



KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

Indian Institute of Science campus, Bengaluru

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Website: www.kscst.org.in/spp.html or https://kscst.karnataka.gov.in/en

FORMAT FOR STUDENT PROJECT PROPOSAL FOR THE 48th SERIES OF STUDENT PROJECT PROGRAMME

<https://forms.gle/ks2WxWB4ei1hgv9D9>

1.	Name of the College: B.M.S. College of Engineering
2.	Project Title: GreenSense: The Complete IoT Solution for Plant Growth and Care Using Machine Vision and AI-Powered Disease Detection.
3.	Branch: Information Science and Engineering
4.	Theme : Integrating Internet of Things, Artificial Intelligence
5.	Name(s) of project guide(s): 1. Name: Dr. Anitha H M Email id: anithahm.ise@bmsce.ac.in Contact No.: 9448839215
6.	Name of Team Members: Name: Sanat K USN No.: 1BM21IS150 Email id: sanatk791@gmail.com Mobile No: 7676875827 Name: Shreesha Bhat USN No.: 1BM21IS165 Email id: shreeshabhat24@gmail.com Mobile No.: 8277631770 Name: Vishal S USN No.: 1BM21IS206 Email id: vishalsantosh2003@gmail.com Mobile No.: 8861857467

7.	Team Leader of the Project: Name: Vishal S USN No.: 1BM21IS206 Email id: vishalsantosh2003@gmail.com Mobile No.: 8861857467
8.	Processing Fee Details : Please furnish the payment details in the format provided in the last page of the proposal.
9.	Date of commencement of the Project: 15-08-2024
10.	Probable date of completion of the project: 15-04-2025
11.	Scope / Objectives of the project: <p>The GreenSense project aims to provide an affordable, sustainable, and scalable solution for urban and terrace gardeners in Bengaluru and Karnataka, promoting efficient plant care using IoT and Machine Vision technologies and future expansion to larger agricultural domain.</p> <p>The project aligns with Karnataka's goals of sustainability, innovation, and smart agriculture.</p> <p>Key Objectives:</p> <ol style="list-style-type: none"> Sustainable Urban Gardening: <ul style="list-style-type: none"> Enable urban and terrace gardeners to monitor and care for plants with minimal manual intervention, promoting water conservation and resource efficiency. AI and Machine Vision for Plant Health: <ul style="list-style-type: none"> Use machine learning and machine vision to detect plant diseases early and provide actionable care recommendations, ensuring healthier plants and optimized fertilizer use. Scalable Agricultural Solutions: <ul style="list-style-type: none"> Develop a modular system that can be scaled for larger agricultural use, empowering small-scale farmers to improve crop yield and productivity through data-driven insights. Economic Empowerment and Innovation: <ul style="list-style-type: none"> Provide an affordable, technology-driven solution to enhance agricultural practices, contributing to Karnataka's vision of fostering smart agriculture and technological adoption in farming. Self-Sustainability and Environmental Impact: <ul style="list-style-type: none"> Integrate solar power and rechargeable batteries to ensure the system operates sustainably, reducing dependence on external power sources and supporting eco-friendly practices.

12.

Methodology:

1. Design and Hardware Integration:

Select and integrate low-cost, high-quality components including ESP microcontroller, soil moisture sensors, temperature/humidity sensors, MLT air quality sensor, camera module, solar panel, and rechargeable batteries.

Develop a modular design with provisions for adding future sensors (e.g., pH, NPK) to enhance system functionality.

2. IoT Connectivity and Real-Time Monitoring:

Use the ESP8266 module to enable Wi-Fi connectivity and real-time data transmission to the Blynk IoT platform.

Configure mobile app integration for remote monitoring and control, allowing users to view sensor data and receive notifications.

3. Machine Vision for Disease Detection:

Integrate a camera with machine vision capabilities to capture plant images.

Use machine learning models to analyze images for plant disease detection and provide actionable insights on plant health.

4. Automated Watering System:

Program the system to automatically trigger watering based on soil moisture levels, ensuring optimal hydration for plants.

Use a small pump connected to a water reservoir, controlled by sensor data.

5. Fertilizer Recommendations:

Implement algorithms that analyze sensor data to suggest appropriate fertilizer types and quantities based on plant health and environmental conditions.

6. Solar Power and Sustainability:

Power the system using a solar panel and rechargeable Li-ion batteries, ensuring self-sustainability and reducing reliance on external power sources.

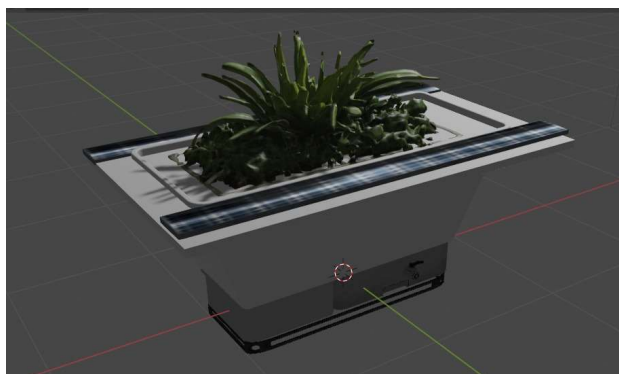
Optimize energy usage for long-term operational efficiency.

7. Modular Expansion and Scalability:

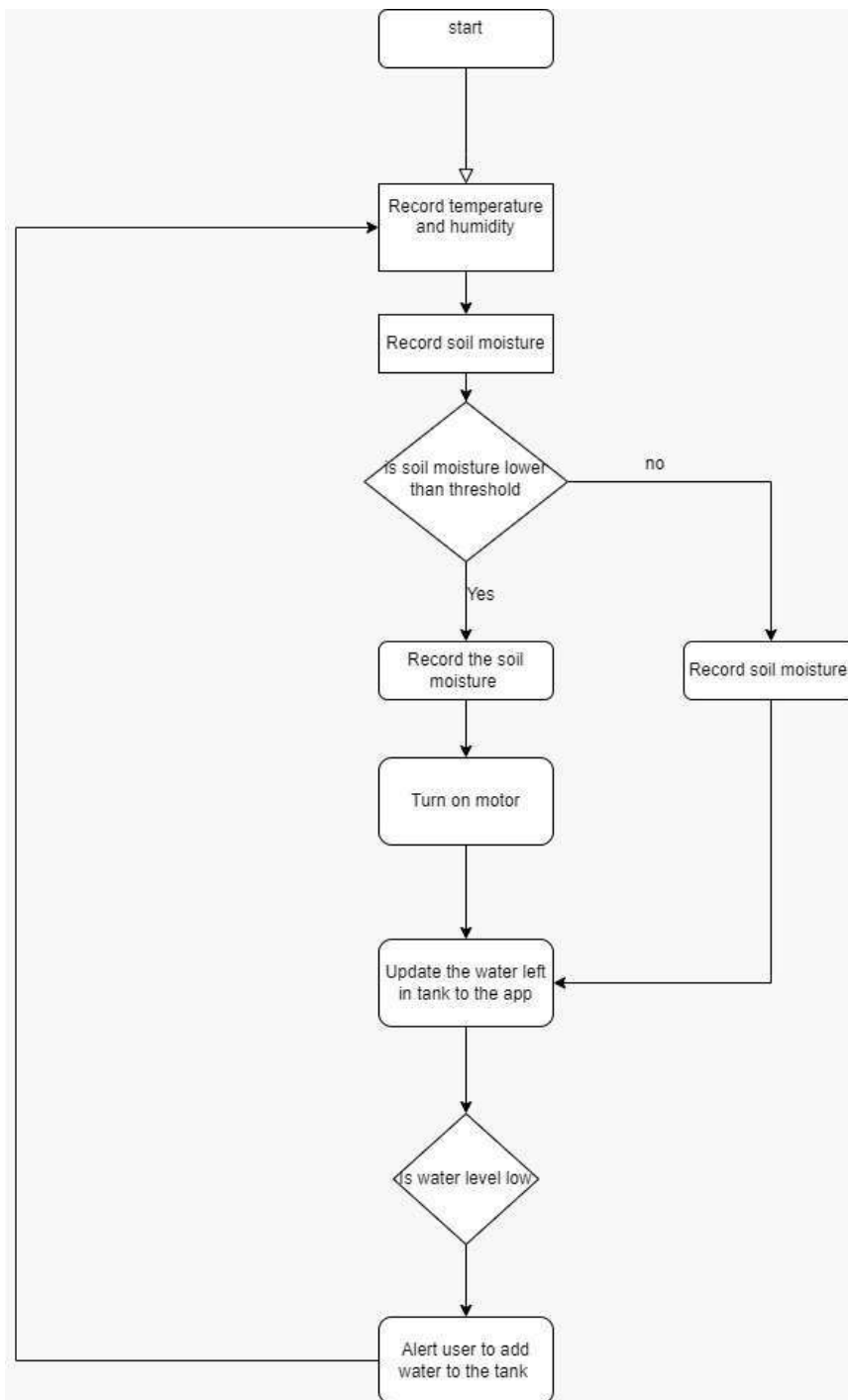
Design the system with open ports for future sensor additions, enabling users to customize the system as per their specific gardening or farming needs.

Develop a plan for scaling the system for larger agricultural applications, integrating Raspberry Pi for data collection and cloud storage.

3D Render:



Flowchart:



13. Expected Outcome of the project:

- The project aims to develop an IoT-based system that monitors plant health in real-time by tracking environmental and soil parameters such as humidity, temperature, light, and soil moisture, with automated irrigation based on these readings to optimize water usage.
- It incorporates disease detection through image processing and CNNs, alongside yield prediction algorithms for domestic plants. The system integrates with the cloud for data storage and analysis, providing users with smartphone notifications and an intuitive interface to monitor plant health and trends.

	<ul style="list-style-type: none"> Powered by a rechargeable battery and solar panel for self-sustainability, it supports scalability by enabling communication between multiple Arduino units for larger setups. This solution reduces water waste, prevents crop loss through early disease detection, and promotes sustainable agriculture, offering a functional prototype with potential for commercialization to domestic gardeners and small-scale farmers. 												
14.	<p>Is the project proposed relevant to the Industry / Society or Institution?</p> <p>Yes / No:</p> <p>Yes.</p> <ul style="list-style-type: none"> GreenSense is relevant to society because it promotes sustainable and efficient plant care. It helps urban gardeners and small-scale farmers by providing real-time monitoring, automated watering, and early disease detection, reducing water waste and preventing crop losses. With its affordable and eco-friendly design, powered by solar energy, GreenSense makes advanced plant care accessible to everyone while supporting food security and sustainable agriculture. 												
15.	<p>Can the product or process developed in the project be taken up for filing a Patent?</p> <p>Yes / No: Yes</p> <p>Prior Art search done?</p> <p>Yes/No: No</p>												
16.	<p>Budget details :</p> <table border="1" style="width: 100%;"> <thead> <tr> <th>Budget</th><th>Amount</th></tr> </thead> <tbody> <tr> <td>a) Materials / Consumables</td><td>₹10,730</td></tr> <tr> <td>b) Labor</td><td>₹1,000</td></tr> <tr> <td>c) Travel</td><td>₹0</td></tr> <tr> <td>d) Miscellaneous</td><td>₹0</td></tr> <tr> <td>Total</td><td>₹11,730</td></tr> </tbody> </table> <p>a) Material:</p> <ol style="list-style-type: none"> ESP microcontroller * 3 :- ₹2400 Solar panel * 6 :- ₹800 Li-ion cell * 4 :- ₹1000 Soil Moisture sensor * 3 :- ₹200 DHT11 Humidity and Temperature Sensor * 3 :- ₹200 Water tank and pump assembly * 2 :- ₹600 Type c charging board * 4 :- ₹150 Large plant pot * 2 :- ₹250 pH sensor * 1 :- ₹1950 NPK Sensor * 1 :- ₹3180 	Budget	Amount	a) Materials / Consumables	₹10,730	b) Labor	₹1,000	c) Travel	₹0	d) Miscellaneous	₹0	Total	₹11,730
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Total	₹11,730												

	<p>b) Labor:</p> <ol style="list-style-type: none"> 1. 3D printing of water tank :- ₹500 2. 3D printing circuit board enclosure :- ₹500
17.	<p>Any other technical details:</p> <ol style="list-style-type: none"> 1. Microcontroller: ESP8266/ESP32 Wi-Fi Module Handles sensor data collection and communication with the Blynk app for real-time monitoring, enables remote control and monitoring through the mobile app. 2. Sensors: Capacitive Soil Moisture Sensor: Measures the moisture level in the soil to log watering data and to determine when watering is needed. Temperature/Humidity Sensor (DHT11): Monitors the ambient temperature and humidity, helping optimize plant care conditions. 3. Solar Panel: Powers the system autonomously, with integrated 18650 3.7v Li-ion rechargeable batteries for energy storage. Also serves as a sensor for measuring exposure to sunlight. 4. Actuators: Water Pump and Relay Module: Controls water flow from the tank to the plant based on soil moisture readings, ensuring efficient water usage. Automated Fertilizer Dispensing (Future Feature): Provisions for adding an automated dispenser controlled by sensor data for accurate fertilizer application. Camera and Machine Vision: Camera Module (ESP32-CAM or other compatible models): Captures images of the plant for disease detection using machine learning techniques. The image data is processed using pre-trained models or cloud-based AI for plant disease identification and health assessment. 5. Modular Design: Open Ports: <ul style="list-style-type: none"> o Two open ports allow the addition of other sensors such as pH or NPK sensors for further environmental monitoring and plant care.
18.	<p>SPP Coordinator (Identified by the college):</p>

	<p>Note: To be identified by the principal of the institution. The project proposals must be submitted to KSCST through SPP coordinator designated by the principal.</p> <p>Name: Prof. / Dr. / Mr. / Mrs.</p> <p>Email id:</p> <p>Contact No.:</p>
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Name of the Project Guide: Dr. Anitha H M
Email id: anithahm.ise@bmsce.ac.in
Contact No.: 9448839215

Name of the HOD: Prof. Jayarekha P.
Email id: jayarekha.ise@bmsce.ac.in
Contact No.:

DECLARATION

(From Project Students)

(To scan this page and enclose in the project proposal)

We, the project team hereby declare that the details enclosed in the project proposal **GreenSense: The Complete IoT Solution for Plant Growth and Care Using Machine Vision and AI-Powered Disease Detection**, Branch: Information Science and Engineering, College: BMS College of Engineering are true and correct to the best of our knowledge and belief. We undertake to inform the Karnataka State Council for Science and Technology (KSCST) of any changes to the project title or team members' names immediately through our project guide or the SPP Coordinator of our institution.

Additionally, we declare that the project work is original and not a result of copying or purchasing. We are committed to completing the project independently, with support from our faculty and project guide, while utilizing the facilities provided by the college. We will not engage in plagiarism and pledge to be sincere and dedicated in executing and completing the project as proposed.

We understand that if any of the above information is found to be false, untrue, or misleading, we may be held liable. We authorize the sharing of the project information contained in this proposal with KSCST, Bengaluru.

We acknowledge that the project team must exhibit and demonstrate the project, participate in the mid-term evaluation of sanctioned projects, and engage with experts. Additionally, we must exhibit the project at the Annual State-Level Poster Presentation and Exhibition, if selected. Should our team fail to participate in the mid-term evaluation or the Annual Exhibition (if selected), we understand that the supported project funds will be returned to KSCST.

We also enclose the endorsement form for KSCST, Bengaluru.

Name of the students with USN No.

Signature with date

1. Sanat K 1BM21IS150
2. Shreesha Bhat 1BM21IS165
3. Vishal S 1BM21IS206

(Name & Signature of Project Guide with Seal)

(Name & Signature of HOD with Seal)

Email id:

Email id:

Contact No.:

Contact No.:

ENDORSEMENT

(From College, endorsement to be taken in the institution / Department Letter head)

(To scan this page and enclose in the project proposal)

This is to certify that 1) Mr Sanat K, 2) Mr Shreesha Bhat 3) Mr Vishal S are bonafide student(s) of Department of Information Science and Engineering in the degree program of our institution. If the project proposal submitted by these students under the 48th series of Student Project Programme is selected by KSCST, we will provide the requisite laboratory / Computer / infrastructure support in our college / Institution. Further we also take necessary steps to see that the project team will exhibit / demonstrate their project in the mid-term evaluation of project and in the Annual State-Level Poster Presentation and Exhibition (if selected). If the student team fails to send the completed project report or fails to attend the evaluation in mid-term evaluation of sanctioned projects or fails to attend the Annual State-Level Poster Presentation and Exhibition (if selected), the supported project amount will be returned to KSCST.

(Name & Signature of
Project Guide with Seal)

(Signature of HOD with Seal)

(Signature of the Principal with
Seal)

Email id:

Email id:

Email id:

Contact No.:

Contact No.:

Contact No.:

DETAILS OF PROCESSING FEES MADE THROUGH NEFT / UPI PAYMENT

(**Note:** Include this page in the softcopy of the student project proposal. The student team shall furnish the details in the Google Form. It is informed to the students to 1) keep ready the softcopy of the project proposal and other documents and 2) Furnish the payment made details as processing fees and 3) update the details in the Google Form on the same day of payment made to KSCST by NEFT / UPI payment).

1. TITLE OF THE PROJECT	:	GreenSense: The Complete IoT Solution for Plant Growth and Care Using Machine Vision and AI-Powered Disease Detection.
2. NAME OF THE TEAM LEADER	:	Vishal S
3. EMAIL ID	:	vishalsantosh2003@gmail.com
4. CONTACT MOBILE NO.	:	8861857467

PAYMENT MADE DETAILS

5. BANK REF. NO. / UTR NO. / UPI No. (12 digits)	:	
6. TRANSACTION ID	:	
7. NAME OF THE SENDER / ACCOUNT HOLDER and CONTACT NUMBER	:	
8. NAME OF THE BANK	:	
9. PROCESSING FEES	:	Rs. 1,180/- (Inclusive of 18% GST)
10. DATE OF PAYMENT MADE	:	
11. TIME	:	
12. MODE OF PAYMENT MADE (NEFT / UPI, PLEASE SPECIFY)	:	

(Name & Signature of
the team leader)

(Name & Signature of
Project Guide or HOD with Seal)

KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

Indian Institute of Science campus, Bengaluru

48th SERIES OF STUDENT PROJECT PROGRAMME (SPP)

(Note: This page is for information about bank details of KSCST to the student team and college / institution and not to include this page in the project proposal softcopy)

BANK ACCOUNT DETAILS OF KSCST

Name and address of the Institution	Karnataka State Council for Science and Technology, IISc Campus, Bangalore -560012
Account holder's name / Designation	Secretary, Karnataka State Council for Science and Technology
Bank Account No. & Name of the bank	Current A/C No. 0683201000024 Canara Bank, IISc Campus Branch, Bangalore-560012
IFSC Code	CNRB0000683
MICR Code	560015023
Bank Branch Address	Canara Bank, Indian Institute of Science, Bangalore-560012

BANK DETAILS

Name of the Agency	Karnataka State Council for Science and Technology IISc Campus, Bangalore - 560012
Account holder's name / Designation	Secretary , Karnataka State Council for Science and Technology
Bank Account No. & Name of the bank	Current A/C No. 0683201000024 Canara Bank IISc Campus Branch Bangalore-560012
IFSC Code	CNRB0000683
MICR Code	560015023
Bank Branch Address	Canara Bank Indian Institute of Science Bangalore-560012



केनरा बैंक Canara Bank

भारत सरकार का उपक्रम

A Government of India Undertaking

सिंडिकेट Syndicate

KARNATAKA STATE COUNCIL FOR SCIENCE



0683201000024@cnrb

BHIM
BHARAT INTERFACE FOR MONEY

UPI
UNIFIED PAYMENTS INTERFACE



भारत 2023 INDIA

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE