Metrics Documentation

Special Classes

There are 2 special classes: unlabelled and false_detection

- `false_detection`: objects that don't exist but have been erroneously detected by the model.
- `unlabelled`: the default value whenever a box is moved/created. This indicates that the object has not yet been labelled by the user and that the user must label this object.

Classification metrics

F1, Precision & Recall Scores

The F1, precision and recall scores for all classes including the two special classes. This also includes the Macro and Weighted averages for the three scores.

- If a class does not appear in the video (neither detected by the model nor added by the user), the per class scores will be NaN (Not A Number), it will also not be taken into account in the Averages.
- If a class was not detected by the model but is later found by the user then the precision for that class will still be NaN while the recall will always be 0. This is due to the fact that, in this case, there is no False Positives for that class but there are still False Negatives. This class will then be taken into account in the Averages. This also applies to the two special classes

Formulas

- precision = true positives / (true positives + false positives)
- recall = true positives / (true positives + false negatives)
- F1 = 2 * (precision * recall) / (precision + recall)

Confusion Matrix

A standard confusion matrix for all the classes including special classes.

The columns and rows for `unlabelled` should always be 0. If it is not the user must find and label all `unlabelled` objects.

Other metrics

Count Comparison

Compares the Actual and Predicted count of all classes given when uploading the container in addition to 2 more special classes

The `unlabelled` class should always have a count of 0, if it's found to be larger then there is an object that has not yet been labelled, and the user must find and label it.

Venn Diagram

Compares the number of detected and labelled objects. It is presented in the form of a table with the following columns:

- Detected but not labelled: this is the count of the objects that were detected by the model but which should not have been (i.e. false detection).
- Detected and labelled: these are valid objects that were detected and labelled by the model. The objects' label could still be incorrect and this is reflected in the previous metrics.
- Labelled but not detected: this is the count of the objects that were not detected by the model but added by the user.

Intersection over Union (IOU)

Calculate the average Intersection Over Union:

- `unlabelled` objects are not taken into account,
- `false_detection` objects are automatically given an IOU of 0
- objects added by the user are automatically given an IOU of 0