**Objective:** Use of AI agent for plant age mapping

**Case:** Problem associated with traditional method of plant age mapping

**Problem:**

|  |  |
| --- | --- |
| **Problem** | **Impact** |
| Manual and labor-intensive | Slow, costly, error-prone |
| Subjective and inconsistent | Low accuracy, observer bias |
| Limited spatial resolution | Cannot capture field-wide variability |
| No real-time monitoring | Delayed decisions, missed critical growth stages |
| Poor data integration | Cannot inform precision agriculture or AI-based systems |
| Ignores environmental variability | Static estimates, not adaptive to stress or climate changes |

###

**Purpose of AI Agent:**

|  |  |
| --- | --- |
| **Component** | **AI Agent Functionality** |
| Data Collection | Uses sensors, drones, or images to gather plant data (leaf size, color, canopy, etc.) |
| Feature Extraction | Identifies features correlated with age: morphology, chlorophyll, height, etc. |
| Model Training | Trains ML/DL models (CNNs, regression, etc.) using annotated plant age data |
| Age Prediction | Predicts plant age or growth stage from real-time data or images |
| Mapping | Generates field maps indicating the age/stage of plants spatially |
| Alerts/Decisions | Sends insights for harvesting, irrigation, nutrient application, etc. |

**Impact of AI agent:**

· Precision Agriculture
Adjusting inputs (fertilizers, irrigation) based on plant age/stage.

· Phenotyping & Breeding
Monitoring age-related traits for genotype performance.

· Disease/Pest Prediction
Certain ages are more vulnerable; AI can trigger preventive action.

· Yield Estimation
Growth stage mapping helps in estimating final yields accurately.

· Automated Farming Systems
Integrates with autonomous sprayers/harvesters that act based on plant stage.

**Here’s a simple interaction sketch showing how plant age mapping would work with the AI‑powered agent:**

 