

## Abstract

### Topic: Smart Farm Keeper

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Search Keyword: Smart Farm Keeper, GR-LYCHEE, Image Acquisition, Image Processing using Plant Image Dataset, Internet of Things (IoT), Location Identifier using GPS.

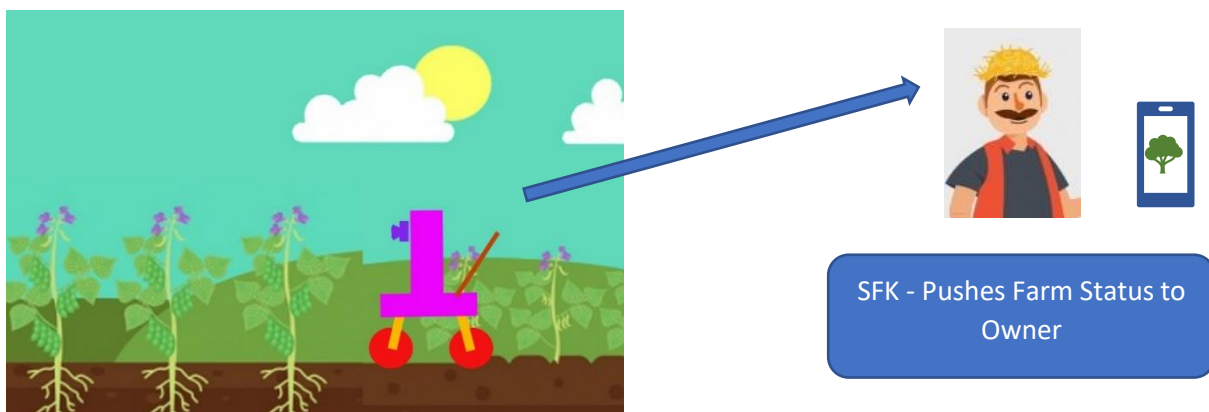
Proposed Master Module: **GR-LYCHEE board with camera Module**

Other Hardware Components: **GPS tracker module, Cam Pan-Tilt Assembly, DC Motor Driver & Motor Chassis Assembly, Temperature, Light Intensity & Moisture Sensor, Rechargeable Battery.**

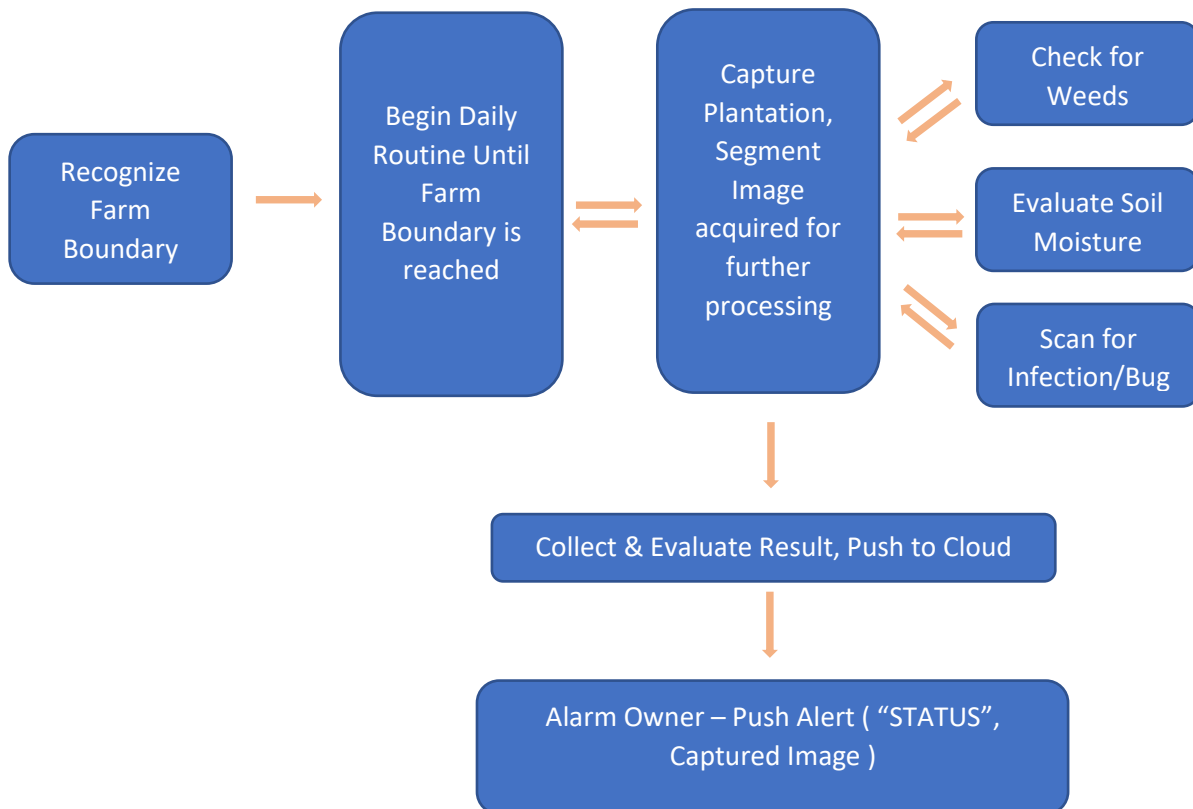
Software Components: **OpenCV, SFK Mobile Application**

**Problem Statement:** Every farm needs a close attention by its owner, right from the day one, involving action plans in terms of “what to plant for this season?”, “how much space required for the plantation?”, “Is my farm fertile enough for the expected yield?”, “Is greenhouse sowing required?” and so forth... till a day with a fruit of harvest in hand. A careful study of farming processes along with corrective measures in every stage improves the yield rate of plantation. A corrective action falls anywhere between removal of weeds, check on sufficient watering, implementing pest control to a plant disease treatment, intruder identification, etc. Of course, these tiresome processes demand relatively long human hours in a remote farm site and, crafting such working time space is really a question of the hour to every individual involved in farming in upcoming days.

**Solution:** My primary goal is to design a system which can take care of a farm activity with its own near human abilities and can update the farm owner with the “status” of the farm or “action plan” as, and when required. This kind of intelligent semi-autonomous assistance overrides the demands for longer human hours at a remote farm site. My system prototype named “SMART FARM KEEPER (SFK)” incorporates a battery powered processing unit (GR-LYCHEE board with inbuilt wifi) mounted over a four wheeled motor chassis coupled with a vision and location tracking abilities, capable of moving around the farm semi-autonomously makes it a perfect fit with the “problem statement” above.



(a) Figure 1: Autonomous activity of Smart Farm Keeper communicating with owner



(b) Figure 2: Block diagram of Typical program flow

Following criteria are expected to be addressed for effective semi-autonomous farming practice,

- 1) Recognising Farm Area  
(Parameters Involved – GPS Location, Visual Fence Marking)
- 2) Identifying plantation  
(Parameters Involved – Predefined marking by owner (or) detection using AI based on board support)
- 3) Check and confirm parameters appropriated for plantation growth  
(Parameters Involved - Temperature, Exposure to sun – light intensity)
- 4) Monitor daily routines – watering plants, suppressing weeds  
(Parameters Involved - Soil Moisture content, Image analysis – detect for weed growth)
- 5) Alarm on identifying Infections  
(Parameters Involved: Image Analysis – scan for infection or bugs in leaves, flower, vegetable / fruit, stem portion)
- 6) Examine yield and identify Time to harvest  
(Parameters Involved: Image Analysis – scan for the fruit/vegetable, make count, check for “ready to harvest” state)
- 7) Intrusion detection  
(Parameters Involved: Image Analysis – Movement detection in scheduled hours)
- 8) Push collected data to Cloud / Owner Mobile App

Fully autonomous ability can also be achieved by adding up solar panels and other additional circuits to our system for self-recharging on the go. However, the above general ideas shall be improvised at the time of implementation considering the board capability and the actual requirement by, preserving the objective.