Project Overview: We are developing a prototype for a facial recognition software using AWS infrastructure and its components. This project includes the development and integration of three main features: Image Recognition/Face Identification, Recorded Video Analysis (human faces and vehicle traffic video), and Live Stream Analysis (human and traffic live feed). The selected developer will work closely with our team of software designers to ensure the successful implementation of these features.

Responsibilities:

- Develop and integrate facial recognition features using AWS infrastructure and tools.
- Set up and manage AWS infrastructure required for the prototype.
- Implement image recognition, recorded video analysis, and live stream analysis features.
- Collaborate with our team to ensure seamless integration and functionality into the frontend.
- Documentation of code and implementation process.
- Provide technical guidance and support throughout the development process.

Milestones and Payment Schedule: The project will be divided into three milestones, with payments distributed as follows:

1. **Milestone 1: Image Recognition/Face Identification (25% of total payment)**
    - Develop and implement the Image Recognition/Face Identification feature.
        1. Output metadata about an uploaded image (pixels, image quality, date image was taken, last modified, device used, geolocation, number of distinct faces etc.)

- *Extracting metadata from the original image (such as pixels, image quality, date taken, and device used) cannot be directly accessed using AWS services. We will need a specific program to extract this data, which I cannot provide.*

        2. Identify and segment/output the unique faces in an image with multiple people.

- *Other features mentioned above can be accomplished using AWS Rekognition services.*

        3. Perform facial recognition against an existing prototype database to identify individuals.
        4. Output matched results in addition to other information available in the database (e.g., full name, date of birth, citizenship, address etc)
    - Test and verify the functionality of the feature.

    Deliverables:

    - Working prototype of the Image Recognition/Face Identification feature as described above.
    - Documentation of the implementation process.
    - Initial test results and reports.

    Payment: 25% of the total project cost upon completion and approval of Milestone 1.

2. **Milestone 2: Recorded Video Analysis (25%)**
    - Develop and implement the Recorded Video Analysis feature
    - Extract and identify faces from recorded videos (Video of People).

- *AWS Rekognition already supports face and people recognition out-of-the-box.*

    - Extract and identify license plates and vehicle descriptions (brand, model, color, etc.) from recorded videos (Video of Vehicles).

- *For customized label detection, we need to train the model with a specific dataset. More training data will result in higher accuracy. The training and testing images need to be labeled, which I cannot do myself. Training could also be expensive!*

    - Test and verify the functionality of the feature.
        1. Output metadata about an uploaded video (pixels, image quality, date image was taken, last modified, device used, geolocation, number of distinct faces/vehicles etc.)

- *Similarly, extracting metadata from videos (such as pixels, date taken, location) cannot be done directly. We need to set up and label specific metadata ourselves (e.g., vehicles, car details).*

        2. Perform facial recognition against an existing prototype database to identify individuals/vehicles

Deliverables:

- Working prototype of the Recorded Video Analysis feature.
- Documentation of the implementation process.
- Initial test results and reports.

Payment: 35% of the total project cost upon completion and approval of Milestone 2.

3. **Milestone 3: Live Stream Analysis (40%)**
    - Develop and implement the Live Stream Analysis feature.

- *Kinesis has to be used for video streaming (Rekognition itself cannot support this feature)*

    - Extract and identify vehicle information from live traffic camera streams (Traffic Camera Video Stream).

- *As with recorded sessions, obtaining custom vehicle information requires custom training. The more specific data we want to include, the more training data is needed. We should be aware of the challenges in analyzing live stream video.*

    - Perform live identification of individuals against an existing database from live video streams (Video Stream of people).
    - Store all output into a database on AWS
    - Test and verify the functionality of the feature.
    - Integrate all features into the frontend.
    - Provide technical guidance and support for final adjustments and optimizations.

Deliverables:

- Working prototype of the Live Stream Analysis feature.

- Fully integrated prototype with all three main features.
- Comprehensive documentation of the implementation process.
- Final test results and reports.
- **Technical support and guidance documentation**

Payment: 40% of the total project cost upon completion and approval of Milestone 3.

Total Payment: The total project cost will be divided as per the milestone payments mentioned above. Payment will be made upon the satisfactory completion and approval of each milestone.

Approval Process: Each milestone will be reviewed and approved based on the deliverables provided. Any feedback or required adjustments will be communicated to the developer, who will make the necessary changes to meet the project requirements.

Potential Issues: *Potential issues include low latency on Kinesis live stream. For better models in custom object detection (e.g., vehicle information), more training is needed. I will need to train models in AWS, so the exact accuracy cannot be guaranteed at this time. AWS service charges will depend on the extent of features used in your prototype.*

Services could be used (possible ones)*:*
S3/ EC2/ DynamoDB or RDS/ lambda / Features from Rekognition / Kenisis / For training the model, have to choose one (SageMaker or Features on Rekognition)

Timeline: *The project should take at least 2-3 months to finish, depending on the amount of data you have and the design of your system.*

Remarks: *Since I am not experienced with frontend development, I will focus on setting up and managing AWS services and infrastructure. I will try to set up the system CaaS with cloudformation. But Frontend developers will need to handle the integration of these services into the user interface. I need to know* ***Clearly*** *the scope of my responsibilities for each task. And this documentation just provides an overview of the entire process. I think we need to detail each phase.*