IT314: Software Engineering
Lab Session III
Project: Speed Detection
Group: G3

Collaborators:

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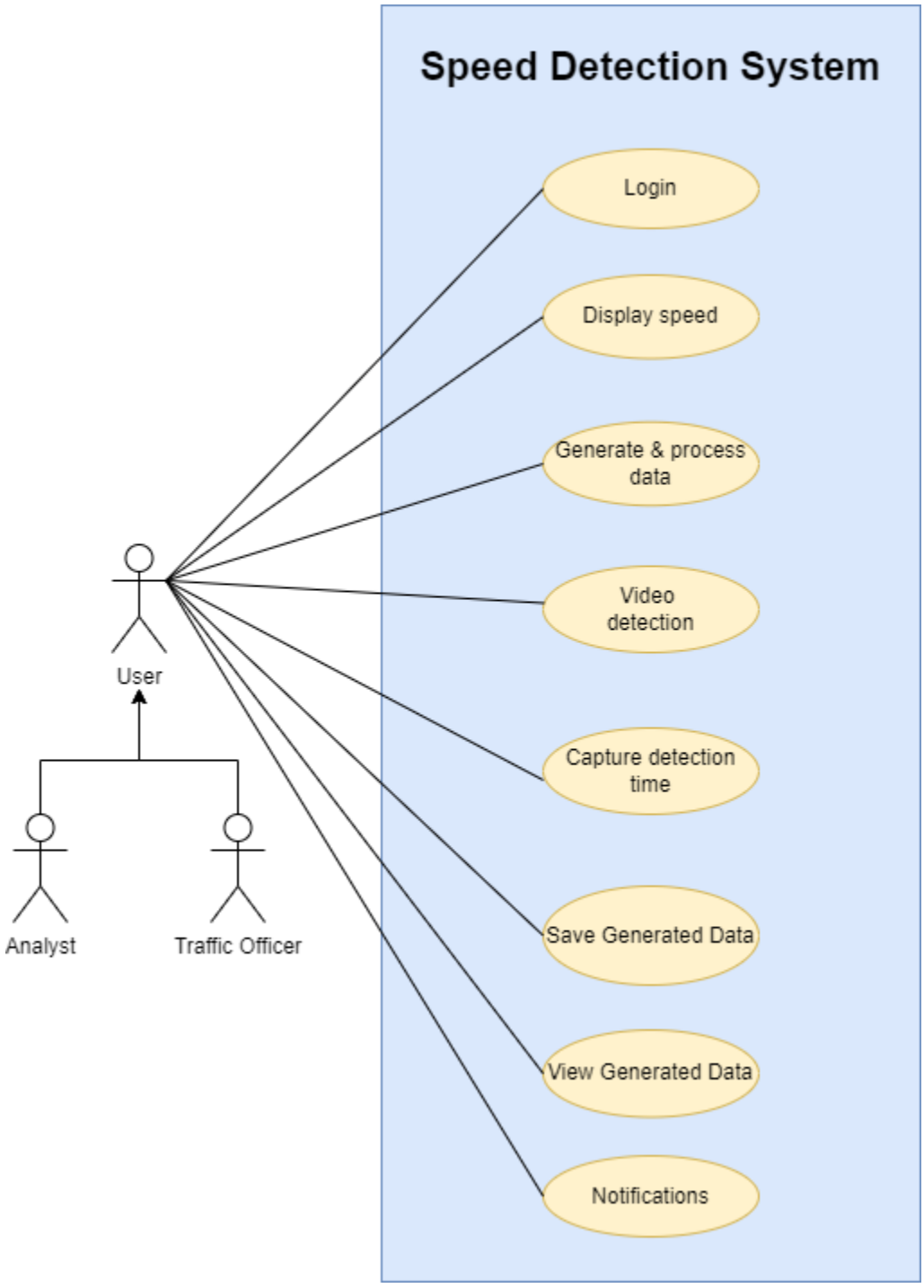
Q1. Draw the use case diagram. State the relationship among the use cases and actors, if applicable.



Q2. Develop the use case textual description for each use case.

Actor: User

Pre-condition: The speed detector system(consisting of a camera) is ready to use, and the user has given the access permissions to the system.

Use-case 1: Camera operation
Normal Flow:

1. Turn ON the system
2. Point the system towards the object
3. Camera in the detection system detects the object
4. System calculates the object speed
   4.1 Frame by frame object detection
   4.2 Image Processing
   4.3 Speed calculation
5. Display the speed detected
6. Turn OFF the system

Alternate/Exception flows:
1.a If the system does not turn ON, make sure the system is charged and then continue.
3.a If the system does not detect the object, restart the system
5.a If the user is unsure about the value of the speed detected, detect again

Post-conditions: The speed detection values are also added to the database of the user.

Pre-condition: The user has the website URL and internet access.

Use-Case 2: Login functionality and access previous speed data

1. User opens the system website
2. User logins to the website if already a registered user
   2.1 Enter username and password
   2.2 Click on Login
3. User signups to the website if not a registered user
   3.1 Enter required signup information
   3.2 Click on SignUp
4. User enters the website
5. Click on the dashboard and navigate to speed database
6. User access the required data

Post-conditions: After the user gets the required data, he/she closes the website

Q3. Write the non-functional requirements of your system. Justify each of them, and why those are applicable.

1. Fast processing: The system should process the image and detect the speed in a short time frame.

   To provide real-time response, the system should have fast processing. If the processing time is slow, the system may miss the detection or provide incorrect information which can be dangerous in situations where speed limits are enforced, for eg highways or in high traffic areas.

2. Accurate detection: The system should be able to accurately measure speed even under challenging conditions like low light, bad weather etc.

   To ensure safety on the road accurate detection is necessary. If the detection system is inaccurate, it may not accurately detect when a vehicle is exceeding the speed limit or driving dangerously. Also, if the system is inaccurate it may use more resources and thus affect the performance of the system.

3. Good quality of the image

   To ensure accuracy and reliability of the speed measurements the system must capture good quality images even in unfavorable conditions like bad weather, heavy traffic, very fast moving objects etc.

4. Usability: The system should be user-friendly and easy to use

   A speed detection system that is difficult to use can lead to incorrect, inconsistent enforcement of speed limits, which can have serious implications on road safety.

5. Scalability: The system should be able to process large amounts of data without much performance issues.

   To ensure the system can handle the increased volume of speed data it receives, processes it quickly and delivers results in a timely manner, it must be scalable. If the system is not scalable it may become unresponsive which would severely impact its ability to accurately detect and report speed violations, and thus affect the road safety.

6. Reliability: The system should give consistent results with low rates of error or malfunctions.To ensure accurate speed detection, reliability of the system is necessary even in adverse conditions.