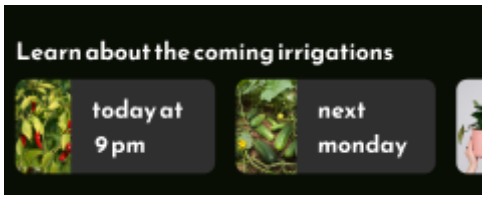
2. **management.Uploading Plant Pictures:** The farmer uploads a picture of their plant or crop along with details such as the plant type and location. This information is

essential for accurate plant care. All uploaded data is securely stored in a cloud database to ensure easy access and management.

3. **Automatic Classification:** The uploaded photo is processed by an AI-based image classification model. This model identifies the plant and assesses soil characteristics based on the provided location. The data used for classification is continuously updated in the cloud to ensure precise and current care recommendations.

4. **Weather Integration:** The app connects to weather services to retrieve real-time data, including precipitation, wind speed, and humidity. This weather data is also stored in the cloud and regularly updated to reflect current conditions, ensuring optimal irrigation management.
5. **Watering Calculation:** Using a predictive model, the app calculates the exact amount of water needed. Key factors include:
    - **Crop Type:** Different plants have distinct water requirements.
    - **Weather Conditions:** Recent and forecasted weather data, including precipitation and humidity, influence watering needs.

- **Predictive Model:** This model adjusts watering duration and timing based on the latest data stored in the cloud, optimizing water use and minimizing waste.



6. **Automated Watering:** The app communicates with a smart irrigation system like **Netafim NetBeat**. This system, installed on the farm, receives commands via API from the app and adjusts irrigation settings accordingly. The irrigation commands are sent based on data stored and processed in the cloud, ensuring efficient and precise watering.

7. **End-of-Process Notification:** Once the irrigation is completed, the farmer receives a notification confirming that their crops have been watered as planned. This notification is sent through the app and helps track irrigation activities, ensuring that all plants receive the necessary care.

Machine Learning Models in ES9INY:

In the ES9INY application, we leverage advanced machine learning to optimize water management. To achieve this, we employ two key models:

1. Plant Classification Model: This model is crucial for accurately identifying and classifying the plant species from user-uploaded images
2. K-Nearest Neighbors (KNN) Model: Once the plant is identified, the KNN model predicts the optimal amount of water required based on various environmental and soil factors. This model ensures efficient irrigation by calculating precise watering needs tailored to current conditions.

Subscription Details:

- **Free Trial:** New users can enjoy a free three-month trial of ES9INY, allowing them to fully experience the app's features and benefits at no cost.
- **Annual Subscription:** After the trial period, users will need to subscribe to an annual plan to continue using the app.

Link for github

Link for figma prototype