Process Mining and Intelligence Project

Emotion Based Music Selection

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2 Task level modeling

Position	Salary	Normalized Salary
Clerk	$52,000.00	1.00
ML engineer	$130,000.00	2.50
Data scientist	$123,000.00	2.37
Domain expert (Neurologist)	$267,000.00	5.13
Minimum	$52,000.00	1.00

Table 1: Salary and normalized salary for each position

2.1 Segregation system

2.1.1 Check data balancing

The task is performed by a Data Analyst.

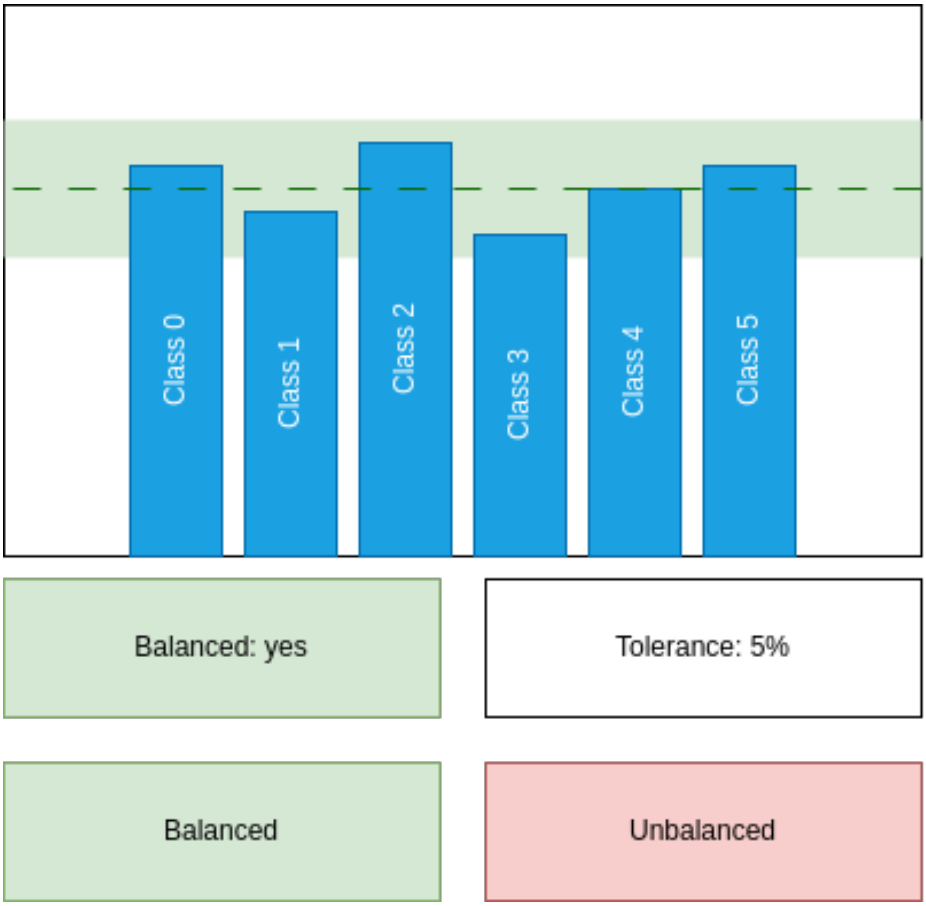

Figure 1: "Check data balancing" mock-up form

Step	**O**	**CL**	**S**	**SC**
1 ACTOR opens "Check data balancing" form.	1	1	1.15	1.15
2 SYSTEM shows the report.				
3 SYSTEM shows a hint whether the data is balanced or not.				
4 ACTOR checks threshold in the UI.	1	2	1.15	2.30
5 FOR EACH column in the report:	1			
5.1 IF the column is not within the displayed threshold.	0.8			
5.1.1 THEN the data is not balanced.	0.8			
6.1 IF the data is balanced.	0.2			
6.1.1 ACTOR clicks "Balanced" button.	0.2	1	1.15	0.23
6.2 ELSE	0.8			
6.2.1 ACTOR clicks "Unbalanced" button.	0.8	1	1.15	0.92
7 SYSTEM shows a confirmation dialog.				
8 ACTOR closes the form.	1	1	1.15	1.15
			Human task cost	5.75

Table 2: Detailed use case for "Check data balancing" task
O - Occurrence, CL - Cognitive Level, S - Normalized Salary, SC - Step Cost

2.1.2 Check input coverage

Figure 2: "Check input coverage" mock-up form

Step	O	CL	S	SC
1 ACTOR opens "Check input coverage" form.				
2 SYSTEM shows a radar scatter plot of the input distribution.				
3 FOR EACH radius in the radar scatter plot:				
3.1 IF the distribution is not uniform as expected.				
3.1.1 THEN the input coverage is not satisfied.				
4.1 IF the input coverage is satisfied.				
4.1.1 ACTOR clicks "Accept" button.				
4.2 ELSE				
4.2.1 ACTOR clicks "Reject" button.				
5 SYSTEM shows a confirmation dialog.				
6 ACTOR closes the form.				
Human task cost				

Table 3: Detailed use case for "Check input coverage" task
O - Occurrence, CL - Cognitive Level, S - Normalized Salary, SC - Step Cost

2.2 Development system

2.2.1 Set iteration number

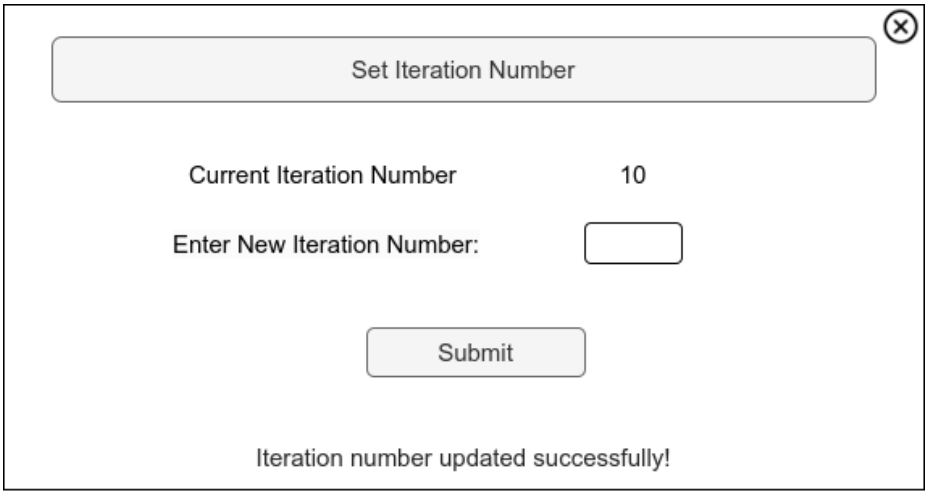

Figure 3: "Set iteration number" mock-up form

Step	O	CL	S	SC
1 ACTOR opens "Set Iteration Number" form.				
2 SYSTEM displays the current iteration number.				
3 ACTOR inputs the desired number of iterations.				
4 ACTOR clicks "Submit" button to confirm the iteration number.				
5 SYSTEM shows a confirmation dialog.				
6 ACTOR closes the form.				
Human task cost				

Table 4: Detailed use case for "Set iteration number" task
O - Occurrence, CL - Cognitive Level, S - Normalized Salary, SC - Step Cost

2.2.2 Check learning report

Figure 4: "Check learning report" mock-up form

Step	O	CL	S	SC
1 ACTOR opens "Check training report" form.				
2 SYSTEM shows the training loss curve.				
3.1 IF the loss is flat for at least half of the iterations:				
3.1.1 THEN ACTOR clicks "Overfit" button.				
3.2 IF the loss is not flat at the end of the iterations:				
3.2.1 THEN ACTOR clicks "Underfit" button.				
3.3 ELSE				
3.3.1 ACTOR clicks "Approved" button.				
4 SYSTEM shows a confirmation dialog.				
5 ACTOR closes the form.				
Human task cost				

Table 5: Detailed use case for "Check training report" task
O - Occurrence, CL - Cognitive Level, S - Normalized Salary, SC - Step Cost

2.2.3 Check validation report

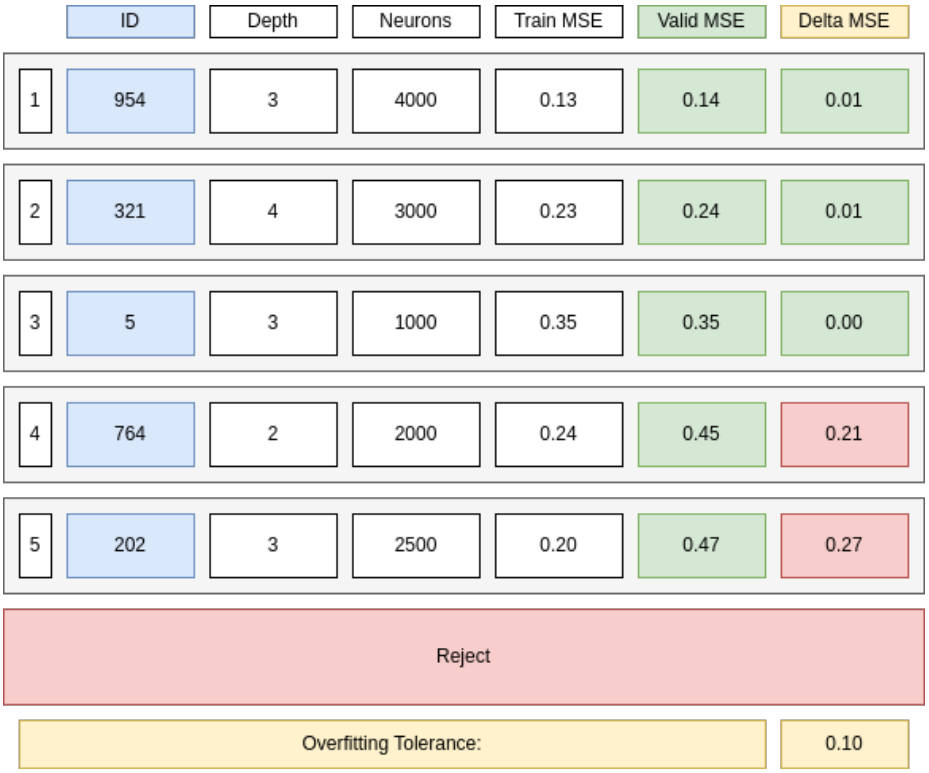

Figure 5: "Check validation report" mock-up form

Step	O	CL	S	SC
1 ACTOR opens "Check validation report" form.				
2 SYSTEM shows the best 5 models sorted by increasing Validation Loss.				
3 FOR EACH model in the list:				
3.1 IF the model Validation Loss minus the Training Loss is less than the Overfitting Tolerance.				
3.1.1 THEN select the model as the Best Model.				
4 FOR EACH model in the list:				
4.1 IF the model is not the Best Model and the Validation Loss minus the Training Loss is less than the Overfitting Tolerance.				
4.1.1 THEN select the model as the Second Best Model.				
5.1 IF the Best Model is not selected.				
5.1.1 ACTOR clicks "Reject" button.				
5.2 ELSE IF the Second Best Model is not selected or the Validation Loss of the Second Best Model is one order of magnitude greater than the Validation Loss of the Best Model.				
5.2.1 ACTOR clicks on the Best Model.				
5.3 ELSE				
5.3.1 ACTOR clicks on the least complex model among the Best Model and the Second Best Model.				
6 SYSTEM shows a confirmation dialog.				
7 ACTOR closes the form.				
Human task cost				

Table 6: Detailed use case for "Check validation report" task
O - Occurrence, CL - Cognitive Level, S - Normalized Salary, SC - Step Cost

2.2.4 Check test results

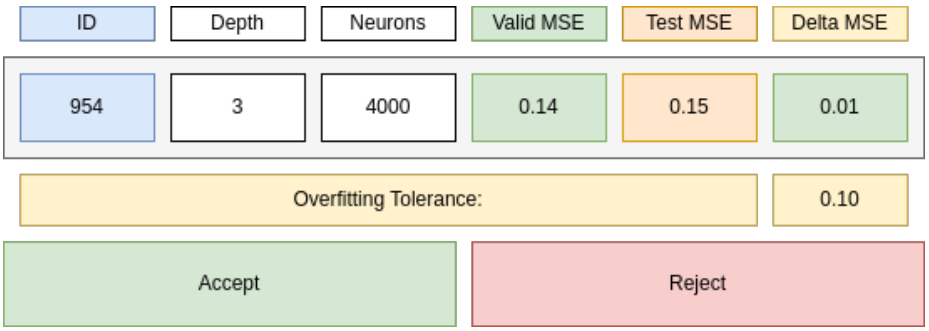

Figure 6: "Check test results" mock-up form

Step	O	CL	S	SC
1 ACTOR opens "Check test results" form.				
2 SYSTEM shows the test results.				
3 ACTOR checks if the difference between the test results and the validation results is within overfitting tolerance.				
4.1 IF the test results is not satisfactory.				
4.1.1 ACTOR clicks "Reject" button.				
4.2 ELSE				
4.2.1 ACTOR clicks "Approve" button.				
5 SYSTEM shows a confirmation dialog.				
6 ACTOR closes the form.				
Human task cost				

Table 7: Detailed use case for "Check test results" task
O - Occurrence, CL - Cognitive Level, S - Normalized Salary, SC - Step Cost

2.3 Evaluation system

2.3.1 Evaluate classifier performance

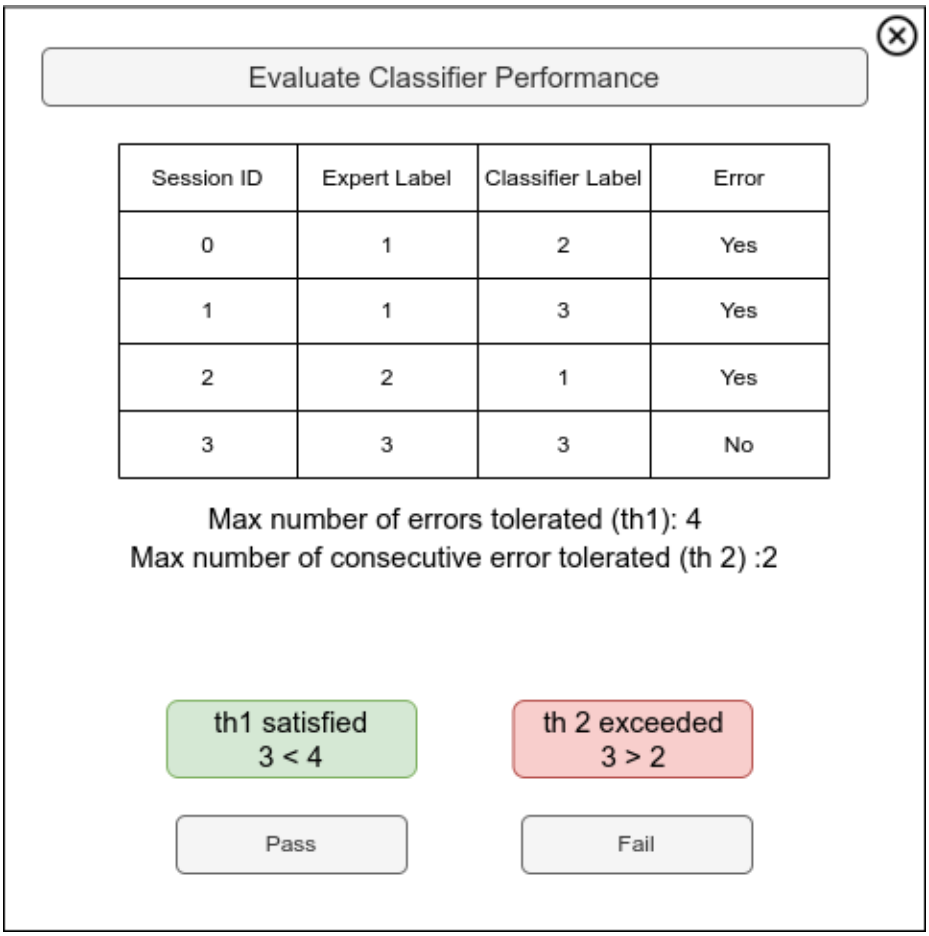

Figure 7: "Evaluate Classifier Performance" mock-up form

Step	O	CL	S	SC
1 ACTOR opens the "Evaluate Classifier Performance" form.				
2 SYSTEM displays a table of sessions with Expert Label (ground truth) and Classifier Label (predicted label). The difference between the labels (if any) represents an error.				
3 ACTOR reviews the table.				
3.1 IF the total errors or consecutive errors exceed their respective thresholds:				
3.1.1 ACTOR clicks the "Fail" button.				
3.2 ELSE				
3.2.1 ACTOR clicks the "Pass" button.				
4 SYSTEM shows a confirmation dialog.				
5 ACTOR closes the form.				
Human task cost				

Table 8: Detailed use case for "Evaluate Classifier Performance" task
O - Occurrence, CL - Cognitive Level, S - Normalized Salary, SC - Step Cost