Project DesignPhase-
IITechnologyArchitectur
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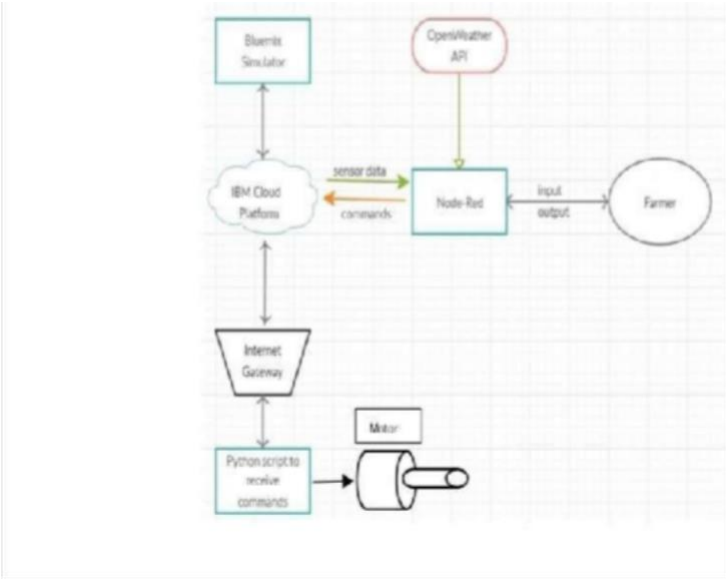
Date	11October2022
TeamID	PNT2022TMID30465
ProjectName	SMARTFARMER-IOTENABLEDSMARTFARMINGAPPLICATIONSYSTEM
MaximumMarks	4 Marks

TechnicalArchitecture:

TheDeliverableshallincludethearchitecturaldiagramasbelowandtheinformationasperthetable1&table2



Guidelines:

1. Includealltheprocesses(Asanapplicationlogic/TechnologyBlock)
2. Provideinfrastructuraldemarcation(Local/Cloud)
3. Indicateexternalinterfaces(thirdpartyAPI'setc.)
4. IndicateDataStoragecomponents/services
5. Indicateinterfacetomachinelearningmodels(ifapplicable)

- The different soil parameters temperature, soil moistures and then humidity are sensed usingdifferent sensorsandobtainedvalue isstoredintheIBMcloud.
- Arduino UNO is used as a processing Unit that process the data obtained from the sensorsandwhetherdatafromtheweatherAPI.
- NODE-RED is used as a programming tool to write the hardware, software, and APIs. The MQTTprotocolisfollowed forthecommunication.
- All the collected data are provided to the user through a mobile application that was developedusing the MIT app inventor. The user could decide through an app, weather to water the crop ornot depending upon the sensor values. By using the app, theycan remotely operate the motorswitch.

Table-1:Components&Technologies:

S.No	Component	Description	Technology
1.	UserInterface	Howuserinteractswithapplicationе.g.WebUI, MobileApp.	HTML,CSS,JavaScript/AngularJs/ReactJs etc.
2.	ApplicationLogic-1	Logicforaprocessintheapplication	Python
3.	ApplicationLogic-2	Logicforaprocessintheapplication	IBMWatsonIOTservice
4.	ApplicationLogic-3	Logicforaprocessintheapplication	IBMWatsonAssistant
5.	Database	DataType,Configurationsetc.	MySQL,NoSQL,etc.
6.	CloudDatabase	DatabaseServiceonCloud	IBMCloud
7.	FileStorage	Filestoragerequirements	IBM Block Storage or OtherStorageServiceorLocal Filesystem
8.	ExternalAPI-1	PurposeofExternalAPIusedintheapplication	IBMWeatherAPI,etc.
9.	MachineLearningModel	PurposeofMachineLearningModel	ObjectRecognitionModel,etc.
10.	Infrastructure(Server/Cloud)	ApplicationDeploymentonLocalSystem/CloudLocal ServerConfiguration: CloudServerConfiguration:	Local,CloudFoundry,Kubernetes,etc.

Table-2:ApplicationCharacteristics:

S.No	Characteristics	Description	Technology
1.	Open-SourceFrameworks	Listtheopen-sourceframeworksused	Technology of Opensourceframework
2.	SecurityImplementations	Sensitiveandprivatedatamustbeprotectedfromtheirproduction until the decision-making andstorage stages.	e.g.Node-Red,OpenweatherAppAPI,MITAppInventor,etc.
3.	ScalableArchitecture	scalabilityisamajorconcernforIoTplatforms.Ithasbeen shown that different architecturalchoices ofIoT platforms affect system scalabilityand that automatic real time decision-making isfeasibleinan environmentcomposedofdozensofthousand.	Technologyused
4.	Availability	Automaticadjustmentoffarmingequipmentmadepossible by linking information like crops/weatherandequipment to auto-adjust temperature,humidity,etc.	Technologyused
5.	Performance	Theideaofimplementingintegratedsensorswithsensing soil and environmental or ambientparameters in farming will be more efficient for overallmonitoring.	Technologyused