AI- BASED DIABETES PREDICTION SYSTEM

ai-phase5

Problem Statement:

The code seems to be related to a dataset that appears to be about diabetes. However, the problem statement is not explicitly mentioned in the code. To formulate a problem statement, you should clarify what you intend to achieve or predict with this dataset. For example, it could be predicting whether an individual has diabetes (Outcome = 1) based on various features, or it could be some other data analysis or prediction task related to diabetes.

Design Thinking Process:

Understand the Problem: Clearly define the problem or objective you want to address with this dataset. In this case, it seems to be related to diabetes data, but the specific problem is not stated.

Data Collection: You've loaded the data from a CSV file named "diabetes.csv." It would be important to describe the source and context of the dataset if available.

Data Preprocessing: Your code shows some initial data preprocessing steps, such as loading the data, examining data types, and checking for missing values. It's important to clean and preprocess the data to ensure its quality for analysis.

Data Visualization: You've created various data visualizations (pie chart, bar graph, and histogram) to explore the data and understand its distribution, particularly with respect to age.

Development Phases:

From the code provided, it's clear that the development process involves the following phases:

Data Loading and Inspection: Loading the dataset using Pandas and inspecting it to understand its structure.

Data Preprocessing: Handling missing values, checking data types, and selecting specific columns of interest (e.g., 'Pregnancies', 'BMI', 'Age', 'Insulin').

Data Visualization: Creating various plots (pie chart, bar graph, and histogram) to visually explore the data's distribution, particularly focusing on the 'Age' column.

Analysis: You need to analyze the data to answer specific questions or address a particular problem. This step is missing from the provided code.

Choice of Machine Learning Algorithm:

Your code does not mention the use of machine learning algorithms, model training, or evaluation metrics. If your goal is to build a predictive model, you would need to select a suitable machine learning algorithm (e.g., logistic regression, random forest, SVM) and define appropriate evaluation metrics (e.g., accuracy, precision, recall, F1-score) to assess the model's performance.

Feature Extraction Techniques:

Feature extraction is not explicitly discussed in the provided code. It's important to select relevant features for your analysis or modeling. In your code, you have chosen a subset of columns for analysis.

Innovative Techniques:

Your code demonstrates common data analysis and visualization techniques. However, it does not appear to use innovative or advanced techniques. Innovative techniques might involve advanced machine learning models, feature engineering, or

```
     0          6          6 33.6   50       0
     1          1          1 26.6   31       0
     2          8          8 23.3   32       0
     3          1          1 28.1   21      94
```

unique data preprocessing methods.

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[3]:
```
# importing the required python libraries
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.express as px
%matplotlib inline
```

[4]:
```
import pandas as pd
df=pd.read_csv("D:\calis\diabetes.csv")
df.head()
```

[4]:
```
   Pregnancies  Glucose  BloodPressure  SkinThickness  Insulin   BMI  \
0            6      148             72             35        0 33.6
1            1       85             66             29        0 26.6
2            8      183             64              0        0 23.3
3            1       89             66             23       94 28.1
4            0      137             40             35      168 43.1

   DiabetesPedigreeFunction Age Outcome
0     0.627 50    1 1   0.351 31    0 2
      0.672 32    1 3   0.167 21    0
4                   2.288   33        1
```

[6]:
```
pr=df[['Pregnancies','Pregnancies','BMI','Age','Insulin']]
pr.head(4)
```

[6]:
```
  Pregnancies Pregnancies  BMI Age Insulin
```

[19]:
```
Pregnancies
0       111
1       135
2       103
3       75
4       68
5       57
6       50
7       45
8       38
9       28
10      24
```

[19]:
```
df.groupby("Pregnancies").size()
11      11
```

```
12     9
13     10
14     2
15     1
17     1
dtype: int64
```

[7]:
```
pr.groupby('Age').size()
```

[7]:
```
Age
21    63
22    72
23    38
24    46
25    48
26    33
27    32
28    35
29    29
30    21
31    24
32    16
33    17
34    14
35    10
36    16
37    19
38    16
39    12
40    13
41    22
42    18
43    13
```

```
44    8
45    15
46    13
47    6
48    5
49    5
50    8
51    8
52    8
53    5
54    6
55    4
56    3
57    5
58    7
59    3
60    5
61    2
62    4
63    4
64    1
65    3
66    4
67    3
68    1
69    2
70    1
72    1
81    1
dtype: int64
```

[8]:
```
df.info()
```

```
<class
'pandas.core.frame.DataFrame'>
RangeIndex: 768 entries, 0 to
767 Data columns (total 9
columns):
 #   Column                Non-Null Count Dtype
--- ------                -------------- -----
0   Pregnancies  768 non-null    int64
1   Glucose 768 non-null    int64
2   BloodPressure     768 non-null    int64
```

```
3   SkinThickness      768 non-null    int64
4   Insulin 768 non-null     int64
5   BMI     768 non-null     float64
6   DiabetesPedigreeFunction 768 non-null
      float64
7   Age     768 non-null     int64
8   Outcome 768 non-null     int64
dtypes: float64(2), int64(7)
     memory usage: 54.1 KB
```

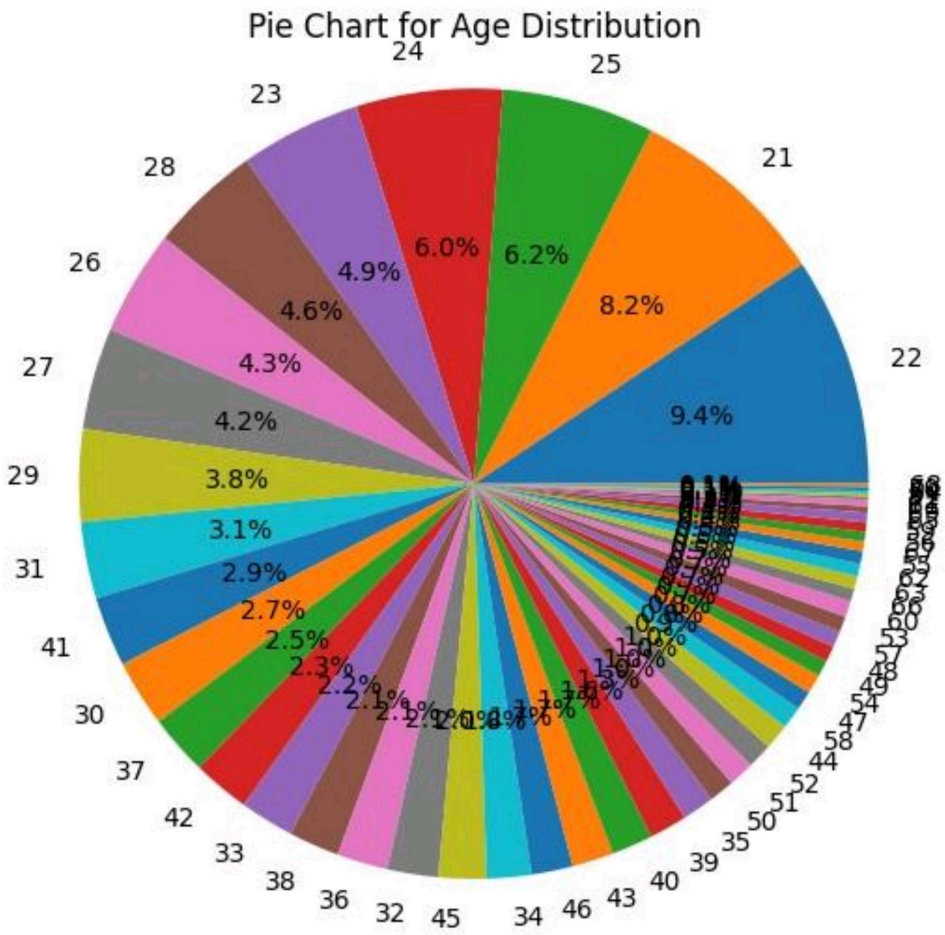
[11]:
```
pr.isnull()
```

[11]:

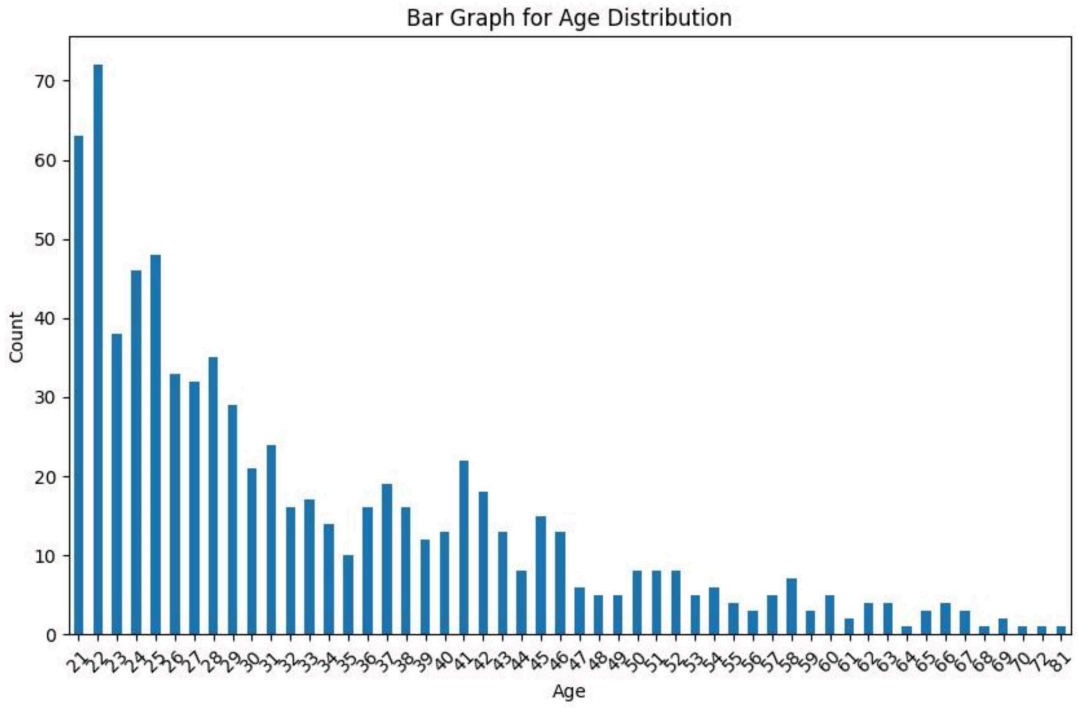
	Pregnancies	Pregnancies	BMI	Age	Insulin
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
..	…	…	…	…	…
763	False	False	False	False	False
764	False	False	False	False	False
765	False	False	False	False	False
766	False	False	False	False	False
767	False	False	False	False	False

[768 rows x 5 columns]

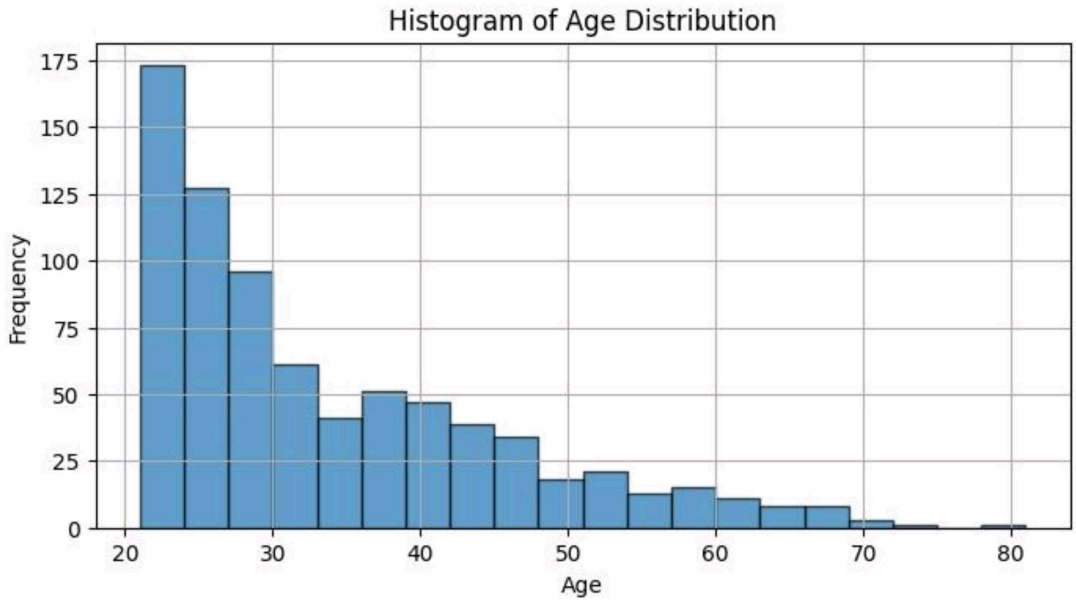
[15]:
```
# Create a pie chart for the "Age" column
age_counts = df['Age'].value_counts()
labels = age_counts.index
sizes = age_counts.values

plt.figure(figsize=(6,6))
plt.pie(sizes, labels=labels, autopct='%1.1f%%')
plt.title("Pie Chart for Age Distribution ")
plt.axis('equal')  # Equal aspect ratio ensures that the pie chart is circular.

plt.show()
```



[17]:
```
# Create a bar graph for the "Age" column
age_counts = df['Age'].value_counts().sort_index()

plt.figure(figsize=(10, 6))
age_counts.plot(kind='bar')
plt.title("Bar Graph for Age Distribution ")
plt.xlabel("Age")
plt.ylabel("Count")
plt.xticks(rotation=45)

plt.show()
```



[21]:
```
# Create a histogram for the "Age" column
plt.figure(figsize=(8, 4))
plt.hist(df['Age'], bins=20, edgecolor='k', alpha=0.7)
plt.title("Histogram of Age Distribution")
plt.xlabel("Age")
plt.ylabel("Frequency")
plt.grid(True)

plt.show()
```



CONCLUSION:

You've provided code and visualizations related to a diabetes dataset, but a clear problem statement and details about the choice of machine learning algorithms and feature extraction techniques are missing. To provide a comprehensive overview, you should clearly define the problem, specify the machine learning approach, and describe the feature engineering and model evaluation processes.