Project Name:

Real-time AI Object Detection Web App

Component Definitions

Main Page – M

The Main Page shows off a collection of panels which the user can interact with and see the models object detection results.

Webcam Panel – W

The Webcam Panel shows the model output stream to the user.

Information Panel – I

The Information Panel shows off basic information metrics to the user.

Feature Settings Panel – F

The Feature Settings Panel shows off settings inputs that enable features to the user.

Feature Specific Settings Panel – S

The Feature Specific Settings Panel shows off settings specific to features to the user.

Model Specific Settings – P

The Model Specific Settings Panel shows off settings to configure the model to the user.

Top Prediction Panel – L

The Top Prediction Panel shows off the top predictions to the user.

Requirements

Main Page

M.1 – The main page shall adhere to responsive CSS design, via no clipping, support dynamic sizing of elements, and scale to multiple device window sizes.
M.1.1 – The main page shall support mobile devices (Breakpoints at Phone, Ipad, Laptop, and 16:9.) sizes.

M.2 – The main page shall support dark and light modes.
M.2.1 – The main page shall allow the user to toggle between dark and light mode manually.
M.2.2 – The main page shall default to darkmode.

M.4 – The main page shall display popups to show user alerts and important status changes.
M.4.1 – Information popups shall clear themselves over time.
M.4.2 – Information popups shall display in clearly defined levels (info, warning, success, error)
M.4.3 – There shall only display one information popup at one time (per Material Design standards)
M.4.4 – Popups shall clear out over time automatically.

M.W – The main page shall display model output.
M.I – The main page shall display inference and postprocessing outputs.
M.F – The main page shall allow features to be enabled.
M.S – The main page shall display feature specific settings.
M.P – The main page shall display model specific settings.
M.L – The main page shall display top predictions to the user.

Webcam Panel

W.1 – The webcam panel shall update in real-time (100-200ms)
W.2 – The webcam panel shall display bounding boxes around objects

W.3 – The webcam panel shall display class and confidence around objects

Information Panel

I.1 – The information panel shall update in real-time

I.2 – The information panel shall display the inference time in ms and fps.

I.3 – The information panel shall display post processing time in ms

I.4 – The information panel shall display the number of objects detected

Feature Settings Panel

F.1 – The feature settings panel shall provide the ability to enable features [Tracking, Pose Estimation, Heatmap, and Segmentation Maps]

Feature Specific Settings Panel

S.1 – The feature specific settings panel shall allow for customization of the enabled features

Model Specific Settings

P.1 – The model settings panel shall allow the user to change the source fed into the model

P.2 – The model settings panel shall allow the user to change model size (Nano, Small, Medium, Large, Extra Large)

P.3 – The model settings panel shall allow the user to change the confidence filter for detected objects.

P.4 – The model settings panel shall allow the user to change the IOU (intersection over union) filter for detected objects.

P.5 – The model settings panel shall allow users to filter which classes are detected.

Top Prediction Panel

L.1 – The top prediction panel shall update in real-time

L.2 – The top prediction panel shall allow users to view the top (to be resolved) number of predictions

Testing and Validation

Main Page

T.M.1 – Load the main page completely. And use the Dev Tools panel to scale the web app. This test has passed if all sub panels are loaded and scale without clipping.
T.M.1.1 – Load the main page completely. Open Dev Tools and toggle device emulation. Change dimensions to Iphone SE, Ipad Air, and Responsive with 1920x1080 and 1080x720. This test passes if all sub panels are loaded and scale without clipping.

T.M.2 – Load the main page completely. Verify that both light mode and dark mode change the web app color palette via the dark mode and light mode toggle. This test passes if the color palette changes in both modes.
T.M.2.1 – Click the dark mode light mode toggle button. This test passes if the toggle button changes the web app palette accordingly.
T.M.2.2 – Load the main page completely. This test passes if the palette loaded is the dark mode palette.

T.M.4 – Load the main page completely. Disconnect the frontend from the backend. This test passes if an error warning popup is displayed during a failed connection to the backend.
T.M.4.1 – Trigger multiple popups via different methods (connection errors, invalid inputs etc.) This test passes if the popup count is displayed and accurately depicts the number of current pop ups in the queue.
T.M.4.2 – Trigger different level popups. This test passes if the color and level of the popup changes respectively to their level.
T.M.4.3 – Trigger multiple popups. This test passes if only one popup is displayed at one time.
T.M.4.4 – Trigger multiple popups. This test passes if each popup is displayed in sequence and disappears after a set time.

T.M.W – Load the main page completely. This test passes if the model output panel renders and functions per T.W.

T.M.I – Load the main page completely. This test passes if the information panel renders and functions per T.I.
T.M.F – Load the main page completely. This test passes if the feature settings panel renders and functions per T.F.
T.M.S – Load the main page completely. This test passes if the feature specific settings panel renders and functions per T.S.
T.M.P – Load the main page completely. This test passes if the model specific settings panel renders and functions per T.P.
T.M.L – Load the main page completely. This test passes if the top prediction panel renders and functions per T.L.

Webcam Panel

T.W.1 – Select a source and model size in the model settings panel if T.P passed. This test passes if the webcam stream connects in the Dev Tools console and the webcam stream is displayed in real time on the main page.
T.W.2 – Select a source and model size in the model settings panel if T.P passed. This test passes if T.W.1 passes and the webcam stream has visible bounding boxes around objects.
T.W.3 – Select a source and model size in the model settings panel if T.P passed. This test passes if T.W.2 passes and the webcam stream has class and confidence displayed on the bounding boxes.

Information Panel

T.I.1 – Select a source and model size in the model settings panel if T.P passed. This test passes if the webcam stream connects in the Dev Tools console and the information sub-panels update in real-time.
T.I.2 – Select a source and model size in the model settings panel if T.P passed. This test passes if T.I.1 passes and the inference time ms and fps sub panels render and update.
T.I.3 – Select a source and model size in the model settings panel if T.P passed. This test passes if T.I.1 passes and the post processing sub panel renders and updates.

T.I.4 – Select a source and model size in the model settings panel if T.P passed. This test passes if T.I.1 passes and the number of objects sub panel renders and updates.

Feature Settings Panel

T.F.1 – Load the main page completely. Open the Dev Tools console. This test passes if enabling each feature results in a broadcast settings change in the Dev Tools console and each implemented features enabled as intended.

Feature Specific Settings Panel

T.S.F.1 – Load the main page completely. Open the Dev Tools console. Enable a specific setting. This test passes if changing the feature specific settings for the enabled feature affects the functionality of the enabled feature.

Model Specific Settings

T.P.1 – Load the main page completely. Select a source in the model settings. This test passes if the source is selected and successfully grabs frames from the source verified via the Dev Tools console.

T.P.2 – Load the main page completely. Select a model size. This test passes if the changed model size is sent to the backend and verified via the Dev Tools console.

T.P.3 – Load the main page completely. Select a model size. This test passes if the changed confidence filter is sent to the backend and verified via the Dev Tools console. If the Webcam is implemented, this can also be passed by sliding the confidence filter and verifying only objects with that confidence or above are displayed.

T.P.4 – Load the main page completely. Select a model size. This test passes if the changed IOU filter is sent to the backend and verified via the Dev Tools console. If the Webcam is implemented, this can also be passed by sliding the IOU filter and verifying that more boxes appear as the IOU filter goes to 0.

T.P.5 – Load the main page completely. Select a model size. This test passes if the changed classes filter is sent to the backend and verified via the Dev Tools console. If the Webcam is implemented, this can also be passed by verifying that only the classes specified are shown in object detections.

Top Prediction Panel

T.L.1 – Select a source and model size in the model settings panel if T.P passed. This test passes if the webcam stream connects in the Dev Tools console and the prediction panel updates in real time with valid current predictions.

T.L.2 – Select a source and model size in the model settings panel if T.P passed. This test passes if the webcam stream connects in the Dev Tools console and the predictions displayed are accurate and are in the top (ascending) order of highest confidence score.