**Lab 02: Determining Requirements (System S1)**

**Objective**

The objective of this lab is to run an activity in the lab to determine the requirements of the problem/solution identified in Lab 01 through surveys and interviews. You may also use other methods such as observation and/or document analysis. In addition, as an optional measure students may think of selection of the methodology for solution and do some feasibility analysis.

**Lab Learning Outcomes (LLO)**

By completion of the lab the students should be able to

1. Design a questionnaire for survey and/or interview.
2. Methodology selection

**Lab Requirements**

Tools: MS Office, Google Surveys, StarUML,

**Lab Assessment**

One Continuous system S1 will be used throughout the duration of the semester and

**Task to Do:**

In this Lab, students have to write a list of questions for conducting a survey/interview.

Instructor will discuss how to prepare **Interview/Survey questionnaire** for system S1 during the lab session and ask students’ groups to come well prepared possibly with documented list of questions (with defined objectives of each question) in the lab so that they can discuss with the teacher who may act as an interviewee and students will act as interviewer. Survey questions will also be discussed with the teacher. All the **groups will ask one question to discuss with the peers and teacher**, at a time about system S1. Each group must come up with **a minimum of 10 questions**. Asking questions will run in rotation among the groups. The lab instructor will ensure the concentration of students on target requirements to achieve the desired objective by asking a question because it is observed that students ask/define random questions in interview/survey and deviate from the track and lose concentration on the objective to determine some requirements or to clarify their confusions.

In context of the problem/solution defined in Lab 01, students may consider the intersection of two perpendicular roads i.e. road crossing with traffic control signal, before writing the list of questions. It will be great if students start with drawing a diagram of roads intersection showing the road with 3 lanes, and considering two-way traffic, there will be 6 lanes on each side of the road intersection.

Following is a set of sample questions. These questions should be written by the students, however, as sample some questions are already given so the students are required to write answers to these questions. It would be great if you supplement your answer with the help of a Figure or diagram. **Please note that some students may act like a police officer and other may act like a driver to have some reflection of the actual requirements as the students may not have time to visit traffic police officers.**

**Example:**

1. What are the existing hardware/software for traffic monitoring? (Students may browse the internet and explore in the lab)
2. What are the possible points/places to install the cameras or sensors on the intersection of roads?
3. What are the possible violations that a driver may commit and be monitored at the intersection of roads?
4. What kind of violation be monitored with what kind of sensors? For instance, over speeding and red-signal crossing are two different violations, so how to monitor and capture both?

There are few other Sample Interview Questions:

1. Can you describe the current challenges you face in monitoring and addressing traffic violations in the city?
2. What are the most common types of traffic violations that you encounter on a regular basis?
3. How do you currently gather information about traffic violations? Are there any limitations or inefficiencies in the existing process?
4. What specific data points would you consider crucial for identifying and verifying traffic violations? (e.g., vehicle number plates, speed, direction)
5. How do you currently classify the severity of different traffic violations? What factors contribute to this classification?
6. What kind of evidence would be required to support the verification process of a traffic violation?
7. Can you describe the steps you take when confirming a traffic violation and deciding on appropriate action?
8. How do you currently communicate with drivers or vehicle owners regarding violations and penalties?
9. Are there any specific features or functionalities that you would like to see in a system aimed at addressing traffic violations?
10. How do you envision the interaction between traffic police officers and the proposed system? What tasks should be automated, and what tasks should remain under human control?

**Sample Questionnaire for Traffic Police Officers:**

1. What is your role and rank within the traffic police department?
2. How often do you encounter cases of traffic violations in your area of responsibility?
3. What are the top three most common traffic violations that you come across?
4. How do you currently document and record information about traffic violations?
5. Do you face any difficulties in collecting accurate data about traffic violations?
6. Which data elements do you consider essential for accurately identifying a traffic violation?
7. How do you decide the severity level of a traffic violation? Are there any specific criteria you follow?
8. What challenges do you encounter in verifying and confirming traffic violations?
9. How do you communicate with drivers or vehicle owners regarding detected violations and penalties?
10. Are there any specific features or functionalities you believe would enhance the effectiveness of a traffic violation monitoring system?

These questions and questionnaire items are designed to gather insights from traffic police officers about their current processes, challenges, and requirements. The answers you receive will help inform the design and functionality of the proposed system, ensuring it aligns with their needs and expectations.

Note: Questions may be designed as open/closed ended.

When you are designing questions, please make sure to carefully read the problem/solution description. There is no end to the number of questions, however a minimum of 10 are expected from each group. Students are required to find the answers to these questions through discussion with the lab instructor, discussion with the peers, browsing through the internet and reviewing related literature etc. Students are advised to read some basic level research articles to gain meaningful insights.

Once the questions are ready in the doc file, these should be used to prepare a survey using Google Surveys to start collecting data and get answers from a wider range of public. After collecting the data, make sure the students rightly interpret the data and discuss with the lab instructor to determine the requirements of functionality.

Students are encouraged to use the following template for the interview.

**Interview Template:**

|  |  |
| --- | --- |
| **Interview Outline** | |
| **Interviewee:**  Instructor Name | **Interviewer:** Student Name(s) |
| **Location/Medium:**  Building 31 , During Lab session or Instructor Office | **Appointment Date: DATE**  Start Time: LAB Start Time End Time: LAB End Time |
| **Objectives:**  The objective of this interview is to determine requirements of the system/user and to clarify the confusions or doubts raised | **Reminders:**  Background/experience of interviewee Known opinions of interviewee |
| **General Observations**: One group member will take notes and write any body language gestures or language tones or anything else that may verbally or non-verbally identify or contribute in determining the requirements. | |
| **Unresolved Issues, Topics Not Covered**: | |
| **Question:** 1  What are the existing hardware/software for traffic monitoring? (Students may browse the internet and explore in the lab) | **Answer:**  Students must write possible answers after discussion with the instructor. You may draw diagrams for elaborations. |
| **Question: 2**  What are the possible points/places to install the cameras or sensors on the intersection of roads? | **Answer:**  Students must write possible answers after discussion with the instructor. You may draw diagrams for elaborations. |
| **Question: 3**  What are the possible violations that a driver may commit and be monitored at the intersection of roads? | **Answer:**  Students must write possible answers after discussion with the instructor. You may draw diagrams for elaborations. |
| **Question: 4**  What kind of violation be monitored with what kind of sensors? For instance, over speeding and red-signal crossing are two different violations, so how to monitor and capture both? | **Answer:**  Students must write possible answers after discussion with the instructor. You may draw diagrams for elaborations. |

**Findings of the interview:**

Once the interview questions are done, students are required to process the results to determine the requirements.

Following yellow highlights are the samples of questions written by the students from the previous terms.

**Sample 1:**

**Interview: Traffic Monitoring System**

1. What are your project limits and constraints? (Such as time and budget)
2. How flexible do you feel about your project limits and constraints?
3. Will you be able to supply us with the needed hardware and environment for development and testing?
4. How do you feel about compromising some features in order to meet the project’s constraints?
5. How would you like us to communicate with you?
6. Would you like us to do regular maintenance for the project?
7. Can you provide us with data we can use to simulate artificial

intelligence?

1. Do you prefer the system to use cameras, sensors or both?
2. Do you have any opinion on how the project should look like? What shape it should be and what are the size constraints?
3. One of the traffic rules is driving within the speeding limit. Do you want the limit to be a fixed number or a ranged number?

**Sample 2**

1- what is the ideal traffic monitoring system in your words

2-at what scope do you think the problem exists

3-Follow up- around how much is the proposed budget

4-what makes you think that the current traffic monitoring system is failing

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5-Follow up- What do you think can improve on the current traffic monitoring system

6- in order to keep the system fully optimized and efficient we need to know how many traffic violations should we be expecting each hour.

7-also, in order to keep drivers from violating traffic rules we need to make the fines fare so how much would u like the fines to be

8-if the violators didn’t pay what would u like the system to do

9-Follow up- and what if the violator got multiple violations in the same year what would you like the system to do

10- is there is an awareness raising campaign in the plans

10.1-Follow up what kind of budget are you planning to spend on it

**Selection of Methodology**

**Agile Methodologies —> Agile software development**

Agile development have development flexibility that provide the necessary flexibility and speed to adapt to changes in requirements. Also, Small sized systems are perfect for agile development. So agile practices are heavily dependent on collaborative teamwork.