Milestone 5 Evaluation

VehID

Version 1.0

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Project Advisor: Dr. Marius Silaghi
Project Client: Clayton Levins, Executive Director of Smart North Florida

March 15, 2024

Contents

1   Progress Matrix

Task	Completion %	Remington	Spencer	Thomas	Alexis	To-do
Construct Web Application	100%	50%	0%	50%	0%	NA
Implement License Plate Recognition Model	100%	0%	50%	0%	50%	NA
Hyper-parameter tuning	100%	0%	50%	0%	50%	NA
Data preprocessing	100%	0%	50%	0%	50%	NA
Implement Video Processing	100%	0%	50%	0%	50%	NA
Split Dataset	100%	0%	50%	0%	50%	NA
Create Poster and Ebook for Senior Design Showcase	100%	25%	25%	25%	25%	NA
Sprint Planning	100%	25%	25%	25%	25%	NA
Milestone Evaluation	100%	25%	25%	25%	25%	NA

2   Discussion - Milestone 5

2.1   Tasks

Construct Web Application: Began implementing server side functionality and APIs. The data is hosted on JSONBin to be accessible by the web application. We are continuing to tweak the UI and features of the application to meet our updated needs, including a new data point for camera location.

Implement License Plate Recognition Model: As part of this milestone we created two separate machine learning models to identify license plates and extract license plate information from a vehicle. Both models were made using YoloV8 from the ultralytics python library.

Hyper-parameter Tuning: As with our previous models we performed hyper-parameter tuning in order to increase the performance of our machine learning models.

Data Preprocessing: To ensure that we will receive our desired results from the machine learning models, we first perform data preprocessing on our datasets.

Implement Video Processing: Utilizing OpenCV we are able to read in video footage and use our machine learning models to extract our desired data from the images.

Split Dataset: Our datasets are pre-split so we didn't have to manual split our dataset into train-test and validation sets.

Create Poster and Ebook for Senior Design Showcase: To ensure that we are prepared for the senior design showcase we have completed our poster and Ebook for the event.

Sprint Planning: As with our previous milestones, at the beginning of each milestone we discuss the work that needs to be accomplished over the milestone and divide up tasks to ensure efficiency.

Milestone Evaluation: We completed our milestone evaluation to summarize all of our work that we accomplished over the past few weeks, outlining the tasks that we accomplished. This time allows us to reflect on our work and find any issues that occured allowing us to correct it in the coming milestone.

2.2 Member Contribution

Remington Greko: I continued to work on the back end of the web application. Implemented the APIs for passing data from the database to the front end. Found a hosting service to allow the car data to be stored for free and allow API interaction for CRUD operations.

Spencer Hirsch: For this milestone I worked on the training and testing the license plate recognition model, the first part of the license plate model described above. In addition to this I helped with data collection for testing the model and working on the Poster and Ebook. I also worked on the Milestone Evaluation Document.

Thomas Johnson: Continued development of the web application by helping with the front-end design, and in helping with the back end. Helped start the implementation of sending requests to retrieve information from database tables. Helped in adding the web application portion to the poster, and ebook.

Alexis Nagle: For this milestone I primarily focused on the license plate character recognition to extract information from the cropped license plate. I also worked on the video processing portion and implementing it to feed into the models as well as collecting data for testing. Lastly I helped put together the poster, ebook, and milestone evaluation.

3 Milestone 6 Plan

3.1 Milestone 6 Task Matrix

Task	Remington	Spencer	Thomas	Alexis
Test/demo of the entire system	50%	0%	50%	0%
Conduct evaluation and analyze results	0%	50%	0%	50%
Create user/developer manual	50%	0%	50%	0%
Create demo video	0%	50%	0%	50%
Sprint Planning	25%	25%	25%	25%
Milestone Evaluation	25%	25%	25%	25%

4 Discussion - Milestone 6

4.1 Milestone 6 Tasks

Test/demo of the entire system: With the end of Senior Project coming nearer we need to ensure that we accomplished our goal. We have already begun testing our system with live data that we collected. In this next milestone we will continue working on this to ensure the best results for the showcase.

Conduct evaluation and analyze results: With this being the last milestone for the course we will take the time to effectively evaluate our system and analyze the results that we produced. We are looking forward to this task because this will allow us to take a deep look at our softare and see everything come together.

Create user/developer manual: We will complete this documentation as outlined on the website during this time. This will allow us to clearly document what the system does and show how the system works.

Create demo video: For the Senior Design showcase we want to have a video demonstration running on a loop showing our system and what it does. This will allow any visitors to visual understand our software and it will allow us to clearly show the judges what our system does.

Sprint Planning: As we have been doing throughout the course, at the beginning of the milestone we will plan our our workload and divide work to ensure that everything is completed in a timely manner.

Milestone Evaluation: Our final Milestone Evaulation will allow us time to reflect on the project and the work that we completed. This will be a great opportunity for us to revist our issues and discuss the changes that we would have made if we were to do it over again.

5 Client

5.1 Meeting Date

Date: Wednesday, March 13, 2024

5.2   Client Feedback

Construct Web Application: We demonstrated out web application to our client, he seemed very pleased with the work that we had accomplished on it during this milestone.

Implement License Plate Recognition Model: We demonstrated our model to our client and he seemed pleased with our progress. We discussed our hardships with model performance and he offered us some feedback on what he believes we should do if we had more time to accomplish the goal.

Hyper-parameter Tuning: Our client did not have any feedback on our hyper-parameter tuning of the model.

Data Preprocessing: Our client did not have any comments about our Data Preprocessing but has been pleased with our data throughout the project.

Implement Video Processing: Showed our client our working demonstration of our models. Was very please with how everything is coming together. Again, we discussed our hardships with performance and he offered some guidance on what he believes we should do if we had more time.

Split Dataset: Our client did not have any comments about how we split our dataset as they are already split.

Create Poster and Ebook for Senior Design Showcase: Our client did not have any comments on our Poster and our Ebook.

Sprint Planning: Our client continues to be pleased with our efficiency as a group. He has been very pleased with our ability to complete our tasks in such a short about of time.

Milestone Evaluation: Our client did not have any comments on our Milestone Evaluation, however, as a whole, he is pleased with our project and what we have been able to create. He has continued to offer of real-world feedback on our project and what he would expect would be the next steps if this was a industry project.

6   Faculty Advisor

6.1   Meeting Date

Date: Friday, March 15, 2024

6.2   Advisor Feedback

Construct Web Application: Dr. Silaghi was very happy with our web application. He seemed very pleased with how the project is wrapping up. With the web application being the final new feature to our system our project is very near to completion.

Implement License Plate Recognition Model: Dr. Silaghi did have some concerns with out license plate model, primarily with the quality of our images. He suggested that we retake or live data with some camera features turned off in hopes of it improving the performance of our models.

Hyper-parameter Tuning: Dr. Silaghi did not have any comments regarding the hyper-parameter tuning portion of our license plate models.

Data Preprocessing: Dr. Silaghi did not have any concerns regarding our data preprocessing as the images we selected for these two models are fairly straight forward.

Implement Video Processing: Dr. Silaghi seemed please with our implementation of the video processing. We demonstrated our PyQt application demo to him and he seemed happy with the demo.

Split Dataset: Dr. Silaghi did not have any comments on the way our dataset was split.

Create Poster and Ebook for Senior Design Showcase: Dr. Silaghi did have some comments on our poster, primarily he suggested that we add graphics for our web application and demonstration to show that it works on the poster. In addition to this he asked that we be more specific in some parts with the actual CNN architecture that we are using as well as the hardware that we are using. He also suggested that we make changes to our Limitations portion of the poster, he suggested that we add a future work section as well.

Sprint Planning: Dr. Silaghi did not have any comments on our Sprint Planning, however, he is pleased with our project thus far. He was impressed with the amount of work that we have been able to complete in the timeframe.

Milestone Evaluation: Dr. Silaghi did not have any comments on our milestone evaluation document. For the Milestone as a whole, Dr. Silaghi was pleased with all of the progress that we have made. The project is coming together nicely, especially with all of the User Interface we have implemented during this milestone.

Faculty Advisor Signature: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ Date: ⎯⎯⎯⎯⎯⎯

6.3   Student Evaluation

Remington Greko	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Spencer Hirsch	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Thomas Johnson	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Alexis Nagle	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: _____   Date: _____