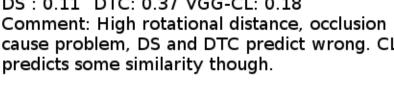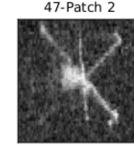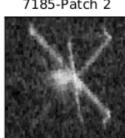## Matching Pair Predictions

47-Patch 1 / **47-Patch 2**

DS : 0.11   DTC: 0.37 VGG-CL: 0.18
Comment: High rotational distance, occlusion cause problem, DS and DTC predict wrong. CL predicts some similarity though.
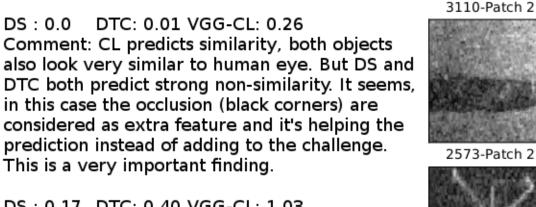
7185-Patch 1 / **7185-Patch 2**

DS : 1.0   DTC: 0.98 VGG-CL: 0.11
Comment: There is very little rotation and translation between two frames, hence all three networks predict very accurately.

2167-Patch 1 / **2167-Patch 2**

DS : 0.99 DTC: 0.98 VGG-CL: 0.61
Comment: Difference in contrast and lot of noise, DS and DTC predict matching pair, very strongly, but CL predicts wrongly.

506-Patch 1 / **506-Patch 2**

DS : 0.99 DTC: 0.98 VGG-CL: 0.20
Comment: Inspite of a lot of noise and unwanted reflections, the prediction for all three are correct.

6126-Patch 1 / **6126-Patch 2**

DS : 0.89 DTC: 0.96 VGG-CL: 0.05
Comment: Very high rotation and some occlusion, but prediction from all three networks are very accurate.

3364-Patch 1 / **3364-Patch 2**

DS : 0.06 DTC: 0.47 VGG-CL: 0.37
Comment: DS predicts non-matching, DTC prediction shows there is some similarity and CL predicts similar pair but very high distance.

1481-Patch 1 / **1481-Patch 2**

DS : 0.58 DTC: 0.57 VGG-CL: 0.28
Comment: Very big rotation is there along with difference in contrast. Though all three networks predict correctly but not very strongly.

2026-Patch 1 / **2026-Patch 2**

DS : 0.0   DTC: 0.11 VGG-CL: 1.17
Comment: CL predicts very big distance and non-matching. DS and DTC also predict non-matching strongly. All three are very wrong in this case. The image has all kind of challenges though, rotation, translation, noise, poor contrast. One of the worst samples.

5108-Patch 1 / **5108-Patch 2**

DS : 0.73 DTC: 1.0 VGG-CL: 0.04
Comment: CL and DTC predict very strongly that this is a matching pair. DS also predicts strong similarity.

4202-Patch 1 / **4202-Patch 2**

DS : 0.23 DTC: 0.84 VGG-CL: 0.27
Comment: DTC prediction is correct. DTC performance in matching pair prediction has been very good. In this case DS prediction is very false., though CL also predicts correctly.

Non-matching Pair Predictions

3110-Patch 1 / **3110-Patch 2**

DS : 0.0   DTC: 0.01 VGG-CL: 0.26
Comment: CL predicts similarity, both objects also look very similar to human eye. But DS and DTC both predict strong non-similarity. It seems, in this case the occlusion (black corners) are considered as extra feature and it's helping the prediction instead of adding to the challenge. This is a very important finding.

2573-Patch 1 / **2573-Patch 2**

DS : 0.17 DTC: 0.40 VGG-CL: 1.03
Comment: All three predict correctly, CL predicts very big distance between two images, DTC does find bit of similarity though.

7331-Patch 1 / **7331-Patch 2**

DS : 0.0   DTC: 0.03 VGG-CL: 1.10
Comment: All three networks very strongly predict non-matching. It is observed that the object in first image has sharp edges, which other two test objects does not. So the object-object non-matching is easier in this case.

3291-Patch 1 / **3291-Patch 2**

DS : 0.79 DTC: 0.90 VGG-CL: 0.23
Comment: This object-object non-matching pair is more challenging as both objects have round edges. All three networks predict matching quite strongly, which is **wrong**. One of the worst cases.

810-Patch 1 / **810-Patch 2**

DS : 0.0   DTC: 0.04 VGG-CL: 0.97
Comment: All three network predict correctly.

4677-Patch 1 / **4677-Patch 2**

DS : 0.06 DTC: 0.19 VGG-CL: 0.17
Comment: Object-background non-matching. The background has some edges, which matches the object in first image. This confuses CL which predicts similarity. Although,both DenseNet predict non-similarity very strongly.
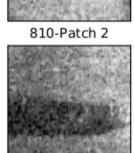
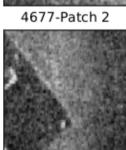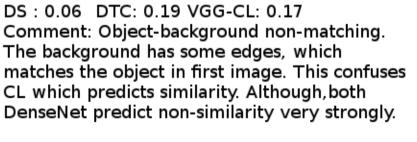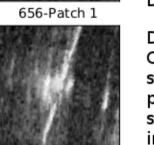**656-Patch 1** / **656-Patch 2**

DS : 0.02 DTC: 0.34 VGG-CL: 0.12
Comment: Object-background non-matching. Cl strongly predicts the pair is matching, DTC predicts non-matching but there is some similarity. DS is very accurate. DS performance in non-matching pairs are very good. Which is benefitting the ensemble prediction too.

1417-Patch 1 / **1417-Patch 2**

DS : 0.0   DTC: 0.02 VGG-CL: 0.51
Comment: Object-background non-matching is easier to predict accurately if the background does not contain any feature. All three predicts correctly. Though CL prediction is in the middle.

836-Patch 1 / **836-Patch 2**
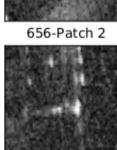
DS : 0.24 DTC: 0.14 VGG-CL: 0.17
Comment: CL prediction is generally weak if there are noisy features in the background. It finds similarity between the object-background non-matc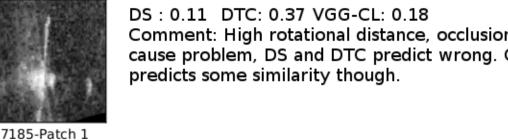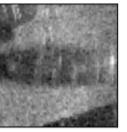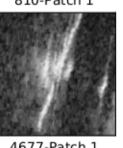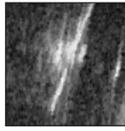hing pair. It might be that DenseNet is better in hard-feature extraction than VGG. Because of high noise, in sonar, doing just pixel-to-pixel comparison is not sufficient.

7055-Patch 1 / **7055-Patch 2**

DS : 0.0   DTC: 0.01 VGG-CL: 1.53
Comment: All three predict correctly.