Florida Light and Power

Image Recognition for Pad Mounted Equipment

Spring Project Plan

*Senior Design – Team 304:*

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*Date:*

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| **#** | **TASK NAME** |  | **PEOPLE** | **X** |
| --- | --- | --- | --- | --- |
| **DESCRIPTION** |
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|  |  |  |  |  |
| **1** | **Spring Work Breakdown Structure** |  |  |  |
| 1.1 | Determine Major Deliverables | Check canvas for assignments | Sam, Gage |  |
| 1.1.1 | **Develop Sub Tasks** | **Look through rubrics and other information for the sub tasks** | Jordan |  |
| 1.2 | **Complete Structure** | **Edit chart to fit our needs** | Erin, Kent |  |
| 1.2.1 | **Submit Work Break Down Structure** | **Submit report of work break down structure** | Any member |  |
| **2** | **Finalize Design** |  |  |  |
| 2.1 | **Introduction** | **Introduce problem and preliminary concept** | All members |  |
| 2.2 | Develop CAD | Add more detailed mechanical components and power constraints | Kent, Jordan |  |
| 2.3 | Selected Concept | Describe selected concept | Any member |  |
| 2.4 | Describe Design Details | Add precise details of operations | Any member |  |
| 2.5 | Review Standards | Confirm design complies with relevant standards | Any member |  |
| **3** | **Update Bill of Materials** |  |  |  |
| 3.1 | Determine Major Components | Materials needed for all components of final design | Sam, Gage |  |
| 3.2 | **Compare Vendors** | **Find best vendors for components** | Jordan |  |
| 3.3 | **Record Needed Components** | **Organize purchases in spreadsheet** | Erin, Kent |  |
| 3.4 | **Order Components** | **Make order and document costs** | Any member |  |
| **4** | **Build Prototype** |  |  |  |
| 4.1 | Submit Machine Shop Request | For use of 3D printing and sheet metal tools | Kent, Jordan |  |
| 4.2 | Safety Standards Analysis | Adhere to appropriate safety standards | All members |  |
| 4.3 | Build Mock-Transformer | Build mock transformer for test images | Kent, Jordan |  |
| 4.4 | 3D Print Test Parts | Use design to print parts | Kent, Jordan |  |
| **5** | **Train Model** |  |  |  |
| 5.1 | Collect Real Backgrounds and Synthetic 3D Model | Combining different backgrounds, lightings and orientations to quickly create a lot of training data | Erin, Sam, Gage |  |
| 5.2 | Acquire and Label Real Footage | Take accurate footage of real protoytpe | Erin, Sam, Gage |  |
| 5.3 | Generate Synthetic Images | Run Python/Blender script to generate synthetic training data | Erin, Sam, Gage |  |
| 5.4 | Train YOLOv5 on Real and Synthetic Data Sets | Train YOLOv5 model for multiple classes | Erin, Sam, Gage |  |
| **6** | **VDR4** |  |  |  |
| 6.1 | Introduce the problem | Project scope  Customer needs | All members |  |
| 6.2 | Introduce Design & Standards | Requirements  Functional decomposition | All members |  |
| 6.4 | Review Presentation Slides | Check the content of slides | Sam, Jordan |  |
| 6.5 | Prepare for Questions | Know the details of the project | All members |  |
| 6.6 | Practice Presentation | Present the presentation | All members |  |
| 6.7 | **Submit VDR4 (For Review)** | Sumbit VDR4 report for review | Any member |  |
| 6.8 | Submit Final VDR4 | Submit final VDR4 report | Any member |  |
| **7** | **Testing** |  |  |  |
| 7.1 | Compile Dataset of Test Images | Multiple angles, blockages, conditions | Erin, Sam, Gage |  |
| 7.2 | Write script to output test results | Compare results for each transformer | Erin, Sam, Gage |  |
| 7.3 | Run model | Run YOLOv5 on test data set | Erin, Sam, Gage |  |
| 7.4 | Analyze results | Analyze accuracy of detections and make predictions for causes of any inaccuracies | Erin, Sam, Gage |  |
| **8** | **Update Final Design** |  |  |  |
| 8.1 | Problem statement | Reiterate problem statement and how previous model could be improved | Jordan, Gage |  |
| 8.2 | Initial testing results | Link to computer vision testing results | Kent, Erin |  |
| 8.3 | Discuss alternatives | Discuss importance of possible updates | Sam, Jordan |  |
| 8.4 | Update CAD model | Create updated design | Kent, Jordan |  |
| 8.5 | Document new design | Document and submit updated design | All members |  |
| **9** | **Update Bill of Materials** |  |  |  |
| 9.1 | Determine Major Components | List any new major components | Erin |  |
| 9.2 | **Compare Vendors** | Determine best vendor to purchase | All members |  |
| 9.3 | **Record Needed Components** | Record use of components and cost | Sam |  |
| 9.4 | **Order Components** | Place order | Sam |  |
| **10** | **VDR5** |  |  |  |
| 10.1 | **Submit VDR5 (For Review)** | Create presentation and submit | Any member |  |
| 10.2 | Submit Final VDR5 | Submit final presentation, practice, and present | Any member |  |
| **11** | **Updates to Model Training** |  |  |  |
| 11.1 | Identify issues in model accuracy | Identify whether computer vision model could've resulted in any inaccuracies | Erin, Sam, Gage |  |
| 11.2 | Collect Additional Real and Synthetic Data if needed | Update test data sets | Erin, Sam, Gage |  |
| 11.3 | Update training classes | Update classes if needed | Erin, Sam, Gage |  |
| 11.4 | Train new YOLOv5 model on updated design and data | Train an updated model on new changes | Erin, Sam, Gage |  |
| **12** | **Assemble Updated Design** |  |  |  |
| 12.1 | Submit Machine Shop Request | For 3D printing use only | Kent, Jordan |  |
| 12.2 | Safety Standards Analysis | Adhere to safety standards | Any member |  |
| 12.4 | 3D Print Test Parts | Print new design | Kent, Jordan |  |
| **13** | **Testing** |  |  |  |
| 13.1 | Compile Dataset of Test Images | Update testing images if needed | Erin, Sam, Gage |  |
| 13.2 | Write script to output test results | Update script for new test set and model | Erin, Sam, Gage |  |
| 13.3 | Run model | **Run tests** | Erin, Sam, Gage |  |
| 13.4 | Analyze results | Analyze results of testing and accuracy | Erin, Sam, Gage |  |
| **14** | **VDR6** |  |  |  |
| 14.1 | **Submit VDR6 (For Review)** | Create draft presentation | Erin |  |
| 14.2 | Submit Final VDR6 | Submit final presentation, practice, and present | All members |  |
| **15** | **Finalize Evidence Book** |  |  |  |
| 15.1 | Document time line | Update all semester dates and details | Erin, Sam |  |
| 15.2 | Document milestones | Include all relevant documentation | Gage, Kent |  |
| 15.3 | Document deliverables | Add design deliverables and final solution | Jordan, Sam |  |
| 15.4 | Update formatting and add additional review if needed | Combine all previous assignmetns into a concise document | Any member |  |
| **15.5** | **Website** | **Compile all documentation into a website** | **Sam** |  |
| **16** | **Final Presentation** |  |  |  |
| 16.1 | Create Presentation | Compile all important work from the year and final design | Erin, Sam |  |
| 16.2 | Submit for Review | Submit final presentation for review | Gage, Kent |  |
| 16.3 | Practice Presentation | Additional final presentation practice | Jordan, Sam |  |
| 16.4 | Present Final Project | Senior Design Day! | Any member |  |