Sri Lanka Institute of Information Technology

PROJECT CHARTER

The purpose of this form is to allow 2nd year students of the B.Sc. (Hon) degree program to enlist in the 2nd year project group. The description of the project entered on this form will not be considered as the formal project proposal. It should however indicate the scope of the project and provide the main potential outcome.

PROJECT TITLE	**Remotely Navigated Automated Water Quality Sampling System**
GROUP NUMBER	**PEP_11**

PROJECT GROUP MEMBER DETAILS:

	STUDENT NAME	STUDENT NO.	CONTACT NO.	EMAIL ADDRESS
1	Muthukumarana T D	IT22310132	070 622 5315	it22310132@my.sliit.lk
2	Gayanuka Weerasekara	IT22032874	076 425 9140	it22032874@my.sliit.lk
3	R A S M Ranawaka	IT22320728	071 641 8341	it22320728@my.sliit.lk
4	R K Kaween Rashmika	IT22083050	077 177 4605	it22083050@my.sliit.lk

PROJECT DETAILS

1. INTRODUCTION

1.1 Purpose of Project Charter:

The charter document for the Remotely Navigated Automated Water Quality Sampling System includes all the necessary information like a brief introduction, business needs, and impacts, scope, budget & time estimation required by decision makers to approve the project for funding. It also provides a clear idea about the services delivered to the clients by the project. It is created during the initiating phase of the project.

2. BRIEF DESCRIPTION OF YOUR PROJECT

2.1 Project description

Our project entails the development of a water quality monitoring system, designed to be mounted on a boat which can be used to determine water quality in large water bodies. This system comprises 2 sensors to read the pH value and Turbidity level of water which are 2 prominent water quality measuring parameters. These 2 sensors are mounted on a robotic arm which can be lowered to obtain the readings in a certain location. Additionally, a GPS tracker is also included in this system to record real-time location data for each measurement point. This functionality allows the users to get better insights about the water quality in different areas of the water bodies. All the data recorded from the system are stored in a database along with the locations, dates, and times. Users can conveniently access this information from a dedicated mobile app or desktop app.

The projected timeline for this project is 2 months, with an estimated budget of Rs. 23,000.

2.2 Project objectives

- Pinpointing precise locations in water bodies that have been subjected to pollution.
- Early detection and identification of pollution sources.
- Reducing manpower and associated costs in ensuring water quality.
- Reaching and quality testing of physically inaccessible water sources.

3. JUSTIFICATION

3.1 Business Need

The primary motivation driving our project is the importance of inland water bodies as a vital source of water for daily consumption. It is widely recognized that many of these water bodies are experiencing pollution due to various factors, including unsystematic waste disposal from industrial facilities and direct dumping of household waste. Given the extensive geographical spread of these water bodies, pinpointing the precise location of pollution, and effectively

monitoring water quality presents a significant challenge for authorities, often requiring substantial manpower and resources.

In response to this challenge, we have developed a smart solution to reduce the manpower and associated costs and streamline the water quality monitoring process. Our system is designed in a way that can be controlled by a single individual, where the user can remotely record crucial water quality parameters and pinpoint the exact locations where the water pollution is occurring using GPS tracking.

3.2 Business Impact

With the implementation of this system, we expect to catalyze a notable shift in the priorities of responsible authorities for maintaining water quality in the inland water bodies. This empowers them to elevate their focus on ensuring water quality due to the reduced manpower and associated costs. Our technology enables these authorities to allocate resources more efficiently and effectively.

The inclusion of precise location pinpointing within our system offers a powerful tool for authorities to identify and hold accountable those responsible for polluting water resources. By leveraging this feature, authorities can effectively gather evidence and build cases against perpetrators, facilitating legal action and enforcement measures.

Our system is designed with utmost user-friendliness, requiring no prior skills or expertise for operation. Although we mainly focused this on testing water quality assurance in inland water bodies, the users can use this according to their needs on any water body that needs to be accessed remotely.

4. SCOPE

4.1 Description of the Solution:

1. Reading pH & Turbidity level of large water bodies & physically inaccessible locations with precise GPS location.
2. All the collected data will be stored in a database which can be accessed by the user, using a desktop application.

4.2 Main Expected Outcomes of the Project:

- Acquisition of accurate and precise data for implementation of an efficient system for monitoring water quality parameters.
- Reduction of manpower and associated costs.

4.3 Boundaries:

1. Our system is vulnerable to potential attacks and disruptions caused by external factors including aquatic wildlife & etc.
2. There exists a potential risk of robotic arm being damaged due to entanglement with moss or other vegetation.

5. BUDGET & TIME ESTIMATIONS

5.1 Executive Milestones:

- Creating the project charter & problem identification.
- Item identification.
- Designing the circuit diagram.
- Creating the model.
- Testing the model.
- Identifying errors.
- Recorrecting the errors.
- Testing again.
- Finalizing the model.

Estimated timeframe – 2 months

5.2 Budget Estimation:

Object Code	Budget Item	Unit Price (Rs.)	Qty.	Total (Rs.)
01	Arduino UNO Board	2,800	2	5,600
02	NodeMcu Wi-Fi Development Board	1,150	1	1,150
03	Breadboard	350	2	700
04	Ublox NEO-6m GPS	1,150	1	1,150
05	pH Sensor with electrode probe	6,000	1	6,000
06	Turbidity Sensor	2,700	1	2,700
07	Servo Motor	490	3	1,470
08	PWM Servo Motor Driver	1,750	1	1,750
09	4-DOF Robo Arm	1,590	1	1,590
10	Power Supply	200	2	400
11	Jumper Wire	200	2	400
Grand Total:				**22,910**

6. ASSUMPTIONS, CONSTRAINTS AND RISKS

Assumptions

- Robotic arm and sensors will consistently perform accurately and reliably in various water conditions.
- GPS tracker will provide accurate location data without any significant errors.

Constraints

- Limited financial resources.
- Limited timeline.
- Lack of expertise knowledge.

Risks

- Malfunction in sensors, GPS tracker, robotic arm would compromise data accuracy and system functionality.
- Extreme weather conditions and rough waters could impact system functionality.
- Potential vulnerability of database to unauthorized access, data breach or cyber-attacks.

7. **WORKLOAD ALLOCATION**

MEMBER 1	**Muthukumarana T D**
Robotic Arm building & programming, Database design and Implementation.	

MEMBER 2	**Gayanuka Weerasekara**
Programming the Turbidity Sensor, Database design and Implementation.	

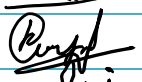
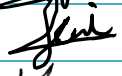
MEMBER 3	**R A S M Ranawaka**
Robotic Arm building & programming, programming the PH Sensor.	

MEMBER 4	**R K Kaween Rashmika**
GPS tracking system, Building Desktop Application	

DECLARATION

"We declare that the project would involve material prepared by the Group members and that it would not fully or partially incorporate any material prepared by other persons for a fee or free of charge or that it would include material previously submitted by a candidate for a Degree or Diploma in any other University or Institute of Higher Learning and that, to the best of our knowledge and belief, it would not incorporate any material previously published or written by another person in relation to another project except with prior written approval from the lecturer of the module and that such unauthorized reproductions will construe offences punishable under the SLIIT Regulations.

We are aware, that if we are found guilty of the above-mentioned offences or any project-related plagiarism, the SLIIT has the right to suspend the project at any time and or to suspend us from the examination and or from the Institution for a minimum period of one year".

	STUDENT NAME	STUDENT NO.	SIGNATURE
1	Muthukumarana T D	IT22310132	
2	Gayanuka Weerasekara	IT22032874	
3	R A S M Ranawaka	IT22320728	
4	R K Kaween Rashmika	IT22083050	