MACHINE LEARNING ALGORITHMS

Assignment 2

Implementation of AI and IOT in Rooftop Farming

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Overview:

- ✓ Rooftop gardens are man-made green spaces on the topmost levels of industrial, commercial, & residential structures.
- ✓ They may be planning to grow produce, provide play space, give shade and shelter, or simply be there as a living, green area.

Conditions Required for Rooftop Farming:

- Rooftop gardens are possible to be exposed to more intense sunlight than those at ground level. Such light is less likely to be filtered by trees or other covering, potentially generating heat levels that can be dangerous to increasing plants.
- If this proves to be the case, it may be wise to invest in a thin shade cloth or netting to present some protection to your crops. The surface of the rooftop also becomes especially important as dark materials will absorb most sunlight & create a very hot, arid environment.
- Self-watering containers are another means to keep plants moist. Such containers normally need less attention than traditional watering and provide a source of water that simulates patterns in nature.

Benefits of Rooftop Farming:

- ✓ Generate income and can provide some local employment for the poor.
- ✓ Utilizing otherwise unused roofs to make an income.

- ✓ Engaging in low time-consuming work that can be shared with other jobs.
- ✓ Establishing food security by providing fresh, safe, & healthy produce.
- ✓ Contributing to environmental sustainability & natural resource management.
- ✓ Reducing heat on residents living on the top floor of buildings, which helps them save electricity by means of fans or AC less.
- ✓ Decreasing harmful Carbon Dioxide & increasing oxygen, thereby improving their health.

Artificial Intelligence and IOT in Rooftop Farming:

It is essential to increase the productivity of agricultural and farming processes to improve yields and cost-effectiveness with new technology such as the Internet of Things (IoT). In particular, IoT can make agricultural

and farming industry processes more efficient by reducing human intervention through automation.

Improving Harvest Quality:

AI systems today are helping farmers to improve harvest quality and accuracy using precision agriculture. It leverages AI to help in identifying diseases in plants, pests, and poor plant nutrition on farms. AI sensors can detect and target weeds and then decide which herbicides to apply within the right buffer zone.

It assists to thwart applications of herbicides and extreme toxins that find their way in today's food. For example, a researchers' team developed an AI to detect diseases in plants.

The team leveraged a method, transfer learning, to teach the AI to identify crop diseases and pest damage, and utilized TensorFlow, a Google's open-source library, which created a library of 2,756 images of cassava leaves from plants in Tanzania. In that case, AI was able to detect disease with 98% accuracy.

Computer Vision-Enabled Farming:

Monitoring their farms, farmers are using Computer Vision and deep learning algorithms to capture data from drones flying over their fields. From drones, AI-powered cameras can take images of the entire farm and evaluate the images in near-real-time to recognize problem areas and potential improvements.

E-Parirakshak – A Device by LPU Students:

As IoT depends on sensor data collections, a vast amount of data needs to be gathered to identify or predict accurate results.

The system comprises several sensor nodes which can be deployed in the field, a hand-held device with LCD screen which displays the field details and micro-controllers that remotely manage devices like sprinklers and water pumps on field.

Using the device, a farmer will be able to monitor the fertility of the soil, water level required, soil temp and soil moisture and control the water pumps, blower and sprinklers through sensors and actuators deployed in the field.

The device will also detect diseases or infections in the crop and update the farmer about them.