DSP505: Programming Lab for Data Science and Artificial Intelligence

TPL616: Advanced Programming for DSAI

Lab-6: Practice Problems (Seaborn)

Date: 16-Sept-2025

Instructions:

1. Try to complete lab problems during the lab hour and submit it through canvas. If you can't complete it within the lab time, you can submit it by the end of tomorrow.
2. Prepare all your solution files in a zip file and name it as <Name.zip> and submit on canvas.
3. You can use a jupyter notebook to solve the problems.

Problem Set-0:

Practice the codes given in the slides, execute them and make sure you get the correct output. No need to submit this.

Problem Set-1:

Download the heart disease dataset from the Canvas and perform the following tasks. The dataset contains the following columns.

Dataset

- age: Patient's age
- sex: Gender (1 = male, 0 = female)
- cp: Chest pain type (categorical: 0–3)
- trestbps: Resting blood pressure
- chol: Serum cholesterol (mg/dl)
- thalach: Maximum heart rate achieved
- target: Heart disease presence (1 = yes, 0 = no)

Task 1: Pairplot

- Create a pairplot for the columns ['age', 'chol', 'thalach', 'target'].
- Use hue='target' to differentiate between patients with and without heart disease.
- Write a short explanation of any visible separation or clustering.

Task 2: Boxplot
- Draw a boxplot of trestbps (resting blood pressure) grouped by target.
- Add another boxplot for chol grouped by sex.
- Interpret whether there are differences in distributions.

Task 3: Violin Plot
- Plot a violin plot of thalach (max heart rate) split by target.
- Add another violin plot for age split by sex.
- Compare the spread and medians across groups.

Task 4: Heatmap
- Compute the correlation matrix for all numerical features.
- Plot a heatmap with annotations.
- Identify which variables are strongly correlated with the target.

Task 5: Jointplot
- Create a jointplot of age vs thalach with hue='target'.
- Try both kind='scatter' and kind='kde'.
- Explain whether younger or older patients tend to achieve higher max heart rates.

Task 6: Barplot
- Create a barplot of cp (chest pain type) vs average thalach, with hue='target'.
- Create another barplot for sex vs average chol, with hue='target'.
- Discuss differences across groups.