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| **Objective:**  You will use MATLAB to perform classification and regression tasks on datasets of your choice from the UCI Machine Learning Repository. You will utilize the MATLAB Classification Learner and Regression Learner apps to train, validate, and evaluate machine learning models.   |  |  | | --- | --- | | **Note: Please follow the Video Recording of your tutorial sessions for the step by step demonstration** | | | **of the using Classification learner and Regression Learner in Matlab** |  |   **Tools Required:**   * MATLAB * Classification Learner App * Regression Learner App   **Datasets:**  You should select datasets from the UCI Machine Learning Repository that includes, but not limited to:   * Iris Dataset * Adult Income Dataset * Bank Marketing Dataset * University Graduate prediction   **Assignment Tasks**  **Part 1: Classification Task**   1. **Dataset Selection:**    * Choose a classification dataset from the UCI Machine Learning Repository. 2. **Data Import:**    * Import the dataset into MATLAB.    * Preprocess the data if necessary (e.g., handle missing values, normalize features). 3. **Model Training:**    * Open the Classification Learner App in MATLAB.    * Use various classifiers such as decision trees, discriminant analysis, naive Bayes, or support vector machines to train models on the dataset..    * Perform feature selection and transformation if needed. 4. **Model Evaluation:**    * Evaluate model performance using cross-validation.    * Compare models based on accuracy, confusion matrix, and other relevant metric. |

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| 5. **Model Export:**   Export the best-performing model to the MATLAB workspace for further analysis or deployment.  **Part 2: Regression Task**   1. **Dataset Selection:**    * Choose a regression dataset from the UCI Machine Learning Repository. 2. **Data Import:**    * Import the dataset into MATLAB.    * Preprocess the data if necessary (e.g., handle missing values, normalize features). 3. **Model Training:**    * Open the Regression Learner App in MATLAB.    * Train various regression models such as linear regression, regression trees, support vector machines, or Gaussian process regression.    * Consider hyperparameter optimization to improve model performance. 4. **Model Evaluation:**    * Evaluate model performance using cross-validation.    * Compare models based on metrics like RMSE (Root Mean Square Error) and R-squared values. 5. **Model Export:**    * Export the best-performing model to the MATLAB workspace for further analysis or deployment.   **Deliverables**   * + A report detailing:   + The chosen datasets and rationale for selection.   + Preprocessing steps taken.   + Model training process and parameters used.   + Evaluation metrics and comparison of different models.   + Conclusions drawn from the analysis. |
| **Submission Format:** |

**Assessment Rubrics**

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| **Performance Criteria** | **Exceed Expectation (6 points)** | **Meet Expectation (5 points)** | **Acceptable**  **Expectation (4 points)** | **Unacceptable**  **Expectation (2 point)** |
| Accuracy (CLO 1) | Accurately represents concepts with no  errors, demonstrating a deep understanding of the assignment requirements and course material. | Minor inaccuracies in representation of concepts, but overall  understanding is demonstrated. | Major inaccuracies in representation of  concepts, indicating gaps in  understanding. | Inaccurate representation of  concepts, showing a  lack of understanding of the assignment requirements and course material. |
| Clarity  (CLO 2) | Provides clear representations of  concepts, making it  easy for the viewer to understand the content presented. | Minor lack of clarity in the  presentation of  concepts, which  may slightly hinder understanding. | Major lack of clarity in the  presentation of  concepts, making it difficult to  understand the content. | Presentation is unclear, making it  nearly impossible to understand the content presented. |
| Layout (CLO 3) | Layout is clean and easy to follow,  enhancing the viewer's  comprehension of the information presented. | Layout is generally clean but may be  slightly difficult to follow in some sections. | Layout is unclear and difficult to  follow, impacting  the viewer's ability  to comprehend the information presented. | Layout is improper and incorrect,  hindering the viewer's  comprehension of the information presented. |
| Completeness (CLO 4) | Provides a comprehensive  presentation that  covers all relevant aspects of the assignment requirements. | Minor deficiencies in coverage of assignment  requirements, but  overall presentation is mostly complete. | Major deficiency in coverage of assignment  requirements, indicating  significant gaps in presentation. | Presentation is incomplete and does not cover the  necessary aspects of the assignment requirements. |
| Correctness (CLO 5) | Demonstrates syntactically and  semantically correct execution of tasks,  showing proficiency  in using the required software/tools. | Minor errors in syntax and  semantics may be  present, but overall execution of tasks is adequate. | Major errors in syntax and  semantics,  indicating a lack of  proficiency in using the required software/tools. | Execution of tasks is syntactically and semantically  incorrect, showing a  lack of proficiency in using the required software/tools. |
| Video  Presentation  10 Marks | Video presentation is structured and well presented  (10) | Minor Deficiencies in Video  Presentation  (8) | Moderate  Deficiencies in  Video Presentation  (6) | Video Presentation not submitted  (0) |