02 Applications - Supervised Machine Learning Readiness



Machine Learning Model Handbook

Grading Rubric

| Part 2: Data HandlingExercise 2b Describe your exploratory data analysis of any target and input features of note. Include the following:   * How many rain and snow records are in the dataset? * Do the distributions of values make sense for the physical world? * Are there any unexpected values? * Which input features may be the strongest predictors of rain vs snow? * Include any important plots to illustrate your conclusions. Limit yourself to 5 plots. | |
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| **Score** | **Criteria** |
| 5 - Excellent | * Correctly identifies the number of rain and snow records * Evaluates if variables fall within expected ranges and identifies major outliers with plausible justification. * Identifies the strongest correlations between variables and precipitation type. * Supports analysis with relevant plots and explains their significance. |
| 4 - Proficient | * Addresses most supporting questions with clear reasoning. * Identifies expected value ranges and major outliers, though some discussion may lack depth or explain deviations. * Discusses variable and precipitation type correlations, but may not fully justify conclusions. * Includes relevant plots but may not thoroughly explain all of them. |
| 3 - Satisfactory | * Discusses expected value ranges but may overlook key outliers. * Addresses variable and precipitation type correlations but lacks strong supporting evidence. * Includes some plots but does not clearly explain their significance. |
| 2 - Needs Improvement | Little to no evaluation of expected ranges or outliers.   * Mentions variable and precipitation type correlations but with weak or no supporting analysis. * Few or no relevant plots included. |
| 1 - Minimal | * Does not adequately analyze expected value ranges, or outliers. * No meaningful discussion of variable and precipitation type correlations. * Little to no supporting plots. |
| 0 - No Response | * No response or entirely off-topic answer. |

| Part 3: Model DevelopmentExercise 3e Paste evaluation results  Then describe the results of the original model validation. Include the following:   * How well does the model predict rain? Support your description with the evaluation metrics. * How well does the model predict snow? Support your description with the evaluation metrics. * How do you interpret these statistics in the context of the physical world? * What changes will you make to try to improve these statistics in the next iteration? | |
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| **Score** | **Criteria** |
| 5 - Excellent | * Includes evaluation results. * Provides a well-reasoned interpretation of validation metrics (accuracy, precision, and recall) for rain and snow. * Connects evaluation results to real-world meteorological implications, such as the implications of incorrect classifications in weather prediction. * Suggests potential improvements for subsequent trials with supported reasoning. |
| 4 - Proficient | * Includes evaluation results. * Evaluates model performance for rain and snow using accuracy, precision, and recall with mostly correct interpretations. * Connects evaluation results to real-world meteorological situations, but may lack sufficient descriptions of real-world implications. * Suggests reasonable improvements, though some may lack depth. |
| 3 - Satisfactory | * Includes evaluation results. * Provides a basic interpretation of validation metrics but may miss some key details or misinterpret one or more metrics. * Mentions real-world situations but does not fully explore the impacts of incorrect classifications. * Suggests general improvements but lacks clear justification. |
| 2 - Needs Improvement | * Includes evaluation results. * Attempts to interpret validation metrics for rain and snow but contains inaccuracies or lacks depth. * Connections to real-world situations are weak or missing. * Suggestions for improvement are vague or missing. |
| 1 - Minimal | * Includes evaluation results. * Provides an incorrect evaluation of model performance with little to no reference to accuracy, precision, or recall. * Connections to real-world situations are weak or missing. * No actionable suggestions for improvement. |
| 0 - No Response | * No response or entirely off-topic answer. |

| Exercise 3f Paste the full output of each of your validation trials, one per box. | |
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| **Score** | **Criteria** |
| 5 - Excellent | * At least three unique additional trials are present * Trials include more than one algorithm * Trials use a variety input features |
| 3 - Satisfactory | * Fewer than three unique additional trials are present |
| 0 - No Response | * No response or entirely off-topic answer. |

| Exercise 3h Then make a final decision on whether this model delivers on the results needed with supporting justification. Include the following:   * Which precipitation class(es) had the best evaluation metrics? List some physical scientific reasons why this may be the case. * Is this model ready for use in the real world? Why or Why not? * What other possible changes could further improve this model? | |
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| **Score** | **Criteria** |
| 5 - Excellent | * Accurately identifies the precipitation class(es) that had the best evaluation metrics given their choices in model development. * Suggests reasonable physical scientific reasons why these variables generated the best model performance, including any surprising results. * Thoughtfully assesses whether the model is ready for real-world use, providing strong justification within the context of the scientific issue at hand and the initial problem statement. * Suggests concrete, scientifically valid improvements for future iterations. |
| 4 - Proficient | * Accurately identifies the precipitation class(es) that had the best evaluation metrics given their choices in model development. * Suggests reasonable physical scientific reasons why these variables generated the best model performance, but may lack depth in some areas. * Assesses real-world readiness with justification, though reasoning may not be fully developed. * Suggests meaningful improvements, but they may not be fully explained. |
| 3 - Satisfactory | * Identifies the precipitation class(es) that had the best evaluation metrics, but with partial accuracy or missing details. * Offers a basic scientific explanation for model performance but lacks depth. * Provides a general assessment of real-world readiness, though justification is weak or incomplete. * Suggests potential improvements but with little scientific reasoning. |
| 2 - Needs Improvement | * Attempts to identify the precipitation class(es) that had the best evaluation metrics, but with significant inaccuracies or missing key metrics. * Provides little or unclear scientific reasoning behind model performance. * Minimal discussion of real-world readiness, with weak or unsupported justification. * Suggestions for improvement are vague or not scientifically valid. |
| 1 - Minimal | * Fails to correctly identify the precipitation class(es) that had the best evaluation metrics. * Fails to assess real-world applicability. * Offers little to no discussion on real-world readiness. * No meaningful suggestions for improvement. |
| 0 - No Response | * No response or entirely off-topic answer. |