02 Applications - Supervised Machine Learning Readiness



Machine Learning Model Handbook

Grading Rubric

| Part 2: Data HandlingExercise 2bDescribe 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.
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| Part 3: Model DevelopmentExercise 3ePaste evaluation resultsThen 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.
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| 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.
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| Exercise 3fPaste 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.
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| Exercise 3hThen 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.
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