Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	03 October 2022
Team ID	PNT2022TMID34035
Project Name	Project – smart farmer-iot
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: smart agricultural processing in IOT

Reference: https://images.app.goo.gl/8wpva1W55ayFq8UV7

Guidelines:

1. Include all the processes (As an application logic / Technology Block)
2. Provide infrastructural demarcation (Local / IOT)
3. Indicate external interfaces (wireless communication, etc.)
4. Indicate agriculture components / services
5. Indicate interface to IOT models .

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	DATA WRAPPER	offers a genericway to describe characteristics of sensors using sensory meta-data, containing general information about the data stream.A semantic annotation module enables to annotate the parsedsensory data	City Pulse
2.	DEVICE MANAGER	automatically manages IoT devices, removing the need forhuman operators, providing the necessary tools for autonomicmanagement processes to enforce decisions at a later stage.Manages device identity and authorization, considers reliabil-ity of data streams (e.g. real-time checking if values fall intospecific limits) and fault recovery.	FIWARE IoT Back-end
3.	DISCOVERY MODULE	en-sures scalable registration and discovery of IoT devices andservices in real-time, in a plug and play way. These devicescan be either located at the same physical space (e.g. insidethe farm) or remotely, accessed through the internet/web	FIWARE IoT Edge
4.	DATA AGGREGATION	deals with largevolumes of data using time series analysis and data compres-sion techniques to reduce the size of raw sensory observationsdelivered by the data wrappers.	IoT-A
5.	DATA FEDERATION	answers users'queries, e.g. the amount of fertilizer needed to apply over somearea. This component first finds relevant streams according tothe requirements specified in the request. Then, it translatesusers' requests into RDF Stream Processing (RSP) queriesand evaluates the queries to obtain results	City Pulse
6.	EVENT DETECTION	provides tools forprocessing annotated and aggregated data streams to obtainfarm events, such as need for irrigation, sick animals or pestidentification in crops.	City Pulse
7.	REAL TIME ADAPTIVE REASONING	takes into account farmer's preferences and dynamic contex-tual farm-related information	City Pulse

		(represented by real-time events),in order to provide optimal decision support in real-time.	
8.	EXTERNAL AGENT	addresses interoperability, device heterogeneity, datahandling and protocol adaptation. Plays an important role forvirtualising objects, services, methods and processes, consid-ering user's identity and authorization.	Agri-IoT in-house devel-oped
9.	DASH BOARD	providesimmediate and intuitive visual access to the results of process-ing and analysis of data and events.	Thing Speak, freeboard
10.	MOBILE APP	arebuilt on top of the other components, similarly to the dash-board, and use their APIs to offer various services to theirmobile users, either to the farmers for real-time informationand fast decision making, or to the consumers and transportagents at the sales points for more transparency	Map Your Meal, Food Loop.
11.	KNOWLEDGE BASE	provides servicemetadata for sensor/data stream discovery.	Open IoT.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Predictive analytics for crops and livestock	IoT in smart farming is not restricted to a particular section. Smart farming sensors can be placed right in the ground. There, it shall read and analysis the derived data and help improve farming practices.	radio frequency identification (RFID) technology
2.	Remote crop and soil monitoring	With the help of smart farming system, moisture and fertility of soil along with crops growth rate can be monitored remotely through real time animation and graphics via a smartphones	Global navigation satellite system
3.	Remote equipment monitoring	Tractors, pickups and harvesting machines and equipment are IoT enables with sensors. Installing, provisioning and managing IoT endpoints, securely and reliably connecting the same.	Remote monitoring technology

S.No	Characteristics	Description	Technology
		Ingesting, managing, curating and analyzing IoT data can be done remotely.	
4.	Sensor based field and resource mapping	With the help of IoT smart farming systems, one can use sensors to map and keep track of the entire farm. This also includes the stats of the human resources, tools and institutional assets.	Ground based platform
5.	Stats on livestock feeding and produce	Feeding patterns of the cattle often predict if there is any illness round the bend. Quality produce of milk and protein depends on the amount and quality consumption of the cattle.	Life cycle assessment

References:

ThingSpeak, 2016. https://thingspeak.com/.

freeBoard, 2016. https://freeboard.io/.

Map your meal Europe Aid funded project, 2016.http://www.mapyourmeal.org/.

FoodLoop GmbH. FoodLoop, 2016. https://www.foodloop.net/en/.

W3C. OWL-S: Semantic Markup for Web Services, 2016.https://www.w3.org/Submission/OWL-S/.