**Project Design Phase-II**

**Solution Requirements (Functional & Non-functional)**

| Date | 03 October 2022 |
| --- | --- |
| Team ID | PNT2022TMID23204 |
| Project Name | Project - Real-Time River Water Quality Monitoring and Control System |
| Maximum Marks | 4 Marks |

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| --- | --- | --- |
| FR-1 | User Registration | Registration through Form  Registration through Gmail  Registration through LinkedIN |
| FR-2 | User Confirmation | Confirmation via Email  Confirmation via OTP |
| FR-3 | Interfacing with hardware | Interface the sensors with the software application so as  to alert the users in case of any change in the water pollution |
| FR-4 | Database Connection | Databases are retrieved from IBM Cloudant |
| FR-5 | Mobile Application | Alarm and motors can be accessed from the mobile app |
|  |  |  |

**Non-functional Requirements:**

Following are the non-functional requirements of the proposed solution.

| **FR No.** | **Non-Functional Requirement** | **Description** |
| --- | --- | --- |
| NFR-1 | **Usability** | the real time river water management system Interface the sensors with the software application so as  to alert the users in case of any change in the water pollution |
| NFR-2 | **Security** | The rapid development of WSN technology provides a novel approach to real-time data acquisition, transmission,  and processing. The clients can get ongoing water quality information from far away.  Now a day’s Internet of things (IoT) is an innovative technological phenomenon. It is shaping today’s world and  is used in different fields for collecting, monitoring and analysis of data from remote locations. IoT integrated  network if everywhere starting from smart cities, smart power grids, and smart supply chain to smart wearable Though IoT is still under applied in the field of environment it has huge potential. It can be applied to detect  forest fire and early earthquake, reduce air population, monitor snow level, prevent landslide, and avalanche etc.  Moreover, it can be implemented in the field of water quality monitoring and controlling system |
| NFR-3 | **Reliability** | An Arduino mega is utilized as a core person. The Arduino victimized here is mega 2560 because multiple  analog sign sensors probe requisite to be conterminous with the Arduino inhabit. It has a set of registers that use as a  solon use RAM. Specific intend to know registers for on-chip component resources are also mapped into the  assemblage grapheme. The addressability of store varies depending on instrumentation series and all PIC devices  someone several banking mechanisms to utilise addressing to additional faculty. Subsequent series of devices have  move instructions which can covert move had to be achieved via the register. Thus the mechanism functions with  the exploit of coding intrinsically in the Arduino UNO R3 skate. |
| NFR-4 | **Performance** | Real-time monitoring of water quality by using IoT integrated Big Data Analytics will immensely help people to become conscious against using contaminated water as well as to stop polluting the water. The research is conducted focusing on monitoring river water quality in real-time. Therefore, IoT integrated big data analytics is appeared to be a better solution as reliability, scalability, speed, and persistence can be provided. During the project development phase an intense comparative analysis of real-time analytics technologies such as Spark streaming analysis through |
| NFR-5 | **Availability** | Compared to the previous related works, the cost of the  system prototype is considerably low. Toensure the portability  of the device, a self-made, small size Arduino microcontroller  is used. The developed system was tested under different  conditions, with solution of water with different impurities,  and in different periods of time.  The results of the test for all tim |
| NFR-6 | **Scalability** | Due to the limitation of the budget, we only focus on measuring the quality of river water parameters. This  project can be extended into an efficient water management system of a local area. Moreover, other parameters  which wasn’t the scope of this project such as total dissolved solid, chemical oxygen demand and dissolved oxygen  can also be quantified. So the additional budget is required for further improvement of the overall system |