Agricultural Intelligence: A Smart Farm That Solves the Causes and Consequences of Climate Change in Agriculture

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Climate and agriculture are intricately interwoven, as seasonal change produces a wide diversity of crops. Climate change has ramifications for agricultural health, yield, water, and soil. Consequently, several problems, including agricultural wastes, water pollution and irrigation, and plant diseases, might be remedied. This project has three phases: (a) “the early warning station” provides statistical analysis of climate data via the Internet of Things (IoT) system; (b) “an artificial intelligence (AI) model” trained with a PlantVillage dataset of predefined crop diseases, detects diseases based on their photos—the first two phases were integrated into a single robot due to their success—and (c) “the water treatment station” prepares drainage water for irrigation by coagulating it with Northern Coast White Sand, ultrafiltration membranes made from cellulose acetate, and activated carbon nanosilver composite. The early warning station provided data with an approximate 2% margin of error, and a delay of a couple of seconds. The AI model correctly detects the disease 96% of the time. The coagulation process could remove roughly 73% of the total dissolved solids (TDS) in water, while the ultrafiltration membranes could remove approximately 50% of the TDS. The conclusion was that the water was used for germination, and was successful in saturating three kg of sandy loam soil with 1.8 L, which solved the irrigation problem and yielded productivity automatically based on the entire statistical analysis of water, soil, and climate.

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