2.Logistic_Regression_Scikit-Learn

March 29, 2025

0.1 Logistic Regression

Import necessary Libraries

[2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, classification_report,␣
 ↪confusion_matrix
import plotly.express as px
import plotly.graph_objects as go
from plotly.subplots import make_subplots
```

[4]:
```
#Set random seed for reproducability
np.random.seed(42)
```

Exploring Iris Dataset

[5]:
```
#Load the iris dataset from scikit-learn
iris = load_iris()
```

[12]:
```
# The feature names are stored in iris.feature_names

df = pd.DataFrame(data= iris.data, columns = iris.feature_names)

#Add the target names (species) as storied in iris.target_names
df['species'] = pd.Categorical.from_codes(iris.target, iris.target_names)

#Lets also keep the numerical target for modeling
df['target'] = iris.target

#Display the first few rows of the datatset
print("First 5 rows of Iris dataset:")
print(df.head())
```

```
First 5 rows of Iris dataset:
   sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)
species  target
0                5.1               3.5                1.4               0.2
setosa       0
1                4.9               3.0                1.4               0.2
setosa       0
2                4.7               3.2                1.3               0.2
setosa       0
3                4.6               3.1                1.5               0.2
setosa       0
4                5.0               3.6                1.4               0.2
setosa       0
```

[13]:
```python
#Get the basic information about the dataset
print("\nDataset information:")
print(f"\n Number of samples: {df.shape[0]}")
print(f"\n Number of features: {len(iris.feature_names)}")
print(f"\n Feature names: {iris.feature_names}")
print(f"\n Target names (species): {iris.target_names}")
```

```
Dataset information:

 Number of samples: 150

 Number of features: 4

 Feature names: ['sepal length (cm)', 'sepal width (cm)', 'petal length (cm)',
'petal width (cm)']

 Target names (species): ['setosa' 'versicolor' 'virginica']
```

[10]:
```python
#Check for missing values
print("Missing values in the dataset:")
print(df.isnull().sum())

#Summary statistics
print("\n Summary statistic:")
print(df.describe())

#Class distribution
print("\n Class distribution:")
print(df['species'].value_counts())
```

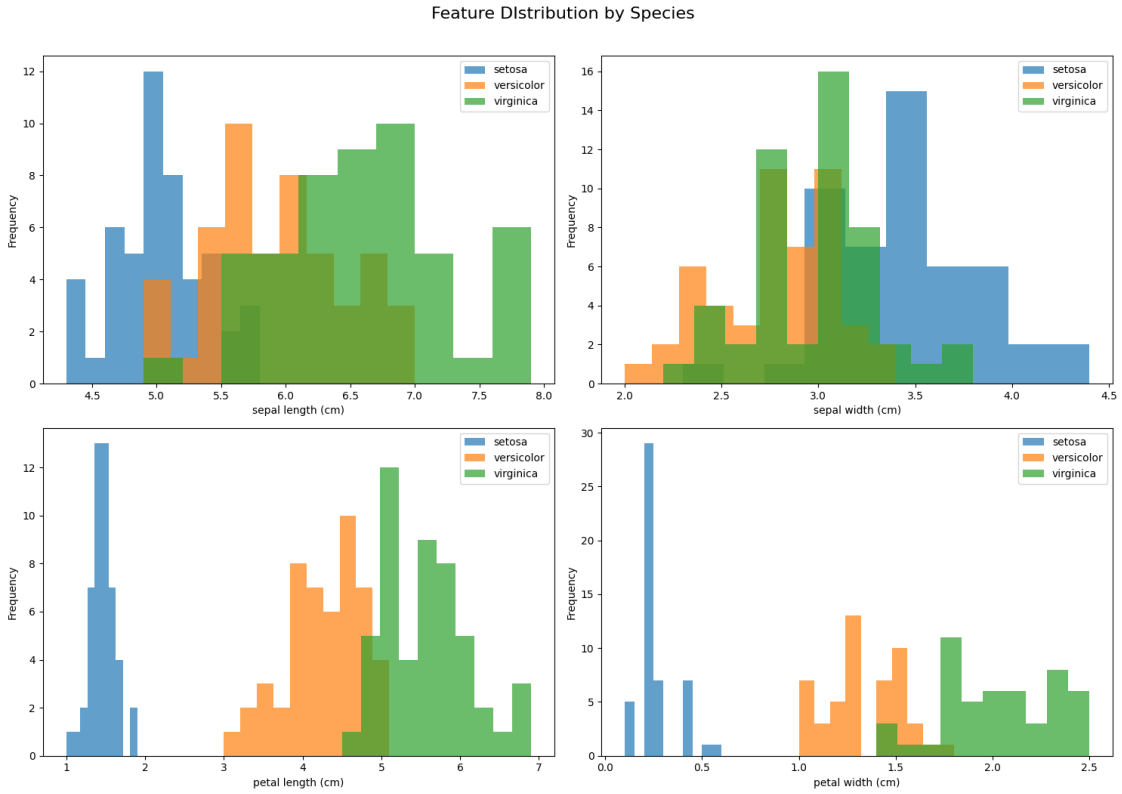
```
Missing values in the dataset:
sepal length (cm)    0
sepal width (cm)     0
```

```
petal length (cm)    0
petal width (cm)     0
species              0
target               0
dtype: int64

 Summary statistic:
       sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)
target
count         150.000000        150.000000         150.000000        150.000000
150.000000
mean            5.843333          3.057333           3.758000          1.199333
1.000000
std             0.828066          0.435866           1.765298          0.762238
0.819232
min             4.300000          2.000000           1.000000          0.100000
0.000000
25%             5.100000          2.800000           1.600000          0.300000
0.000000
50%             5.800000          3.000000           4.350000          1.300000
1.000000
75%             6.400000          3.300000           5.100000          1.800000
2.000000
max             7.900000          4.400000           6.900000          2.500000
2.000000

 Class distribution:
species
setosa        50
versicolor    50
virginica     50
Name: count, dtype: int64
```

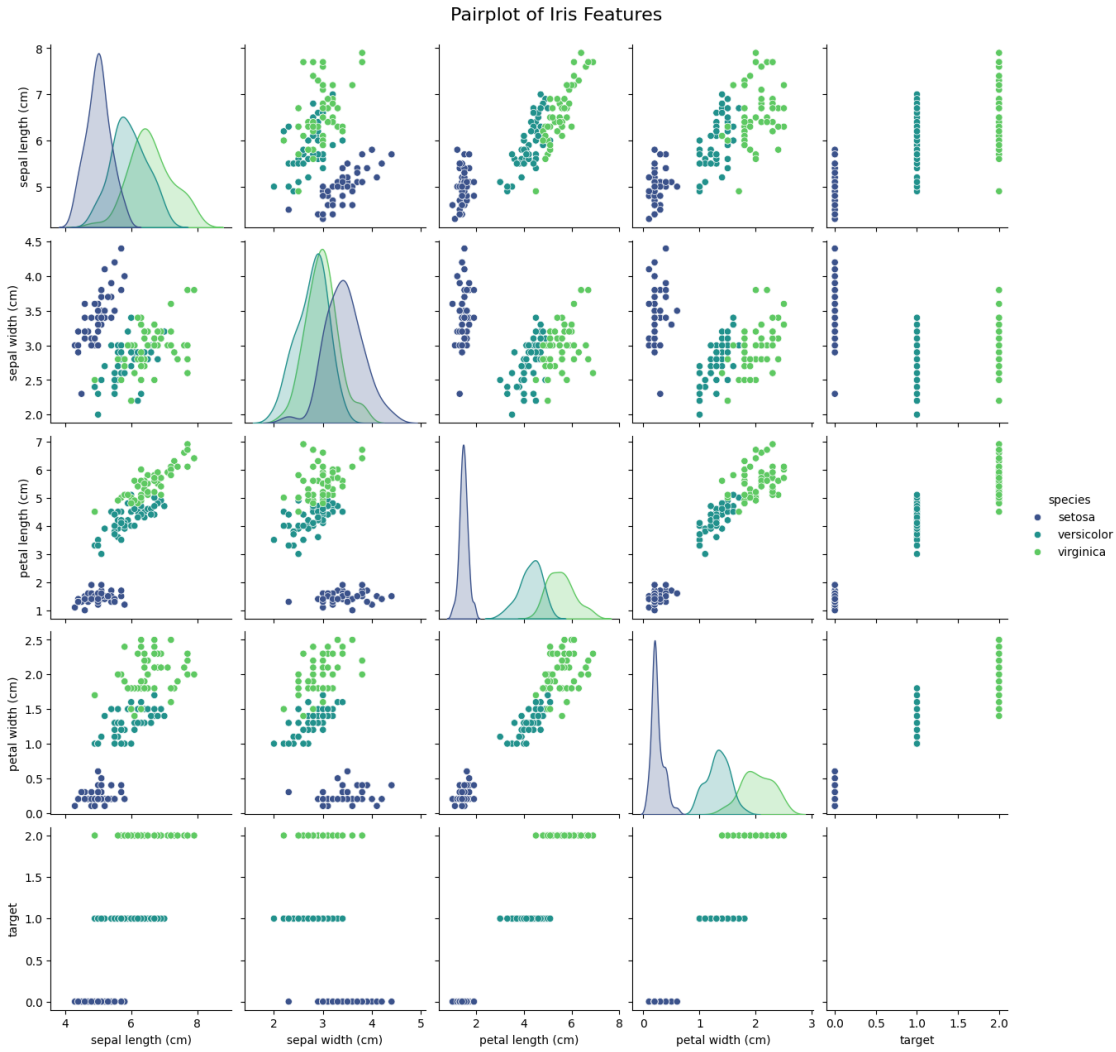
Exploratory Data Analysis with Matplotlib

[15]:
```
# Create a figure with multiple subplots
plt.figure(figsize=(15,10))

# Histogram for each feature
for i, feature in enumerate(iris.feature_names):
  plt.subplot(2, 2, i+1)
  for species in iris.target_names:
    plt.hist(df[df['species']== species][feature], alpha =0.7, label = species)
  plt.xlabel(feature)
  plt.ylabel('Frequency')
  plt.legend()

plt.tight_layout()
```

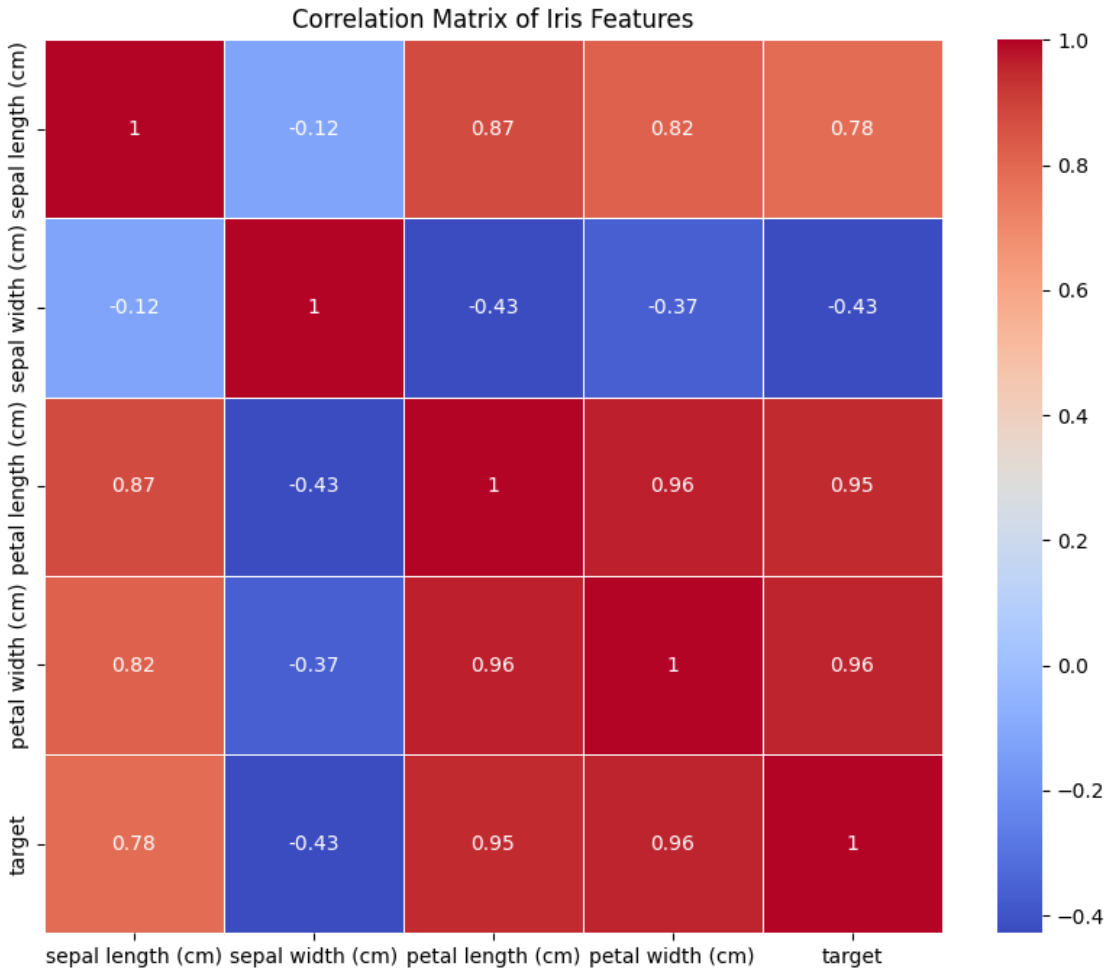
```
plt.suptitle('Feature DIstribution by Species', fontsize = 16, y= 1.05)
plt.show()
```



[16]:
```
# Pairplot to visualize relationship between features
sns.pairplot(df, hue='species', palette='viridis', height = 2.5)
plt.suptitle('Pairplot of Iris Features', fontsize = 16, y= 1.02)
plt.show()
```



[17]:
```
# Correlation matrix
plt.figure(figsize=(10,8))
correlation = df.drop('species', axis=1).corr()
sns.heatmap(correlation, annot= True, cmap='coolwarm', linewidths=0.5)
plt.title("Correlation Matrix of Iris Features")
plt.show()
```



Exploratory Data Analysis with plotly

[18]:
```
# Histogram with each feature
for feature in iris.feature_names:
  fig = px.histogram(df, x=feature, color = 'species', marginal = 'box',
                     title=f'Distribution of {feature} by Species',
                     color_discrete_sequence= px.colors.qualitative.Set1)
  fig.show()
```

[19]:
```
# Create a scatter matrix with plotly
fig = px.scatter_matrix(df, dimensions=iris.feature_names, color='species',
                        title='Scatter Matrix of Iris Features',
                        color_discrete_sequence= px.colors.qualitative.Set1)
fig.update_layout(width= 900, height= 900)
fig.show()
```

[21]:
```
fig = px.scatter_3d(df, x='sepal length (cm)',
                    y='sepal width (cm)',
                    z='petal length (cm)',
                   color='species',
                    symbol='species', size_max=10,
                   title='3D Scatter Plot of Iris Features')
fig.show()
```

Data Preprocessing

[23]:
```
# Split the data into features (X) and target (y)
X = df.drop(['species', 'target'], axis=1).values  # Convert to numpy array for␣
 ↪scikit-learn
y = df['target'].values

# Split the data into training and testing sets (80% train, 20% test)
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
 ↪random_state=42, stratify=y)

print("\nData splitting:")
print(f"Training set size: {X_train.shape[0]} samples")
print(f"Testing set size: {X_test.shape[0]} samples")
```

```
Data splitting:
Training set size: 120 samples
Testing set size: 30 samples
```

[24]:
```
# Feature scaling - standardize features by removing the mean and scaling to␣
 ↪unit variance
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)

#show the effect of scaling on the first sample
print("\nEffect of scaling on the first training sample:")
print("Before scaling:", X_train[0])
print("After scaling:", X_train_scaled[0])
```

```
Effect of scaling on the first training sample:
Before scaling: [4.4 2.9 1.4 0.2]
After scaling: [-1.72156775 -0.33210111 -1.34572231 -1.32327558]
```

0.1.1 Logistic Regression with Stochastic Grdient Descent

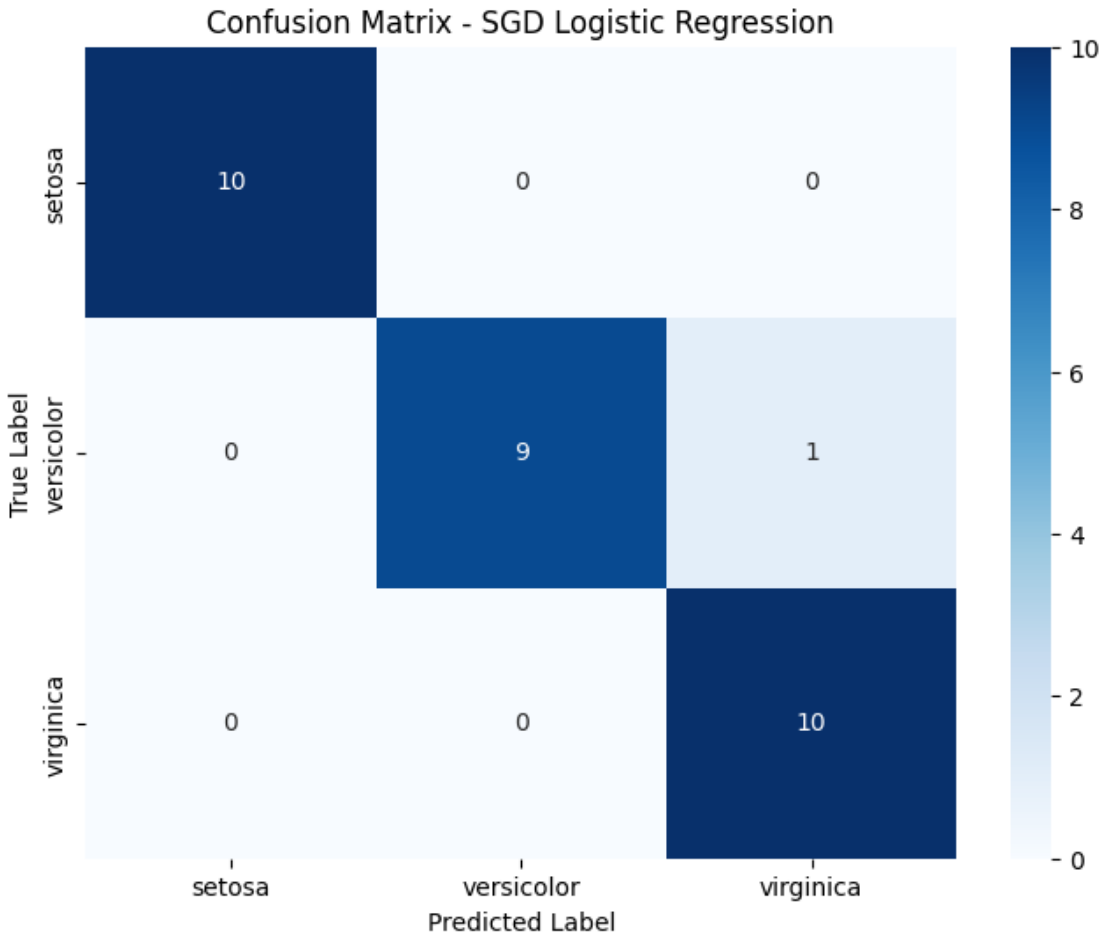
[26]:
```
#SGD is the optimization that minimizes the loss function by taking steps
#proportional to the negative of the gradient of the loss function
from sklearn.linear_model import SGDClassifier

sgd_clf = SGDClassifier(loss= 'log_loss', # log loss for logistic regression
                        max_iter = 1000, # Max number of itertions
                        tol = 1e-3, # tolerance for stopping criterion
                        random_state= 42, # for reporducability
                        learning_rate = 'optimal', # let SGD choose optimal rate
                        eta0=0.01 # initial learning rate
                        )

# Train the model
sgd_clf.fit(X_train_scaled, y_train)

# Make predictions
y_pred_sgd = sgd_clf.predict(X_test_scaled)
```

[27]:
```
# Evaluate the model
print("\nLogistic Regression with SGD:")
print(f"Accuracy: {accuracy_score(y_test, y_pred_sgd):.4f}")
print("\nClassification Report:")
print(classification_report(y_test, y_pred_sgd, target_names=iris.target_names))
```

```
Logistic Regression with SGD:
Accuracy: 0.9667

Classification Report:
              precision    recall  f1-score   support

      setosa       1.00      1.00      1.00        10
  versicolor       1.00      0.90      0.95        10
   virginica       0.91      1.00      0.95        10

    accuracy                           0.97        30
   macro avg       0.97      0.97      0.97        30
weighted avg       0.97      0.97      0.97        30
```

[28]:
```
# Confusion Matrix with matplotlib
plt.figure(figsize=(8,6))
cm = confusion_matrix(y_test, y_pred_sgd)

sns.heatmap(cm, annot=True,
```

```
            fmt='d',
            cmap='Blues',
            xticklabels=iris.target_names, yticklabels=iris.target_names)
plt.title('Confusion Matrix - SGD Logistic Regression')
plt.xlabel('Predicted Label')
plt.ylabel('True Label')
plt.show()
```



[29]:
```
# Confusion Matrix with plotly
fig = px.imshow(cm,
                labels=dict(x="Predicted Label", y="True Label", color="Count"),
                x=iris.target_names, y=iris.target_names,
                text_auto=True, color_continuous_scale='Blues',
                title='Confusion Matrix - SGD Logistic Regression')
fig.show()
```

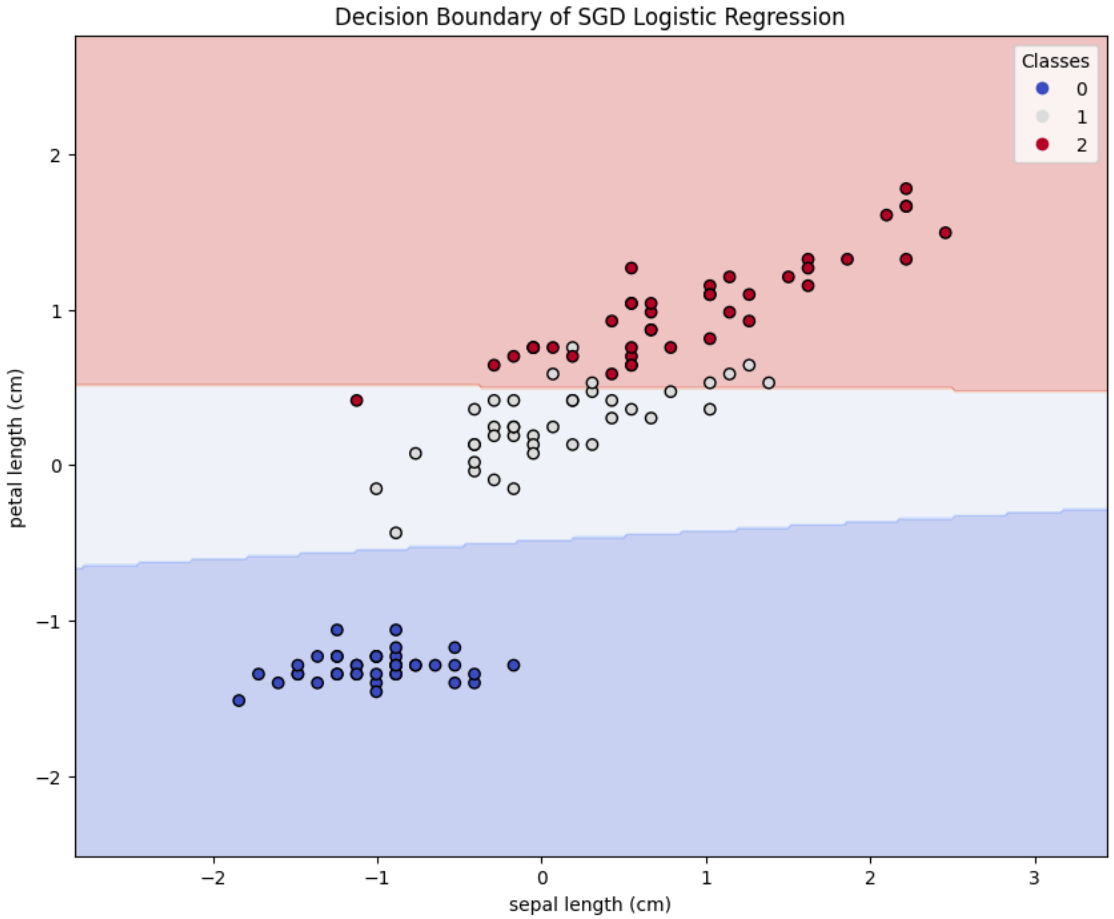
[32]:
```
# Cross-validation to get a more robust measure of model performance
from sklearn.model_selection import cross_val_score
cv_scores = cross_val_score(sgd_clf, X_train_scaled, y_train, cv=5)
print("\nCross-validation scores:", cv_scores)
print(f"Mean cross-validation score: {cv_scores.mean():.4f}")
print(f"Standard deviation: {cv_scores.std():.4f}")
```

```
Cross-validation scores: [0.91666667 0.95833333 0.83333333 0.91666667
0.95833333]
Mean cross-validation score: 0.9167
Standard deviation: 0.0456
```

[33]:
```
# For visualization purposes, we'll use only 2 features
# We'll use sepal length and petal length which are typically more separable
X_2d = X[:, [0, 2]]  # sepal length and petal length
y_2d = y

# Split and scale the 2D data
X_2d_train, X_2d_test, y_2d_train, y_2d_test = train_test_split(
    X_2d, y_2d, test_size=0.2, random_state=42, stratify=y_2d
)
scaler_2d = StandardScaler()
X_2d_train_scaled = scaler_2d.fit_transform(X_2d_train)
X_2d_test_scaled = scaler_2d.transform(X_2d_test)

# Train the SGD model on the 2D data
sgd_clf_2d = SGDClassifier(loss='log_loss', max_iter=1000, random_state=42)
sgd_clf_2d.fit(X_2d_train_scaled, y_2d_train)

# Create a mesh grid for the decision boundary
def plot_decision_boundary(clf, X, y, feature_names, class_names, ax=None):
    # Create a mesh grid
    h = 0.02  # Step size in the mesh
    x_min, x_max = X[:, 0].min() - 1, X[:, 0].max() + 1
    y_min, y_max = X[:, 1].min() - 1, X[:, 1].max() + 1
    xx, yy = np.meshgrid(np.arange(x_min, x_max, h),
                         np.arange(y_min, y_max, h))

    # Make predictions on the mesh grid
    Z = clf.predict(np.c_[xx.ravel(), yy.ravel()])
    Z = Z.reshape(xx.shape)

    # If no axes provided, create a new figure
    if ax is None:
        plt.figure(figsize=(10, 8))
        ax = plt.gca()
```

```
    # Plot the decision boundary
    ax.contourf(xx, yy, Z, alpha=0.3, cmap='coolwarm')

    # Plot the data points
    scatter = ax.scatter(X[:, 0], X[:, 1], c=y, edgecolors='k', cmap='coolwarm')

    # Add legend and labels
    ax.set_xlabel(feature_names[0])
    ax.set_ylabel(feature_names[1])
    ax.legend(*scatter.legend_elements(), title="Classes", loc="upper right")

    return ax

plt.figure(figsize=(10, 8))
feature_names_2d = [iris.feature_names[0], iris.feature_names[2]]  # sepal␣
 ↪length and petal length
plot_decision_boundary(sgd_clf_2d, X_2d_train_scaled, y_2d_train,␣
 ↪feature_names_2d, iris.target_names)
plt.title('Decision Boundary of SGD Logistic Regression')
plt.show()
```

```
<Figure size 1000x800 with 0 Axes>
```



[34]:
```python
# Create a mesh grid for the decision boundary using plotly
def create_decision_boundary_plot(clf, X, y, feature_names, class_names):
    # Create a mesh grid
    h = 0.02  # Step size in the mesh
    x_min, x_max = X[:, 0].min() - 1, X[:, 0].max() + 1
    y_min, y_max = X[:, 1].min() - 1, X[:, 1].max() + 1
    xx, yy = np.meshgrid(np.arange(x_min, x_max, h),
                         np.arange(y_min, y_max, h))

    # Make predictions on the mesh grid
    Z = clf.predict(np.c_[xx.ravel(), yy.ravel()])
    Z = Z.reshape(xx.shape)

    # Create the plotly figure
    fig = go.Figure()

    # Add contour for the decision boundary
    fig.add_trace(go.Contour(
```

```
        z=Z,
        x=np.arange(x_min, x_max, h),
        y=np.arange(y_min, y_max, h),
        colorscale='RdBu',
        showscale=False,
        opacity=0.4
    ))

    # Add scatter plot for data points
    for i, class_name in enumerate(class_names):
        idx = np.where(y == i)
        fig.add_trace(go.Scatter(
            x=X[idx, 0].flatten(),
            y=X[idx, 1].flatten(),
            mode='markers',
            name=class_name,
            marker=dict(size=10, line=dict(width=1, color='DarkSlateGrey'))
        ))

    # Update layout
    fig.update_layout(
        title='Decision Boundary of SGD Logistic Regression',
        xaxis_title=feature_names[0],
        yaxis_title=feature_names[1],
        width=800,
        height=600
    )

    return fig

plotly_fig = create_decision_boundary_plot(sgd_clf_2d, X_2d_train_scaled,␣
 ↪y_2d_train,
                                           feature_names_2d, iris.target_names)
plotly_fig.show()
```

0.1.2 Comparing different solvers for Logistic Regression

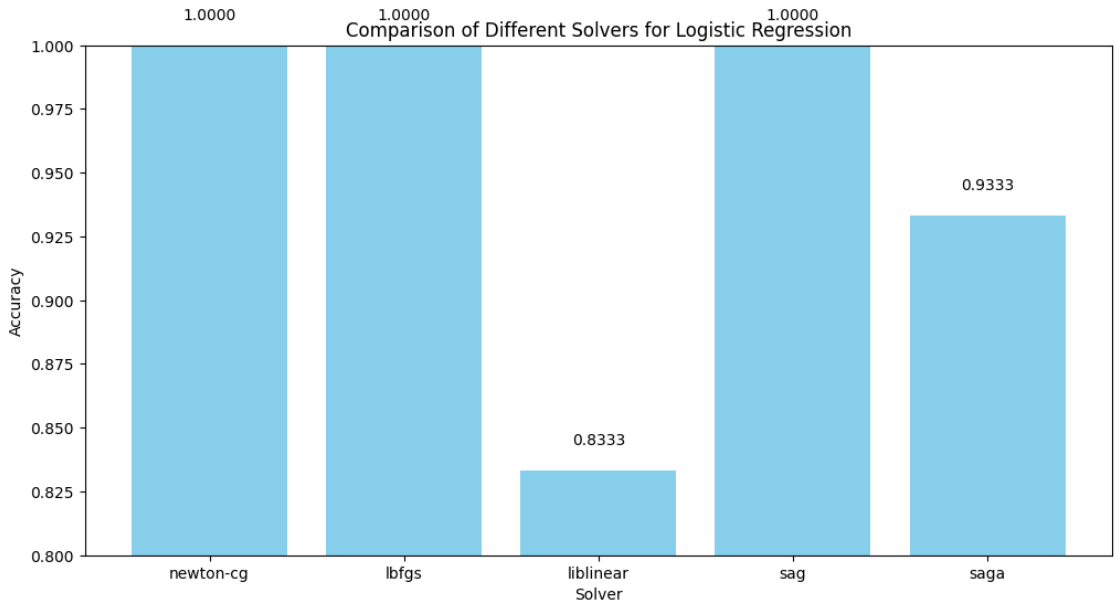
[37]:
```
# Define different solvers to try
solvers = ['newton-cg', 'lbfgs', 'liblinear', 'sag', 'saga']
solver_results = {}

# Train and evaluate models with different solvers
for solver in solvers:
    print(f"\nTraining Logistic Regression with solver: {solver}")

    # Some solvers don't work well without regularization tuning
    if solver in ['newton-cg', 'sag', 'lbfgs']:
```

```
        C = 10.0  # Lower regularization
    else:
        C = 1.0   # Default regularization

    # Create and train the model
    lr = LogisticRegression(solver=solver,
                            C=C, max_iter=1000,
                            random_state=42,
                            )

    lr.fit(X_train_scaled, y_train)

    # Make predictions
    y_pred = lr.predict(X_test_scaled)

    # Calculate accuracy
    accuracy = accuracy_score(y_test, y_pred)
    solver_results[solver] = accuracy

    print(f"Accuracy with {solver}: {accuracy:.4f}")
    print(f"Classification Report:")
    print(classification_report(y_test, y_pred, target_names=iris.target_names))
```

```
Training Logistic Regression with solver: newton-cg
Accuracy with newton-cg: 1.0000
Classification Report:
              precision    recall  f1-score   support

      setosa       1.00      1.00      1.00        10
  versicolor       1.00      1.00      1.00        10
   virginica       1.00      1.00      1.00        10

    accuracy                           1.00        30
   macro avg       1.00      1.00      1.00        30
weighted avg       1.00      1.00      1.00        30


Training Logistic Regression with solver: lbfgs
Accuracy with lbfgs: 1.0000
Classification Report:
              precision    recall  f1-score   support

      setosa       1.00      1.00      1.00        10
  versicolor       1.00      1.00      1.00        10
   virginica       1.00      1.00      1.00        10
```

```
    accuracy                           1.00        30
   macro avg       1.00      1.00      1.00        30
weighted avg       1.00      1.00      1.00        30


Training Logistic Regression with solver: liblinear
Accuracy with liblinear: 0.8333
Classification Report:
              precision    recall  f1-score   support

      setosa       1.00      1.00      1.00        10
  versicolor       0.86      0.60      0.71        10
   virginica       0.69      0.90      0.78        10

    accuracy                           0.83        30
   macro avg       0.85      0.83      0.83        30
weighted avg       0.85      0.83      0.83        30


Training Logistic Regression with solver: sag
Accuracy with sag: 1.0000
Classification Report:
              precision    recall  f1-score   support

      setosa       1.00      1.00      1.00        10
  versicolor       1.00      1.00      1.00        10
   virginica       1.00      1.00      1.00        10

    accuracy                           1.00        30
   macro avg       1.00      1.00      1.00        30
weighted avg       1.00      1.00      1.00        30


Training Logistic Regression with solver: saga
Accuracy with saga: 0.9333
Classification Report:
              precision    recall  f1-score   support

      setosa       1.00      1.00      1.00        10
  versicolor       0.90      0.90      0.90        10
   virginica       0.90      0.90      0.90        10

    accuracy                           0.93        30
   macro avg       0.93      0.93      0.93        30
weighted avg       0.93      0.93      0.93        30
```

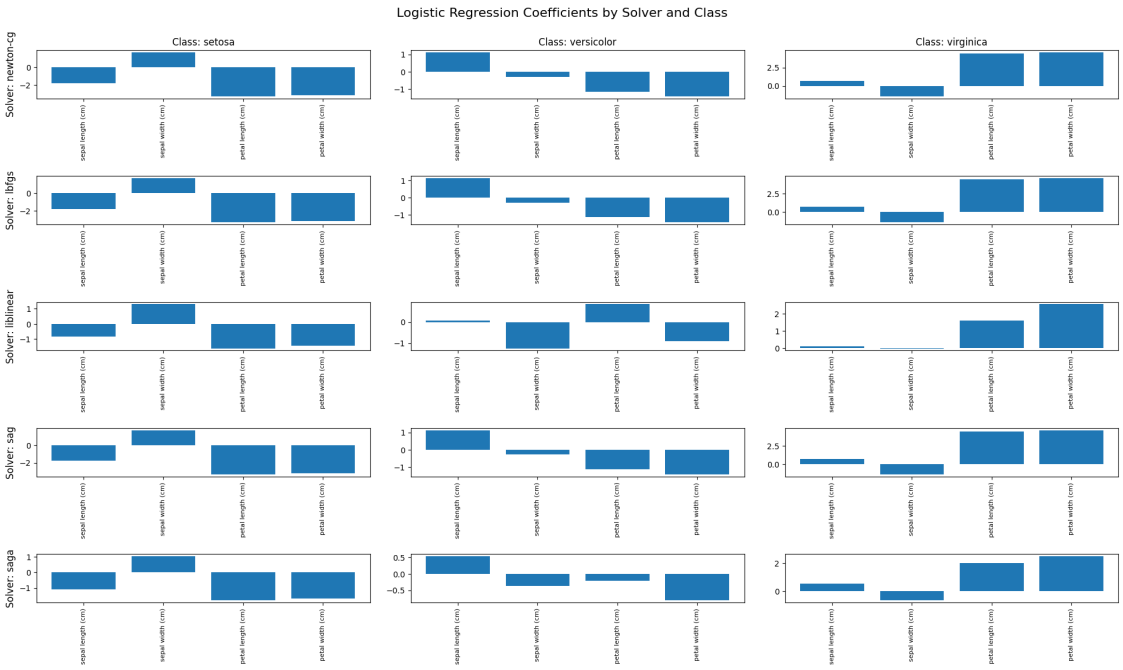
[38]:
```
# Visualize solver comparisons with matplotlib
plt.figure(figsize=(12, 6))
plt.bar(solver_results.keys(), solver_results.values(), color='skyblue')
plt.xlabel('Solver')
plt.ylabel('Accuracy')
plt.title('Comparison of Different Solvers for Logistic Regression')
plt.ylim(0.8, 1.0)  # Adjust y-axis to better see differences
for i, (solver, accuracy) in enumerate(solver_results.items()):
    plt.text(i, accuracy + 0.01, f'{accuracy:.4f}', ha='center')
plt.show()
```



[39]:
```
# Visualize solver comparisons with plotly
fig = px.bar(x=list(solver_results.keys()), y=list(solver_results.values()),
             labels={'x': 'Solver', 'y': 'Accuracy'},
             title='Comparison of Different Solvers for Logistic Regression',
             color=list(solver_results.keys()),
             text=[f'{acc:.4f}' for acc in solver_results.values()])

fig.update_layout(
    xaxis_title='Solver',
    yaxis_title='Accuracy',
    yaxis_range=[0.8, 1.0]
)
fig.show()
```

0.1.3 Visualize the model coefficients

[43]:
```
# Compare coefficients for different solvers
plt.figure(figsize=(20, 12))  # Increased figure size

for i, solver in enumerate(solvers):
    if solver in ['newton-cg', 'sag', 'lbfgs']:
        C = 10.0
    else:
        C = 1.0

    lr = LogisticRegression(solver=solver, C=C, max_iter=1000, random_state=42)
    lr.fit(X_train_scaled, y_train)

    # For each class
    for j in range(len(iris.target_names)):
        plt.subplot(len(solvers), len(iris.target_names), i*len(iris.
 ↪target_names) + j + 1)

        # One-vs-Rest approach coefficients
        coefs = lr.coef_[j]
        plt.bar(iris.feature_names, coefs)
        plt.xticks(rotation=90, fontsize=8)  # Smaller font size

        if i == 0:
            plt.title(f'Class: {iris.target_names[j]}', fontsize=12)
        if j == 0:
            plt.ylabel(f'Solver: {solver}', fontsize=12)

# Add more space between subplots
plt.subplots_adjust(wspace=0.3, hspace=0.4)  # Increase white space
plt.tight_layout(pad=2.0, rect=[0, 0, 1, 0.96])  # Add padding, leave room for␣
 ↪suptitle
plt.suptitle('Logistic Regression Coefficients by Solver and Class', y=0.98,␣
 ↪fontsize=16)
plt.show()
```



[41]:
```python
# Visualize coefficients with plotly
for solver in solvers:
    if solver in ['newton-cg', 'sag', 'lbfgs']:
        C = 10.0
    else:
        C = 1.0

    lr = LogisticRegression(solver=solver, C=C, max_iter=1000, random_state=42)
    lr.fit(X_train_scaled, y_train)

    fig = make_subplots(rows=1, cols=3, subplot_titles=[f'Class: {name}' for␣
 ↪name in iris.target_names])

    for j in range(len(iris.target_names)):
        coefs = lr.coef_[j]

        fig.add_trace(
            go.Bar(x=iris.feature_names, y=coefs, name=iris.target_names[j]),
            row=1, col=j+1
        )

    fig.update_layout(
        height=400, width=1000,
        title_text=f'Logistic Regression Coefficients - Solver: {solver}'
    )
```

```
    fig.show()
```

0.1.4 Summary

[42]:
```
print("\n--- SUMMARY ---")
print("We've successfully trained logistic regression models on the Iris␣
 ↪dataset using:")
print("1. Stochastic Gradient Descent (SGD)")
print(f"   - Accuracy: {accuracy_score(y_test, y_pred_sgd):.4f}")
print("2. Various solvers for logistic regression:")
for solver, accuracy in solver_results.items():
    print(f"   - {solver}: {accuracy:.4f}")

print("\nBest performing solver:", max(solver_results, key=solver_results.get))
print(f"Best accuracy: {max(solver_results.values()):.4f}")

print("\nKey insights:")
print("- The Iris dataset is relatively simple and all models perform well")
print("- The liblinear and saga solvers are generally good choices for small␣
 ↪datasets like Iris")
print("- Feature scaling is important, especially for gradient-based methods")
print("- Sepal length and petal length are good features for separating the␣
 ↪classes")

print("\nNext steps:")
print("1. Try other classifiers (SVM, Random Forest, etc.)")
print("2. Perform hyperparameter tuning")
print("3. Apply dimensionality reduction techniques")
print("4. Test on more complex datasets")
```

```
--- SUMMARY ---
We've successfully trained logistic regression models on the Iris dataset using:
1. Stochastic Gradient Descent (SGD)
   - Accuracy: 0.9667
2. Various solvers for logistic regression:
   - newton-cg: 1.0000
   - lbfgs: 1.0000
   - liblinear: 0.8333
   - sag: 1.0000
   - saga: 0.9333

Best performing solver: newton-cg
Best accuracy: 1.0000

Key insights:
- The Iris dataset is relatively simple and all models perform well
```

```
- The liblinear and saga solvers are generally good choices for small datasets
like Iris
- Feature scaling is important, especially for gradient-based methods
- Sepal length and petal length are good features for separating the classes

Next steps:
1. Try other classifiers (SVM, Random Forest, etc.)
2. Perform hyperparameter tuning
3. Apply dimensionality reduction techniques
4. Test on more complex datasets
```

[44]:
```
!sudo apt-get update
!sudo apt-get install texlive-xetex pandoc
```

```
 0% [Working]              Get:1 https://cloud.r-project.org/bin/linux/ubuntu
jammy-cran40/ InRelease [3,632 B]
 0% [Waiting for headers] [Connecting to security.ubuntu.com] [1 InRelease 3,632
Get:2 https://developer.download.nvidia.com/compute/cuda/repos/ubuntu2204/x86_64
InRelease [1,581 B]
Hit:3 http://archive.ubuntu.com/ubuntu jammy InRelease
Get:4 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:5 https://r2u.stat.illinois.edu/ubuntu jammy InRelease [6,555 B]
Get:6 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Get:8 https://developer.download.nvidia.com/compute/cuda/repos/ubuntu2204/x86_64
Packages [1,381 kB]
Hit:9 https://ppa.launchpadcontent.net/deadsnakes/ppa/ubuntu jammy InRelease
Hit:10 https://ppa.launchpadcontent.net/graphics-drivers/ppa/ubuntu jammy
InRelease
Hit:11 https://ppa.launchpadcontent.net/ubuntugis/ppa/ubuntu jammy InRelease
Get:12 https://r2u.stat.illinois.edu/ubuntu jammy/main all Packages [8,781 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [3,045
kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages
[55.7 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages
[1,538 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages
[4,049 kB]
Get:17 http://archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages
[35.2 kB]
Get:18 https://r2u.stat.illinois.edu/ubuntu jammy/main amd64 Packages [2,681 kB]
Get:19 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64
Packages [47.7 kB]
Get:20 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages
[2,737 kB]
Get:21 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages
[1,239 kB]
```

```
Get:22 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64
Packages [3,892 kB]
Fetched 29.9 MB in 8s (3,971 kB/s)
Reading package lists… Done
W: Skipping acquire of configured file 'main/source/Sources' as repository
'https://r2u.stat.illinois.edu/ubuntu jammy InRelease' does not seem to provide
it (sources.list entry misspelt?)
Reading package lists… Done
Building dependency tree… Done
Reading state information… Done
The following additional packages will be installed:
  dvisvgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java
  libcmark-gfm-extensions0.29.0.gfm.3 libcmark-gfm0.29.0.gfm.3
  libcommons-logging-java libcommons-parent-java libfontbox-java libfontenc1
  libgs9 libgs9-common libidn12 libijs-0.35 libjbig2dec0 libkpathsea6
  libpdfbox-java libptexenc1 libruby3.0 libsynctex2 libteckit0 libtexlua53
  libtexluajit2 libwoff1 libzzip-0-13 lmodern pandoc-data poppler-data
  preview-latex-style rake ruby ruby-net-telnet ruby-rubygems ruby-webrick
  ruby-xmlrpc ruby3.0 rubygems-integration t1utils teckit tex-common tex-gyre
  texlive-base texlive-binaries texlive-fonts-recommended texlive-latex-base
  texlive-latex-extra texlive-latex-recommended texlive-pictures
  texlive-plain-generic tipa xfonts-encodings xfonts-utils
Suggested packages:
  fonts-noto fonts-freefont-otf | fonts-freefont-ttf libavalon-framework-java
  libcommons-logging-java-doc libexcalibur-logkit-java liblog4j1.2-java
  texlive-luatex pandoc-citeproc context wkhtmltopdf librsvg2-bin groff ghc
  nodejs php python libjs-mathjax libjs-katex citation-style-language-styles
  poppler-utils ghostscript fonts-japanese-mincho | fonts-ipafont-mincho
  fonts-japanese-gothic | fonts-ipafont-gothic fonts-arphic-ukai
  fonts-arphic-uming fonts-nanum ri ruby-dev bundler debhelper gv
  | postscript-viewer perl-tk xpdf | pdf-viewer xzdec
  texlive-fonts-recommended-doc texlive-latex-base-doc python3-pygments
  icc-profiles libfile-which-perl libspreadsheet-parseexcel-perl
  texlive-latex-extra-doc texlive-latex-recommended-doc texlive-pstricks
  dot2tex prerex texlive-pictures-doc vprerex default-jre-headless tipa-doc
The following NEW packages will be installed:
  dvisvgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java
  libcmark-gfm-extensions0.29.0.gfm.3 libcmark-gfm0.29.0.gfm.3
  libcommons-logging-java libcommons-parent-java libfontbox-java libfontenc1
  libgs9 libgs9-common libidn12 libijs-0.35 libjbig2dec0 libkpathsea6
  libpdfbox-java libptexenc1 libruby3.0 libsynctex2 libteckit0 libtexlua53
  libtexluajit2 libwoff1 libzzip-0-13 lmodern pandoc pandoc-data poppler-data
  preview-latex-style rake ruby ruby-net-telnet ruby-rubygems ruby-webrick
  ruby-xmlrpc ruby3.0 rubygems-integration t1utils teckit tex-common tex-gyre
  texlive-base texlive-binaries texlive-fonts-recommended texlive-latex-base
  texlive-latex-extra texlive-latex-recommended texlive-pictures
```

```
  texlive-plain-generic texlive-xetex tipa xfonts-encodings xfonts-utils
0 upgraded, 58 newly installed, 0 to remove and 40 not upgraded.
Need to get 202 MB of archives.
After this operation, 728 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-droid-fallback all
1:6.0.1r16-1.1build1 [1,805 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-lato all 2.0-2.1
[2,696 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 poppler-data all
0.4.11-1 [2,171 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-common all 6.17
[33.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-urw-base35 all
20200910-1 [6,367 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9-common
all 9.55.0~dfsg1-0ubuntu5.11 [753 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libidn12 amd64
1.38-4ubuntu1 [60.0 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy/main amd64 libijs-0.35 amd64
0.35-15build2 [16.5 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy/main amd64 libjbig2dec0 amd64
0.19-3build2 [64.7 kB]
Get:10 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9 amd64
9.55.0~dfsg1-0ubuntu5.11 [5,031 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libkpathsea6
amd64 2021.20210626.59705-1ubuntu0.2 [60.4 kB]
Get:12 http://archive.ubuntu.com/ubuntu jammy/main amd64 libwoff1 amd64
1.0.2-1build4 [45.2 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy/universe amd64 dvisvgm amd64
2.13.1-1 [1,221 kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-lmodern all
2.004.5-6.1 [4,532 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-noto-mono all
20201225-1build1 [397 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-texgyre all
20180621-3.1 [10.2 MB]
Get:17 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libapache-pom-java
all 18-1 [4,720 B]
Get:18 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcmark-
gfm0.29.0.gfm.3 amd64 0.29.0.gfm.3-3 [115 kB]
Get:19 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcmark-gfm-
extensions0.29.0.gfm.3 amd64 0.29.0.gfm.3-3 [25.1 kB]
Get:20 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-parent-
java all 43-1 [10.8 kB]
Get:21 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-logging-
java all 1.2-2 [60.3 kB]
Get:22 http://archive.ubuntu.com/ubuntu jammy/main amd64 libfontenc1 amd64
1:1.1.4-1build3 [14.7 kB]
```

```
Get:23 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libptexenc1
amd64 2021.20210626.59705-1ubuntu0.2 [39.1 kB]
Get:24 http://archive.ubuntu.com/ubuntu jammy/main amd64 rubygems-integration
all 1.18 [5,336 B]
Get:25 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby3.0 amd64
3.0.2-7ubuntu2.8 [50.1 kB]
Get:26 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-rubygems all
3.3.5-2 [228 kB]
Get:27 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby amd64 1:3.0~exp1
[5,100 B]
Get:28 http://archive.ubuntu.com/ubuntu jammy/main amd64 rake all 13.0.6-2 [61.7
kB]
Get:29 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-net-telnet all
0.1.1-2 [12.6 kB]
Get:30 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-webrick
all 1.7.0-3ubuntu0.1 [52.1 kB]
Get:31 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-xmlrpc all
0.3.2-1ubuntu0.1 [24.9 kB]
Get:32 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libruby3.0
amd64 3.0.2-7ubuntu2.8 [5,113 kB]
Get:33 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libsynctex2
amd64 2021.20210626.59705-1ubuntu0.2 [55.6 kB]
Get:34 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libteckit0 amd64
2.5.11+ds1-1 [421 kB]
Get:35 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexlua53
amd64 2021.20210626.59705-1ubuntu0.2 [120 kB]
Get:36 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexluajit2
amd64 2021.20210626.59705-1ubuntu0.2 [267 kB]
Get:37 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libzzip-0-13 amd64
0.13.72+dfsg.1-1.1 [27.0 kB]
Get:38 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-encodings all
1:1.0.5-0ubuntu2 [578 kB]
Get:39 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-utils amd64
1:7.7+6build2 [94.6 kB]
Get:40 http://archive.ubuntu.com/ubuntu jammy/universe amd64 lmodern all
2.004.5-6.1 [9,471 kB]
Get:41 http://archive.ubuntu.com/ubuntu jammy/universe amd64 pandoc-data all
2.9.2.1-3ubuntu2 [81.8 kB]
Get:42 http://archive.ubuntu.com/ubuntu jammy/universe amd64 pandoc amd64
2.9.2.1-3ubuntu2 [20.3 MB]
Get:43 http://archive.ubuntu.com/ubuntu jammy/universe amd64 preview-latex-style
all 12.2-1ubuntu1 [185 kB]
Get:44 http://archive.ubuntu.com/ubuntu jammy/main amd64 t1utils amd64
1.41-4build2 [61.3 kB]
Get:45 http://archive.ubuntu.com/ubuntu jammy/universe amd64 teckit amd64
2.5.11+ds1-1 [699 kB]
Get:46 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-gyre all
20180621-3.1 [6,209 kB]
```

```
Get:47 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 texlive-
binaries amd64 2021.20210626.59705-1ubuntu0.2 [9,860 kB]
Get:48 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-base all
2021.20220204-1 [21.0 MB]
Get:49 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-fonts-
recommended all 2021.20220204-1 [4,972 kB]
Get:50 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-base
all 2021.20220204-1 [1,128 kB]
Get:51 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libfontbox-java all
1:1.8.16-2 [207 kB]
Get:52 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libpdfbox-java all
1:1.8.16-2 [5,199 kB]
Get:53 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-
recommended all 2021.20220204-1 [14.4 MB]
Get:54 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-pictures
all 2021.20220204-1 [8,720 kB]
Get:55 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-extra
all 2021.20220204-1 [13.9 MB]
Get:56 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-plain-
generic all 2021.20220204-1 [27.5 MB]
Get:57 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tipa all 2:1.3-21
[2,967 kB]
Get:58 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-xetex all
2021.20220204-1 [12.4 MB]
Fetched 202 MB in 6s (35.1 MB/s)
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line 78,
<> line 58.)
debconf: falling back to frontend: Readline
debconf: unable to initialize frontend: Readline
debconf: (This frontend requires a controlling tty.)
debconf: falling back to frontend: Teletype
dpkg-preconfigure: unable to re-open stdin:
Selecting previously unselected package fonts-droid-fallback.
(Reading database … 126209 files and directories currently installed.)
Preparing to unpack …/00-fonts-droid-fallback_1%3a6.0.1r16-1.1build1_all.deb
…
Unpacking fonts-droid-fallback (1:6.0.1r16-1.1build1) …
Selecting previously unselected package fonts-lato.
Preparing to unpack …/01-fonts-lato_2.0-2.1_all.deb …
Unpacking fonts-lato (2.0-2.1) …
Selecting previously unselected package poppler-data.
Preparing to unpack …/02-poppler-data_0.4.11-1_all.deb …
Unpacking poppler-data (0.4.11-1) …
Selecting previously unselected package tex-common.
Preparing to unpack …/03-tex-common_6.17_all.deb …
Unpacking tex-common (6.17) …
```

```
Selecting previously unselected package fonts-urw-base35.
Preparing to unpack …/04-fonts-urw-base35_20200910-1_all.deb …
Unpacking fonts-urw-base35 (20200910-1) …
Selecting previously unselected package libgs9-common.
Preparing to unpack …/05-libgs9-common_9.55.0~dfsg1-0ubuntu5.11_all.deb …
Unpacking libgs9-common (9.55.0~dfsg1-0ubuntu5.11) …
Selecting previously unselected package libidn12:amd64.
Preparing to unpack …/06-libidn12_1.38-4ubuntu1_amd64.deb …
Unpacking libidn12:amd64 (1.38-4ubuntu1) …
Selecting previously unselected package libijs-0.35:amd64.
Preparing to unpack …/07-libijs-0.35_0.35-15build2_amd64.deb …
Unpacking libijs-0.35:amd64 (0.35-15build2) …
Selecting previously unselected package libjbig2dec0:amd64.
Preparing to unpack …/08-libjbig2dec0_0.19-3build2_amd64.deb …
Unpacking libjbig2dec0:amd64 (0.19-3build2) …
Selecting previously unselected package libgs9:amd64.
Preparing to unpack …/09-libgs9_9.55.0~dfsg1-0ubuntu5.11_amd64.deb …
Unpacking libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.11) …
Selecting previously unselected package libkpathsea6:amd64.
Preparing to unpack …/10-libkpathsea6_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libwoff1:amd64.
Preparing to unpack …/11-libwoff1_1.0.2-1build4_amd64.deb …
Unpacking libwoff1:amd64 (1.0.2-1build4) …
Selecting previously unselected package dvisvgm.
Preparing to unpack …/12-dvisvgm_2.13.1-1_amd64.deb …
Unpacking dvisvgm (2.13.1-1) …
Selecting previously unselected package fonts-lmodern.
Preparing to unpack …/13-fonts-lmodern_2.004.5-6.1_all.deb …
Unpacking fonts-lmodern (2.004.5-6.1) …
Selecting previously unselected package fonts-noto-mono.
Preparing to unpack …/14-fonts-noto-mono_20201225-1build1_all.deb …
Unpacking fonts-noto-mono (20201225-1build1) …
Selecting previously unselected package fonts-texgyre.
Preparing to unpack …/15-fonts-texgyre_20180621-3.1_all.deb …
Unpacking fonts-texgyre (20180621-3.1) …
Selecting previously unselected package libapache-pom-java.
Preparing to unpack …/16-libapache-pom-java_18-1_all.deb …
Unpacking libapache-pom-java (18-1) …
Selecting previously unselected package libcmark-gfm0.29.0.gfm.3:amd64.
Preparing to unpack …/17-libcmark-gfm0.29.0.gfm.3_0.29.0.gfm.3-3_amd64.deb …
Unpacking libcmark-gfm0.29.0.gfm.3:amd64 (0.29.0.gfm.3-3) …
Selecting previously unselected package libcmark-gfm-
extensions0.29.0.gfm.3:amd64.
Preparing to unpack …/18-libcmark-gfm-
extensions0.29.0.gfm.3_0.29.0.gfm.3-3_amd64.deb …
Unpacking libcmark-gfm-extensions0.29.0.gfm.3:amd64 (0.29.0.gfm.3-3) …
```

```
Selecting previously unselected package libcommons-parent-java.
Preparing to unpack …/19-libcommons-parent-java_43-1_all.deb …
Unpacking libcommons-parent-java (43-1) …
Selecting previously unselected package libcommons-logging-java.
Preparing to unpack …/20-libcommons-logging-java_1.2-2_all.deb …
Unpacking libcommons-logging-java (1.2-2) …
Selecting previously unselected package libfontenc1:amd64.
Preparing to unpack …/21-libfontenc1_1%3a1.1.4-1build3_amd64.deb …
Unpacking libfontenc1:amd64 (1:1.1.4-1build3) …
Selecting previously unselected package libptexenc1:amd64.
Preparing to unpack …/22-libptexenc1_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package rubygems-integration.
Preparing to unpack …/23-rubygems-integration_1.18_all.deb …
Unpacking rubygems-integration (1.18) …
Selecting previously unselected package ruby3.0.
Preparing to unpack …/24-ruby3.0_3.0.2-7ubuntu2.8_amd64.deb …
Unpacking ruby3.0 (3.0.2-7ubuntu2.8) …
Selecting previously unselected package ruby-rubygems.
Preparing to unpack …/25-ruby-rubygems_3.3.5-2_all.deb …
Unpacking ruby-rubygems (3.3.5-2) …
Selecting previously unselected package ruby.
Preparing to unpack …/26-ruby_1%3a3.0~exp1_amd64.deb …
Unpacking ruby (1:3.0~exp1) …
Selecting previously unselected package rake.
Preparing to unpack …/27-rake_13.0.6-2_all.deb …
Unpacking rake (13.0.6-2) …
Selecting previously unselected package ruby-net-telnet.
Preparing to unpack …/28-ruby-net-telnet_0.1.1-2_all.deb …
Unpacking ruby-net-telnet (0.1.1-2) …
Selecting previously unselected package ruby-webrick.
Preparing to unpack …/29-ruby-webrick_1.7.0-3ubuntu0.1_all.deb …
Unpacking ruby-webrick (1.7.0-3ubuntu0.1) …
Selecting previously unselected package ruby-xmlrpc.
Preparing to unpack …/30-ruby-xmlrpc_0.3.2-1ubuntu0.1_all.deb …
Unpacking ruby-xmlrpc (0.3.2-1ubuntu0.1) …
Selecting previously unselected package libruby3.0:amd64.
Preparing to unpack …/31-libruby3.0_3.0.2-7ubuntu2.8_amd64.deb …
Unpacking libruby3.0:amd64 (3.0.2-7ubuntu2.8) …
Selecting previously unselected package libsynctex2:amd64.
Preparing to unpack …/32-libsynctex2_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libteckit0:amd64.
Preparing to unpack …/33-libteckit0_2.5.11+ds1-1_amd64.deb …
Unpacking libteckit0:amd64 (2.5.11+ds1-1) …
Selecting previously unselected package libtexlua53:amd64.
```

```
Preparing to unpack …/34-libtexlua53_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libtexluajit2:amd64.
Preparing to unpack
…/35-libtexluajit2_2021.20210626.59705-1ubuntu0.2_amd64.deb …
Unpacking libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libzzip-0-13:amd64.
Preparing to unpack …/36-libzzip-0-13_0.13.72+dfsg.1-1.1_amd64.deb …
Unpacking libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) …
Selecting previously unselected package xfonts-encodings.
Preparing to unpack …/37-xfonts-encodings_1%3a1.0.5-0ubuntu2_all.deb …
Unpacking xfonts-encodings (1:1.0.5-0ubuntu2) …
Selecting previously unselected package xfonts-utils.
Preparing to unpack …/38-xfonts-utils_1%3a7.7+6build2_amd64.deb …
Unpacking xfonts-utils (1:7.7+6build2) …
Selecting previously unselected package lmodern.
Preparing to unpack …/39-lmodern_2.004.5-6.1_all.deb …
Unpacking lmodern (2.004.5-6.1) …
Selecting previously unselected package pandoc-data.
Preparing to unpack …/40-pandoc-data_2.9.2.1-3ubuntu2_all.deb …
Unpacking pandoc-data (2.9.2.1-3ubuntu2) …
Selecting previously unselected package pandoc.
Preparing to unpack …/41-pandoc_2.9.2.1-3ubuntu2_amd64.deb …
Unpacking pandoc (2.9.2.1-3ubuntu2) …
Selecting previously unselected package preview-latex-style.
Preparing to unpack …/42-preview-latex-style_12.2-1ubuntu1_all.deb …
Unpacking preview-latex-style (12.2-1ubuntu1) …
Selecting previously unselected package t1utils.
Preparing to unpack …/43-t1utils_1.41-4build2_amd64.deb …
Unpacking t1utils (1.41-4build2) …
Selecting previously unselected package teckit.
Preparing to unpack …/44-teckit_2.5.11+ds1-1_amd64.deb …
Unpacking teckit (2.5.11+ds1-1) …
Selecting previously unselected package tex-gyre.
Preparing to unpack …/45-tex-gyre_20180621-3.1_all.deb …
Unpacking tex-gyre (20180621-3.1) …
Selecting previously unselected package texlive-binaries.
Preparing to unpack …/46-texlive-
binaries_2021.20210626.59705-1ubuntu0.2_amd64.deb …
Unpacking texlive-binaries (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package texlive-base.
Preparing to unpack …/47-texlive-base_2021.20220204-1_all.deb …
Unpacking texlive-base (2021.20220204-1) …
Selecting previously unselected package texlive-fonts-recommended.
Preparing to unpack …/48-texlive-fonts-recommended_2021.20220204-1_all.deb …
Unpacking texlive-fonts-recommended (2021.20220204-1) …
Selecting previously unselected package texlive-latex-base.
```

```
Preparing to unpack …/49-texlive-latex-base_2021.20220204-1_all.deb …
Unpacking texlive-latex-base (2021.20220204-1) …
Selecting previously unselected package libfontbox-java.
Preparing to unpack …/50-libfontbox-java_1%3a1.8.16-2_all.deb …
Unpacking libfontbox-java (1:1.8.16-2) …
Selecting previously unselected package libpdfbox-java.
Preparing to unpack …/51-libpdfbox-java_1%3a1.8.16-2_all.deb …
Unpacking libpdfbox-java (1:1.8.16-2) …
Selecting previously unselected package texlive-latex-recommended.
Preparing to unpack …/52-texlive-latex-recommended_2021.20220204-1_all.deb …
Unpacking texlive-latex-recommended (2021.20220204-1) …
Selecting previously unselected package texlive-pictures.
Preparing to unpack …/53-texlive-pictures_2021.20220204-1_all.deb …
Unpacking texlive-pictures (2021.20220204-1) …
Selecting previously unselected package texlive-latex-extra.
Preparing to unpack …/54-texlive-latex-extra_2021.20220204-1_all.deb …
Unpacking texlive-latex-extra (2021.20220204-1) …
Selecting previously unselected package texlive-plain-generic.
Preparing to unpack …/55-texlive-plain-generic_2021.20220204-1_all.deb …
Unpacking texlive-plain-generic (2021.20220204-1) …
Selecting previously unselected package tipa.
Preparing to unpack …/56-tipa_2%3a1.3-21_all.deb …
Unpacking tipa (2:1.3-21) …
Selecting previously unselected package texlive-xetex.
Preparing to unpack …/57-texlive-xetex_2021.20220204-1_all.deb …
Unpacking texlive-xetex (2021.20220204-1) …
Setting up fonts-lato (2.0-2.1) …
Setting up fonts-noto-mono (20201225-1build1) …
Setting up libwoff1:amd64 (1.0.2-1build4) …
Setting up libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up libijs-0.35:amd64 (0.35-15build2) …
Setting up libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up libfontbox-java (1:1.8.16-2) …
Setting up rubygems-integration (1.18) …
Setting up libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) …
Setting up fonts-urw-base35 (20200910-1) …
Setting up poppler-data (0.4.11-1) …
Setting up tex-common (6.17) …
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
update-language: texlive-base not installed and configured, doing nothing!
Setting up libfontenc1:amd64 (1:1.1.4-1build3) …
Setting up libjbig2dec0:amd64 (0.19-3build2) …
Setting up libteckit0:amd64 (2.5.11+ds1-1) …
Setting up libapache-pom-java (18-1) …
```

```
Setting up ruby-net-telnet (0.1.1-2) …
Setting up xfonts-encodings (1:1.0.5-0ubuntu2) …
Setting up t1utils (1.41-4build2) …
Setting up libidn12:amd64 (1.38-4ubuntu1) …
Setting up fonts-texgyre (20180621-3.1) …
Setting up libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up ruby-webrick (1.7.0-3ubuntu0.1) …
Setting up libcmark-gfm0.29.0.gfm.3:amd64 (0.29.0.gfm.3-3) …
Setting up fonts-lmodern (2.004.5-6.1) …
Setting up libcmark-gfm-extensions0.29.0.gfm.3:amd64 (0.29.0.gfm.3-3) …
Setting up fonts-droid-fallback (1:6.0.1r16-1.1build1) …
Setting up pandoc-data (2.9.2.1-3ubuntu2) …
Setting up ruby-xmlrpc (0.3.2-1ubuntu0.1) …
Setting up libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up libgs9-common (9.55.0~dfsg1-0ubuntu5.11) …
Setting up teckit (2.5.11+ds1-1) …
Setting up libpdfbox-java (1:1.8.16-2) …
Setting up libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.11) …
Setting up preview-latex-style (12.2-1ubuntu1) …
Setting up libcommons-parent-java (43-1) …
Setting up dvisvgm (2.13.1-1) …
Setting up libcommons-logging-java (1.2-2) …
Setting up xfonts-utils (1:7.7+6build2) …
Setting up libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up pandoc (2.9.2.1-3ubuntu2) …
Setting up texlive-binaries (2021.20210626.59705-1ubuntu0.2) …
update-alternatives: using /usr/bin/xdvi-xaw to provide /usr/bin/xdvi.bin
(xdvi.bin) in auto mode
update-alternatives: using /usr/bin/bibtex.original to provide /usr/bin/bibtex
(bibtex) in auto mode
Setting up lmodern (2.004.5-6.1) …
Setting up texlive-base (2021.20220204-1) …
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
mktexlsr: Updating /var/lib/texmf/ls-R-TEXLIVEDIST…
mktexlsr: Updating /var/lib/texmf/ls-R-TEXMFMAIN…
mktexlsr: Updating /var/lib/texmf/ls-R…
mktexlsr: Done.
tl-paper: setting paper size for dvips to a4:
/var/lib/texmf/dvips/config/config-paper.ps
tl-paper: setting paper size for dvipdfmx to a4:
/var/lib/texmf/dvipdfmx/dvipdfmx-paper.cfg
tl-paper: setting paper size for xdvi to a4: /var/lib/texmf/xdvi/XDvi-paper
tl-paper: setting paper size for pdftex to a4: /var/lib/texmf/tex/generic/tex-
ini-files/pdftexconfig.tex
debconf: unable to initialize frontend: Dialog
```

```
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
Setting up tex-gyre (20180621-3.1) …
Setting up texlive-plain-generic (2021.20220204-1) …
Setting up texlive-latex-base (2021.20220204-1) …
Setting up texlive-latex-recommended (2021.20220204-1) …
Setting up texlive-pictures (2021.20220204-1) …
Setting up texlive-fonts-recommended (2021.20220204-1) …
Setting up tipa (2:1.3-21) …
Setting up texlive-latex-extra (2021.20220204-1) …
Setting up texlive-xetex (2021.20220204-1) …
Setting up rake (13.0.6-2) …
Setting up libruby3.0:amd64 (3.0.2-7ubuntu2.8) …
Setting up ruby3.0 (3.0.2-7ubuntu2.8) …
Setting up ruby (1:3.0~exp1) …
Setting up ruby-rubygems (3.3.5-2) …
Processing triggers for man-db (2.10.2-1) …
Processing triggers for mailcap (3.70+nmu1ubuntu1) …
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) …
Processing triggers for libc-bin (2.35-0ubuntu3.8) …
/sbin/ldconfig.real: /usr/local/lib/libhwloc.so.15 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtcm.so.1 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc_proxy.so.2 is not a symbolic
link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_0.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc.so.2 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbb.so.12 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libur_adapter_opencl.so.0 is not a symbolic
link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtcm_debug.so.1 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libur_adapter_level_zero.so.0 is not a
symbolic link

/sbin/ldconfig.real: /usr/local/lib/libur_loader.so.0 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libumf.so.0 is not a symbolic link
```

```
/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_5.so.3 is not a symbolic link

Processing triggers for tex-common (6.17) …
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
Running updmap-sys. This may take some time… done.
Running mktexlsr /var/lib/texmf … done.
Building format(s) --all.
        This may take some time… done.
```

[46]:
```
!jupyter nbconvert --to pdf "/content/drive/MyDrive/Colab_Notebooks/
↪Machine_Learning/2.Logistic_Regression_Scikit-Learn.ipynb"
```

```
[NbConvertApp] WARNING | pattern '/content/drive/MyDrive/Colab_Notebooks/Machine
_Learning/2.Logistic_Regression_Scikit-Learn.ipynb' matched no files
This application is used to convert notebook files (*.ipynb)
        to various other formats.

        WARNING: THE COMMANDLINE INTERFACE MAY CHANGE IN FUTURE RELEASES.

Options
=======
The options below are convenience aliases to configurable class-options,
as listed in the "Equivalent to" description-line of the aliases.
To see all configurable class-options for some <cmd>, use:
    <cmd> --help-all

--debug
    set log level to logging.DEBUG (maximize logging output)
    Equivalent to: [--Application.log_level=10]
--show-config
    Show the application's configuration (human-readable format)
    Equivalent to: [--Application.show_config=True]
--show-config-json
    Show the application's configuration (json format)
    Equivalent to: [--Application.show_config_json=True]
--generate-config
    generate default config file
    Equivalent to: [--JupyterApp.generate_config=True]
-y
    Answer yes to any questions instead of prompting.
    Equivalent to: [--JupyterApp.answer_yes=True]
--execute
    Execute the notebook prior to export.
```

```
    Equivalent to: [--ExecutePreprocessor.enabled=True]
--allow-errors
    Continue notebook execution even if one of the cells throws an error and
include the error message in the cell output (the default behaviour is to abort
conversion). This flag is only relevant if '--execute' was specified, too.
    Equivalent to: [--ExecutePreprocessor.allow_errors=True]
--stdin
    read a single notebook file from stdin. Write the resulting notebook with
default basename 'notebook.*'
    Equivalent to: [--NbConvertApp.from_stdin=True]
--stdout
    Write notebook output to stdout instead of files.
    Equivalent to: [--NbConvertApp.writer_class=StdoutWriter]
--inplace
    Run nbconvert in place, overwriting the existing notebook (only
            relevant when converting to notebook format)
    Equivalent to: [--NbConvertApp.use_output_suffix=False
--NbConvertApp.export_format=notebook --FilesWriter.build_directory=]
--clear-output
    Clear output of current file and save in place,
            overwriting the existing notebook.
    Equivalent to: [--NbConvertApp.use_output_suffix=False
--NbConvertApp.export_format=notebook --FilesWriter.build_directory=
--ClearOutputPreprocessor.enabled=True]
--coalesce-streams
    Coalesce consecutive stdout and stderr outputs into one stream (within each
cell).
    Equivalent to: [--NbConvertApp.use_output_suffix=False
--NbConvertApp.export_format=notebook --FilesWriter.build_directory=
--CoalesceStreamsPreprocessor.enabled=True]
--no-prompt
    Exclude input and output prompts from converted document.
    Equivalent to: [--TemplateExporter.exclude_input_prompt=True
--TemplateExporter.exclude_output_prompt=True]
--no-input
    Exclude input cells and output prompts from converted document.
            This mode is ideal for generating code-free reports.
    Equivalent to: [--TemplateExporter.exclude_output_prompt=True
--TemplateExporter.exclude_input=True
--TemplateExporter.exclude_input_prompt=True]
--allow-chromium-download
    Whether to allow downloading chromium if no suitable version is found on the
system.
    Equivalent to: [--WebPDFExporter.allow_chromium_download=True]
--disable-chromium-sandbox
    Disable chromium security sandbox when converting to PDF..
    Equivalent to: [--WebPDFExporter.disable_sandbox=True]
--show-input
```

```
    Shows code input. This flag is only useful for dejavu users.
    Equivalent to: [--TemplateExporter.exclude_input=False]
--embed-images
    Embed the images as base64 dataurls in the output. This flag is only useful
for the HTML/WebPDF/Slides exports.
    Equivalent to: [--HTMLExporter.embed_images=True]
--sanitize-html
    Whether the HTML in Markdown cells and cell outputs should be sanitized..
    Equivalent to: [--HTMLExporter.sanitize_html=True]
--log-level=<Enum>
    Set the log level by value or name.
    Choices: any of [0, 10, 20, 30, 40, 50, 'DEBUG', 'INFO', 'WARN', 'ERROR',
'CRITICAL']
    Default: 30
    Equivalent to: [--Application.log_level]
--config=<Unicode>
    Full path of a config file.
    Default: ''
    Equivalent to: [--JupyterApp.config_file]
--to=<Unicode>
    The export format to be used, either one of the built-in formats
            ['asciidoc', 'custom', 'html', 'latex', 'markdown', 'notebook',
'pdf', 'python', 'qtpdf', 'qtpng', 'rst', 'script', 'slides', 'webpdf']
            or a dotted object name that represents the import path for an
            ``Exporter`` class
    Default: ''
    Equivalent to: [--NbConvertApp.export_format]
--template=<Unicode>
    Name of the template to use
    Default: ''
    Equivalent to: [--TemplateExporter.template_name]
--template-file=<Unicode>
    Name of the template file to use
    Default: None
    Equivalent to: [--TemplateExporter.template_file]
--theme=<Unicode>
    Template specific theme(e.g. the name of a JupyterLab CSS theme distributed
    as prebuilt extension for the lab template)
    Default: 'light'
    Equivalent to: [--HTMLExporter.theme]
--sanitize_html=<Bool>
    Whether the HTML in Markdown cells and cell outputs should be sanitized.This
    should be set to True by nbviewer or similar tools.
    Default: False
    Equivalent to: [--HTMLExporter.sanitize_html]
--writer=<DottedObjectName>
    Writer class used to write the
                                        results of the conversion
```

```
    Default: 'FilesWriter'
    Equivalent to: [--NbConvertApp.writer_class]
--post=<DottedOrNone>
    PostProcessor class used to write the
                                        results of the conversion
    Default: ''
    Equivalent to: [--NbConvertApp.postprocessor_class]
--output=<Unicode>
    Overwrite base name use for output files.
                Supports pattern replacements '{notebook_name}'.
    Default: '{notebook_name}'
    Equivalent to: [--NbConvertApp.output_base]
--output-dir=<Unicode>
    Directory to write output(s) to. Defaults
                                    to output to the directory of each notebook.
To recover
                                    previous default behaviour (outputting to the
current
                                    working directory) use . as the flag value.
    Default: ''
    Equivalent to: [--FilesWriter.build_directory]
--reveal-prefix=<Unicode>
    The URL prefix for reveal.js (version 3.x).
            This defaults to the reveal CDN, but can be any url pointing to a
copy
            of reveal.js.
            For speaker notes to work, this must be a relative path to a local
            copy of reveal.js: e.g., "reveal.js".
            If a relative path is given, it must be a subdirectory of the
            current directory (from which the server is run).
            See the usage documentation
            (https://nbconvert.readthedocs.io/en/latest/usage.html#reveal-js-
html-slideshow)
            for more details.
    Default: ''
    Equivalent to: [--SlidesExporter.reveal_url_prefix]
--nbformat=<Enum>
    The nbformat version to write.
            Use this to downgrade notebooks.
    Choices: any of [1, 2, 3, 4]
    Default: 4
    Equivalent to: [--NotebookExporter.nbformat_version]

Examples
--------

    The simplest way to use nbconvert is
```

```
            > jupyter nbconvert mynotebook.ipynb --to html

            Options include ['asciidoc', 'custom', 'html', 'latex', 'markdown',
'notebook', 'pdf', 'python', 'qtpdf', 'qtpng', 'rst', 'script', 'slides',
'webpdf'].

            > jupyter nbconvert --to latex mynotebook.ipynb

            Both HTML and LaTeX support multiple output templates. LaTeX
includes
            'base', 'article' and 'report'.  HTML includes 'basic', 'lab' and
            'classic'. You can specify the flavor of the format used.

            > jupyter nbconvert --to html --template lab mynotebook.ipynb

            You can also pipe the output to stdout, rather than a file

            > jupyter nbconvert mynotebook.ipynb --stdout

            PDF is generated via latex

            > jupyter nbconvert mynotebook.ipynb --to pdf

            You can get (and serve) a Reveal.js-powered slideshow

            > jupyter nbconvert myslides.ipynb --to slides --post serve

            Multiple notebooks can be given at the command line in a couple of
            different ways:

            > jupyter nbconvert notebook*.ipynb
            > jupyter nbconvert notebook1.ipynb notebook2.ipynb

            or you can specify the notebooks list in a config file, containing::

                c.NbConvertApp.notebooks = ["my_notebook.ipynb"]

            > jupyter nbconvert --config mycfg.py

To see all available configurables, use `--help-all`.
```