National Agricultural Higher Education Project

CENTRE OF EXCELLENCE FOR DIGITAL FARMING SOLUTIONS FOR ENHANCING PRODUCTIVITY BY ROBOTS, DRONES AND AGVS

Indian Institute of Technology Bombay, Powai, Mumbai 400 076, Maharashtra, India

Eight Weeks Online Workshop

on

Embedded Systems and IoT in Agriculture

17th June - 07th August 2021

About NAHEP-CAAST Project

Centre for Advanced Agricultural Sciences and Technology (CAAST) under World Bank Sponsored National Agricultural Higher Education Project (NAHEP) of Indian Council of Agricultural Research (ICAR), New Delhi is paramount to develop and adopt the knowledge-intensive agriculture education to enhance the agricultural productivity. Agricultural Post-Graduates and Doctoral students are the target objectives to develop the quality human resource in digital technology with appropriately equipped by knowledge and their expertise in frontier areas of agricultural science and technology. The desired traits and skills could be instrumental for market-driven research and rapid adoption of advanced agricultural practices. Moreover, emphasis is being placed upon inclusiveness and equity aspects of the access to agricultural higher education. The project envisages the enhancement of quality and relevance of the agricultural higher education to the agricultural university students. The NAHEP centre is integrated by three interdisciplinary research divisions such as Agribots, Agri-Drones and Agri-AGV's based on four portfolios:

1. **Climate-based Digital Knowledge Support Centre. (CDKS)**
2. **Seed/Seedling Processing and Nursery Automation Centre. (SSPN)**
3. **Smart Portable Machinery Centre. (SPM)**
4. **Food Processing Automation Centre. (FPA)**
5. **Instrumentation Cell (IC)**

Project Knowledge Partner

1. **NAHEP-CAAST-IIT Bombay, Indian Institute of Technology Bombay, Powai, Mumbai 400 076, Maharashtra, India (Knowledge Centre).**

   Aim of the center is to conduct the research in the area of Agri-Robots, Agri-Drones and Agri-AGVs and to train the PG /Ph.D. and Faculty members of NAHEP-CAAST-VNMKV.

   Principal Investigator : Dr. Amit Arora, IIT Bombay
   Co-Principal Investigator : Dr. P. Chinnasamy, IIT Bombay.
   Co-Principal Investigator : Dr. Kavi Arya, IIT Bombay

2. **NAHEP-CAAST-VNMKV, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani-431402, Maharashtra, India (Centre of Excellence).**

   Aim of the centre is to establish the advanced academic and research facilities, to establish University and Industry Interface in the area of Agri-Robots, Agri-Drones and Agri-AGVs keeping IIT Kharagpur as one of the knowledge Partner.

   Principal Investigator : Dr. G.U. Shinde, Team Leader and Assistant Professor, FMPE, VNMKV, Parbhani
   Co-Principal Investigator : Dr. R.P Kadam, Professor, Extension Dept., VNMKV Parbhani
   Co-Principal Investigator : Er. Sanjay N. Pawar, Asst. Professor, CAET, VNMKV, Parbhani
   Organizing Secretary : Dr. Narendra Khatri, Research Associate (Agri-Drones), NAHEP, VNMKV, Parbhani
   Mob: +91-9460533888**, Email:** raagridrones.nahep.vnmkv@gmail.com
   Co- Organizing Secretary : Dr. Aniket Waikar, Senior Research Fellow (CDKS), NAHEP, VNMKV, Parbhani
   Mob: +91-9421864320**, Email:** srfcdks.nahep.vnmkv@gmail.com

About the Workshop:

Automation in agriculture is enabled by using Sensors, Actuators, Drones, Weather stations, Terrestrial robots with robotic arms, etc. All these enablers make use of a controller/processor. In order to perform the task, intelligence is required and is developed by programming the controllers/processors. It also becomes essential for these enablers to store data on the cloud, this data translates to valuable information by using machine learning and artificial intelligence.

The objective of the workshop is to acquaint the participants with the know-how of embedded systems and Internet of Things (IoT), which is a small contribution towards agriculture automation. The workshop will be broken down into three sessions (detailed outline below). The first session will cover the basic prerequisites required for a better understanding of the next two sessions. The second session will involve interfacing sensors/actuators to the controller and programming the same. The third session will enable us to send sensor data over the Internet for data analysis. By the end of the workshop participants will have an understanding of technologies that can be deployed in the field and also be able to build their own system.

IoT and Embedded system can be applied to agriculture operations such as irrigation management, precision farming technologies, food processing automation, pest detection, nutrient management etc.

The Eight-week online workshop on "**Embedded Systems and IoT in Agriculture**" is organized to acquaint the participants with the know-how of embedded systems and Internet of Things (IoT), which is a small contribution towards agriculture automation.

PG/Ph.D. Students, Faculties, Scientists of Vasantrao Marathwada Krishi Vidyapeeth, Parbhani are eligible to register and are requested to take the advantage of the Eight weeks' online workshop from 17th June 2021 to 07th August 2021.

Daily lectures as per the schedule are live telecasted through online platform with tutorials and online discussions by the renowned professors in the domain area from Centre for Technology Alternatives for Rural Areas (CTARA) Centre, IIT Bombay.

This training would definitely develop skills that will drive their employability, Productivity and wellbeing in the decades to come and ensure the overall progress of India.

Registration Details

Total No. of Seats: 50 Participants (classification of participants)

20 students from VNMKV, Parbhani
20 students from other institutions
10 faculty members

Interested candidates can register through google form: https://qrgo.page.link/sYAAv before 14 June 2021, 5:00 PM

QR Code:

Online counselling of the interested candidates (Registered through this google form link) will be held for the final selection. The final selection will be notified via the registered email address. Only selected participants need to pay program fees as applicable.

Registration Fee (Non-Refundable):only short listed participant (on 15th JUNE 2020) has to Pay Registration fees.

Rs. **100/-** for All Students
Rs. **500/-** for All Faculty

Account Details:

Account Name: Comptroller, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani
Account Number: 38639565001
Bank Branch: State Bank of India,
Branch: MKV, Parbhani (MS) India.
IFSC Code: SBIN0020317
MICR Code: 431002203

Training Schedule

Duration/ Session	Content	Mode
Session 1 10 days	1. Basics of C programming 2. Digital electronics 3. Masking and shifting operators 4. Getting started with Software	There will be weekly (Mon/Wed/Fri) three 1 Hr. virtual hands-on sessions
Session 2 30 days	1. Getting Started with Robotics 2. Introduction to ATmega2560 microcontroller 3. Embedded C Programming 4. Input-Output devices Interfacing - Switch, Buzzer, LCD 5. Analog-to-Digital converter in ATmega2560 6. Interrupts in ATmega2560 7. DC Motor Interfacing and its Control 8. Timers and PWM generation in ATmega2560 9. External Hardware Interrupts in ATmega2560	This is self-paced learning which will require participants to spend around 7- 8 Hrs. a week to complete tasks within the deadline. If needed there will be one live session for troubleshooting problems.
Session 3 10 days	1. Introduction to IoT 2. Exploring protocols (HTTP/MQTT) 3. Use of Visualization tools	There will one session per week for a duration of 2 Hrs. each and will be virtual hands-on