VPKBIET, Baramati.
Department of E&TC Engineering

AY 2022-23

Final Year Curricular Project Diary
Status till March 2022.

Project Title: Use of Digital Technology For Micro Irrigation System To Improve Water Efficiency Of Irrigation Sector (Using IOT, ML and Cloud Computing)

Broad Domain: IOT

Category of the Project: Product Development

Sponsored/Non-Sponsored: Non-Sponsored

Submitted by Group No: 25

Names of Project Group Members:
1. Patange Shivam Kishor
2. Sagare Rushikesh Madhav
3. Mahalankar Shivam Govindrao

Project Guide/Supervisor: Mr. Sachin Trankatwar

August 2022

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	August Week 1-2	**Tasks performed:** 1. Group formation 2. Project Idea discussion. **Outcomes:** 1. Formed a project group of 3 members. 2. Discussed various project ideas and finalised the project.
Slot 2	August Week 3-4	**Tasks performed:** 1. Research about the estimated cost and tools needed. 2. Research about targeted consumers. **Outcomes:** 1. The estimated cost was found to be around Rs.10000. 2. Finalised tools and technologies. 3. Targeted consumers were found to be farmers.

September 2022

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	September Week 1-2	**Tasks performed:** 1. Discovering recent research. 2. Discovering related products. **Outcomes:** 1. Found out about the recent researches and published papers about the topic. 2. Completed the research about the related products.
Slot 2	September Week 3-4	**Tasks performed:** 1. Research about the different approach. 2. Finalised best approach for solving the problem. **Outcomes:** 1. Confirmed the final approach for solving the problem.

October 2022

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	October Week 1-2	**Tasks performed:** 1. Discussed about the different tools and technologies suitable for the project as well as affordable. 2. Discussed about different sensors needed for the project. **Outcomes:** 1. NodeMCU ESP8266 was found to be best suitable for the project. 2. FC-28 Hygrometer, DHT11, etc. sensor were finalised.
Slot 2	October Week 3-4	**Tasks performed:** 1. Discussed about the different cloud platforms, technologies and platforms for project which would be suitable as well as affordable for the project. **Outcomes:** 1. Finalised the Amazon AWS EC2 cloud platform for the project.

November 2022

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	November Week 1-2	**Tasks performed:** 1. Started working on cloud servers locally on the VMware virtual machines to check the suitability and cross verifying the Ubuntu operating system for the project **Outcomes:** 1. The Ubuntu operating system was found suitable for our project as it is easy to configure and can handle server side load more effortlessly. 2. Created a basic Ubuntu server using Ubuntu image locally.
Slot 2	November Week 3-4	**Tasks performed:** 1. Getting hardware components needed for the project and Deciding best place to buy them. **Outcomes:** 1. Bought NodeMCU ESP8266, FC-28 Hygrometer soil moisture sensor, etc. from https://robu.in/

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	December Week 1-2	**Tasks performed:** 1. Interfacing FC28 Hygrometer soil moisture sensor with NodeMCU ESP8266 micro-controller. 2. Interfacing ESP8266 micro-controller with WiFi for data communication with cloud. **Outcomes:** 1. Interfaced FC28 Hygrometer soil moisture sensor with NodeMCU ESP8266 micro-controller using jumper wires and wrote embedded C code for collecting soil moisture data from the sensor. 2. The NodeMCU ESP8266 micro-controller was able to connect to WiFi and transport data.
Slot 2	December Week 3-4	**Tasks performed:** 1. Getting the cloud platform for the project. 2. And suitable instance type for the project. **Outcomes:** 1. Signed up for the AWS cloud platform. 2. And booked EC2 instance type for the project.

January 2023

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	January Week 1-2	**Tasks performed:** 1. Started working on cloud, and researching about different HTTP, SSH and MQTT service providers for Ubuntu. 2. Implementation of the HTTP, SSH, and MQTT services. **Outcomes:** 1. Finalised Apache2 for HTTP service on port 80 and 8080. 2. OpenSSH for SSH service on port 22 and Mosquitto MQTT for MQTT service on port 1883. 3. Implemented Apache2, OpenSSH and Mosquitto on AWS EC2 cloud.
Slot 2	January Week 3-4	**Tasks performed:** 1. Modification of AWS firewall rules for fluent communication. 2. Modification of Ubuntu firewall rules for opening required port to the public network. **Outcomes:** 1. Modified AWS inbound and outbound rules to allow network traffic on ports 80, 8080, 22, 1883. 2. Modified Ubuntu's UFW firewall to allow traffic on ports 80, 8080, 22, 1883 from public networks.

February 2023

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	February Week 1-2	**Tasks performed:** 1. Installation of necessary services, tools, libraries for Machine Learning on cloud. 2. Deciding suitable machine learning algorithm for the project. 3. Testing of the machine learning model for accuracy. **Outcomes:** 1. Installed Python3, PIP3 and Python Virtual environment. 2. Installed pandas, scikit-learn, joblib, paho-mqtt, Flask, etc. from APT and pip3. 3. Decided DecisionTree supervised machine learning algorithm for the project and programmed the model accordingly. 4. Accuracy of the machine learning model came to be 100%.
Slot 2	February Week 3-4	**Tasks performed:** 1. Moving the machine learning code from local machine to the cloud. 2. And creating configuration files. 3. Taking dry run of the overall project by running it. 4. Running model in the background all the time. **Outcomes:** 1. Moved machine learning model the cloud at "/home/ubuntu" 2. Created necessary config files in "/etc/project.conf/" 3. Took dry run and found everything to be working as expectations. 4. Used "jobs" and "disown" linux commands to run the python files in the background.

March 2023

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	March Week 1-2	**Tasks performed:** 1. Creating a web page for the project. 2. Creating a web application which should be able to control switching of the motor. 3. Deployment. **Outcomes:** 1. Created a web page for the project in HTML and CSS. 2. Created the web application in Flask with Python3 as a backend. 3. Successfully turned ON/OFF from the web application. 4. The deployed web page and application using Apache2 on port 80 and 8080 respectively.
Slot 2	March Week 3-4	**Tasks performed:** 1. Surveying and implementing DDNS service provider 2. Getting a domain name. **Outcomes:** 1. Finalised No-IP DDNS for the project domain name.(https://www.noip.com) 2. Configured No-IP on the Ubuntu system. 3. Got http://group25.hopto.org/ as a domain name.

April 2023

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	April Week 1-2	**Tasks performed:** 1. Shifted the web address from No-IP to default IPV4 domain name. **Outcomes:** 1. As the free tier access for No-IP service has expired we moved our web site from No-IP to default domain name. (http://ec2-43-205-192-42.ap-south-1.compute.amazonaws.com/)
Slot 2	April Week 3-4	**Tasks performed:** 1. Stared working on research paper as well as project report **Outcomes:** 1. Finished work on the project report and research paper.

May 2023

Slot No.	Range	Project Progress Work done (Pointwise) Description with outcomes
Slot 1	May Week 1-2	**Tasks performed:** 1. Applied for research paper publication **Outcomes:** 1. Acknowledgement received for published paper.
Slot 2	May Week 3-4	**Tasks performed:** 1. Black book printing. 2. Write-up and Submission **Outcomes:** 1. Printed black book 2. Completed any left over write up.

Project Guide Comments/Remarks:

1.

2.

3.

Online Resources Accessed Summary:

Sr. No.	Website/link	Purpose of Access	Accessed when (date and time)	Outcomes	Remark of the project guide
1	http://ecoursesonline.iasri.res.in/mod/page/view.php?id=124927#:~:text=Automation%20of%20micro%20irrigation%20system%20refers%20to%20operation%20of%20the,yield%20and%20benefit%20cost%20ratio.	Overall idea, need of the solution.	04/09/2022 10:00:00	Overall Idea.	
2	https://aws.amazon.com/pricing/	AWS pricing and operating.	14/10/2022 10:00:00	AWS EC2 is suitable for the project	
3	https://ubuntu.com/server/docs/cloud-images/amazon-ec2	Ubuntu documentation.	14/11/2022 10:00:00	Learned about Server setup in Ubuntu.	
4	https://robu.in/	Hardware Components	20/11/2022 10:00:00	Bought Hardware Components	
5	https://aws.amazon.com/ec2/	Signing up for EC2	18/12/2022 10:00:00	Booked EC2 instance.	
6	https://httpd.apache.org/	HTTP service	12/01/2023 10:00:00	Implemented HTTP service	
7	https://mosquitto.org/	MQTT service	20/01/2023 10:00:00	Implemented MQTT service	
8	https://www.openssh.com/	SSH service	20/01/2023 10:00:00	Implemented SSH service	
9	https://www.noip.com/	DDNS service	17/03/2023 10:00:00	Implemented DDNS service	

Signature of the project guide/supervisor:
(Write your name with designation)