

This chapter will present the results from training and testing of the three data representations using two different outputs. Training results support arguments to how optimization of the models were performed as well as the generalization performance of the models. Final testing shows how the trained model will generalize unseen data, displayed in a confusion matrix, along with its calculated type 1 and type 2 errors. According to the final result, optimal model will be found

1 Initial optimization and training of the models

Initial grid search of hyperparameters led to results that were used as an indication to initial settings of the models in order to (improve) raise or maintain performance for the different networks. The results of the grid search is shown in

2 Training optimization based on validation performance

Further optimization was performed based the development in validation performance. These results were used to evaluate the performance of the model, in terms of the under- and overfitting of the training subset. Training were performed using 10-fold cross-validation providing the mean values of accuracy, sensitivity, specificity The results of this training optimization process is shown as graphs in

2.1 Simple representation training results



Figure 1: Training graphs:

Classes	Avg. Accuracy (%)	Avg. Sensitivity (%)	Avg. Specificity (%)	Avg. PPV (%)	Avg. NPV (%)
Pain duration	54.56% ($\pm 12.81\%$)	50.68% ($\pm 0.15\%$)	59.55% ($\pm 0.15\%$)	58.33% ($\pm 0.25\%$)	51.33% ($\pm 0.20\%$)
Pain intensity	63.33% ($\pm 1.67\%$)	0.00% ($\pm 0.00\%$)	63.33% ($\pm 0.02\%$)	0.00% ($\pm 0.00\%$)	100% ($\pm 0.00\%$)

Table 1: My caption

2.2 Binary representation training results



Figure 2: Training graphs:

Classes	Mean Accuracy (%)	Mean Sensitivity (%)	Mean Specificity (%)	Mean PPV (%)	Mean NPV (%)
Pain duration	59.51% ($\pm 11.20\%$)	62.16% ($\pm 21.59\%$)	62.20% ($\pm 18.13\%$)	54.53% ($\pm 27.10\%$)	69.10% ($\pm 19.47\%$)
Pain intensity	65.04% ($\pm 10.83\%$)	48.23% ($\pm 0.28\%$)	71.02% ($\pm 0.12\%$)	44.09% ($\pm 0.26\%$)	78.65% ($\pm 0.14\%$)

Table 2: My caption

2.3 Combined representation training results



Figure 3: Training graphs:

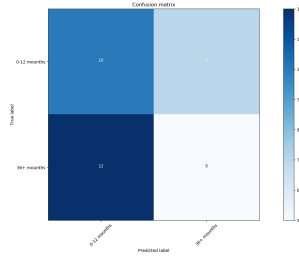
Classes	Mean Accuracy (%)	Mean Sensitivity (%)	Mean Specificity (%)	Mean PPV (%)	Mean NPV (%)
Pain duration	55.49% ($\pm 10.06\%$)	55.23% ($\pm 16.07\%$)	56.99% ($\pm 12.55\%$)	42.92% ($\pm 21.03\%$)	68.47% ($\pm 13.90\%$)
Pain intensity	65.14% ($\pm 12.87\%$)	37.50% ($\pm 0.35\%$)	67.34% ($\pm 0.15\%$)	22.14% ($\pm 0.20\%$)	92.41% ($\pm 0.07\%$)

Table 3: My caption

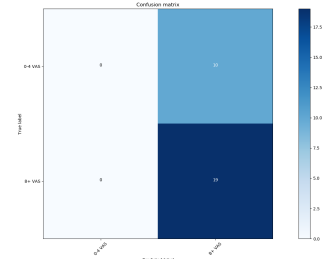
3 Testing results

These results reflect the generalization performance of the three representation models, to which the models classification capabilities to unseen data is shown in confusion matrices, from where specificity, sensitivity, type 1 and type 2 errors are calculated.

3.1 Simple representation training results



(a) Confusion matrix for classification of pain duration



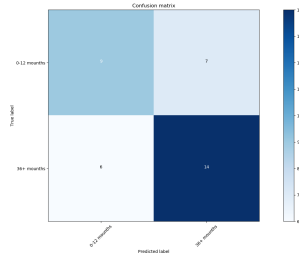
(b) Confusion matrix for classification of pain intensity

Figure 4: Confusion matrices for simple representation testing

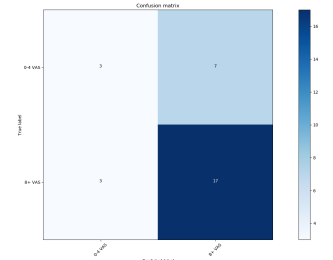
Classes	Accuracy (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Pain duration	44.12%	45.45%	41.67%	58.82%	29.41%
Pain intensity	65.52%	0%	65.52%	0%	100%

Table 4: My caption

3.2 Binary representation training results



(a) Confusion matrix for classification of pain duration



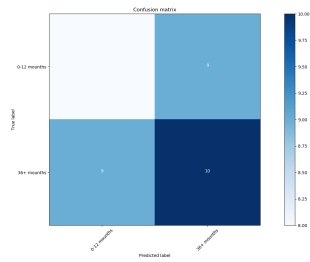
(b) Confusion matrix for classification of pain intensity

Figure 5: Confusion matrices for binary representation testing

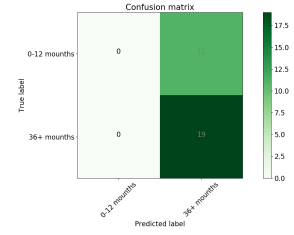
Classes	Accuracy (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Pain duration	63.89%	60%	66.67%	57.25%	70%
Pain intensity	70%	60%	72%	30%	90%

Table 5: My caption

3.3 Combined representation training results



(a) Confusion matrix for classification of pain duration



(b) Confusion matrix for classification of pain intensity

Figure 6: Confusion matrices for combined representation testing

Classes	Accuracy (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Pain duration	52.78%	50%	55.56%	52.94%	52.63%
Pain intensity	63.33%	0%	63.33%	0%	100%

Table 6: My caption