

Table of Contents

1.  Understand the Data
2.  Data Cleaning
3.  Analysis
 - A. Correlation
 - B. Software and Global Market
 - C. Varies Fields Impacts
 - D. Global Exceptions
 - E. Job Created & Eliminated
 - F. Ai Adoption
 - G. Jobs at High Risks
 - H. Ai Voice Assistants
 - I. Companies and Organizations
 - J. AI in Healthcare
 - K. Growth in Diff. fields
4.  Conclusion
 - A. Summary

Chapter One | Understand the Data

[Table of Content  

```
In [87]: import numpy as np
import pandas as pd

import matplotlib.pyplot as plt
import seaborn as sns

import missingno as msno
from tabulate import tabulate
#from wordcloud import WordCloud
#import networkx as nx

import plotly.express as px
import plotly.graph_objects as go
import plotly.figure_factory as ff
from plotly.subplots import make_subplots
```

```
import warnings
warnings.filterwarnings('ignore')
```

```
In [88]: source = r'C:\Users\Rudra\Downloads\Python_Pandas_profiling\The Rise Of Arti
df = pd.read_csv(source, encoding= 'unicode_escape')
df.sample(7)
```

Out[88]:

	Year	AI Software Revenue(in Billions)	Global AI Market Value(in Billions)	AI Adoption (%)	Organizations Using AI	Organizations Planning to Implement AI	Expected Adoption (%)
6	2024	94.41	400.0	40%	50%	55%	
3	2021	34.87	65.0	35%	42%	47%	
4	2022	51.27	140.0	35%	45%	50%	
7	2025	126.00	1810.0	63%	55%	58%	
0	2018	10.10	29.5	10%	35%	40%	
2	2020	22.59	45.0	30%	40%	45%	
1	2019	14.69	35.0	20%	37%	42%	

7 rows × 22 columns

```
In [89]: print("The size of the DataFrame:",df.size, '\n')
print('The Shape of the DataFrame', df.shape, '\n')
print("Available columns in the DataFrame:", df.columns)
```

The size of the DataFrame: 176

The Shape of the DataFrame (8, 22)

```
Available columns in the DataFrame: Index(['Year', 'AI Software Revenue(in B  
illions)',  
      'Global AI Market Value(in Billions)', 'AI Adoption (%)',  
      'Organizations Using AI', 'Organizations Planning to Implement AI',  
      'Global Expectation for AI Adoption (%)',  
      'Estimated Jobs Eliminated by AI (millions)',  
      'Estimated New Jobs Created by AI (millions)', 'Net Job Loss in the U  
S',  
      'Organizations Believing AI Provides Competitive Edge',  
      'Companies Prioritizing AI in Strategy',  
      'Estimated Revenue Increase from AI (trillions USD)',  
      'Marketers Believing AI Improves Email Revenue',  
      'Expected Increase in Employee Productivity Due to AI (%)',  
      'Americans Using Voice Assistants (%)',  
      'Digital Voice Assistants (billions of devices)',  
      'Medical Professionals Using AI for Diagnosis',  
      'AI Contribution to Healthcare(in Billions)',  
      'Jobs at High Risk of Automation - Transportation & Storage (%)',  
      'Jobs at High Risk of Automation - Wholesale & Retail Trade',  
      'Jobs at High Risk of Automation - Manufacturing'],  
      dtype='object')
```

```
In [90]: # Get info summary  
info = {  
    "Index": df.index,  
    "Columns": df.columns.tolist(),  
    "Non-Null Count": df.notnull().sum().tolist(),  
    "Dtype": df.dtypes.tolist()  
}  
  
# Convert to a format suitable for tabulation  
info_table = zip(info["Columns"], info["Non-Null Count"], info["Dtype"])  
  
# Print the summary information in a table format  
print(tabulate(info_table, headers=["Column", "Non-Null Count", "Dtype"], ta
```

			Non-Null
Column			
Count	Dtype		
Year			
8	int64		
AI Software Revenue(in Billions)			
8	float64		
Global AI Market Value(in Billions)			
8	float64		
AI Adoption (%)			
8	object		
Organizations Using AI			
8	object		
Organizations Planning to Implement AI			
8	object		
Global Expectation for AI Adoption (%)			
8	object		
Estimated Jobs Eliminated by AI (millions)			
8	object		
Estimated New Jobs Created by AI (millions)			
8	object		
Net Job Loss in the US			
8	object		
Organizations Believing AI Provides Competitive Edge			
8	object		
Companies Prioritizing AI in Strategy			
8	object		
Estimated Revenue Increase from AI (trillions USD)			
8	float64		

8	object		
8	object		
8	object		
8	float64		
8	object		
8	int64		
8	object		
8	object		
8	object		

In [91]: `df.describe(include='all').T`

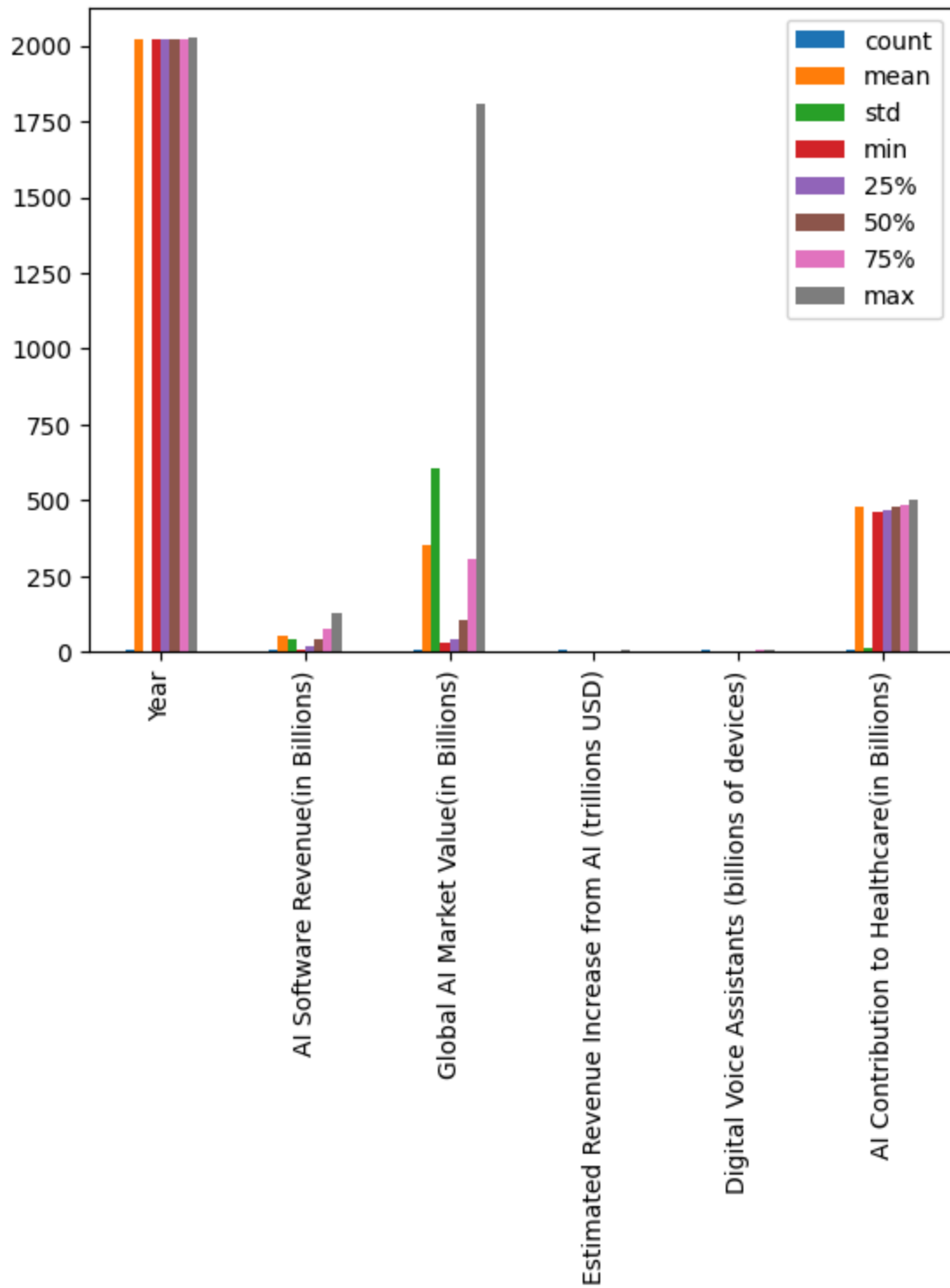
Out[91]:

	count	unique	top	freq	mean	std	min	
Year	8.0	NaN	NaN	NaN	2021.5	2.44949	2018.0	201
AI Software Revenue(in Billions)	8.0	NaN	NaN	NaN	53.10875	41.283101	10.1	20
Global AI Market Value(in Billions)	8.0	NaN	NaN	NaN	350.4375	604.676386	29.5	
AI Adoption (%)	8	6	35%	3	NaN	NaN	NaN	
Organizations Using AI	8	8	35%	1	NaN	NaN	NaN	
Organizations Planning to Implement AI	8	8	40%	1	NaN	NaN	NaN	
Global Expectation for AI Adoption (%)	8	8	40%	1	NaN	NaN	NaN	
Estimated Jobs Eliminated by AI (millions)	8	8	10%	1	NaN	NaN	NaN	
Estimated New Jobs Created by AI (millions)	8	8	5%	1	NaN	NaN	NaN	
Net Job Loss in the US	8	8	7%	1	NaN	NaN	NaN	
Organizations Believing AI Provides Competitive Edge	8	7	88%	2	NaN	NaN	NaN	
Companies Prioritizing AI in Strategy	8	8	83%	1	NaN	NaN	NaN	
Estimated Revenue Increase from AI (trillions USD)	8.0	NaN	NaN	NaN	3.3125	1.490386	1.2	
Marketers Believing AI Improves Email Revenue	8	8	41.29%	1	NaN	NaN	NaN	
Expected Increase in Employee	8	8	5%	1	NaN	NaN	NaN	

	count	unique	top	freq	mean	std	min	
Productivity Due to AI (%)								
Americans Using Voice Assistants (%)	8	8	20%	1	NaN	NaN	NaN	
Digital Voice Assistants (billions of devices)	8.0	NaN	NaN	NaN	3.5	1.429286	1.5	
Medical Professionals Using AI for Diagnosis	8	8	38%	1	NaN	NaN	NaN	
AI Contribution to Healthcare(in Billions)	8.0	NaN	NaN	NaN	478.25	13.155661	461.0	461.0
Jobs at High Risk of Automation - Transportation & Storage (%)	8	8	35%	1	NaN	NaN	NaN	
Jobs at High Risk of Automation - Wholesale & Retail Trade	8	8	44%	1	NaN	NaN	NaN	
Jobs at High Risk of Automation - Manufacturing	8	8	46.40%	1	NaN	NaN	NaN	

```
In [92]: df.describe().T.plot(kind='bar')
```

Out[92]: <Axes: >



Chapter Two | Data Cleaning 🧹

[Table of Content 📖 ⬆]


```
In [93]: df_cleaned = df.copy()

# Convert percentage columns to numeric by removing % and converting to float
percentage_columns = [
    'AI Adoption (%)', 'Global Expectation for AI Adoption (%)',
    'Estimated Jobs Eliminated by AI (millions)', 'Estimated New Jobs Created by AI (millions)',
    'Net Job Loss in the US', 'Organizations Believing AI Provides Competitive Edge',
    'Companies Prioritizing AI in Strategy', 'Marketers Believing AI Improves Email Revenue',
    'Expected Increase in Employee Productivity Due to AI (%)', 'Americans Using Voice Assistants (%)',
    'Medical Professionals Using AI for Diagnosis', 'Jobs at High Risk of Automation - Transportation & Storage (%)',
    'Jobs at High Risk of Automation - Wholesale & Retail Trade (%)', 'Jobs at High Risk of Automation - Manufacturing (%)'
]

# Remove % and convert to numeric
for col in percentage_columns:
    df_cleaned[col] = df_cleaned[col].str.replace('%', '').astype(float)
```

```
In [94]: df.duplicated().sum()
```

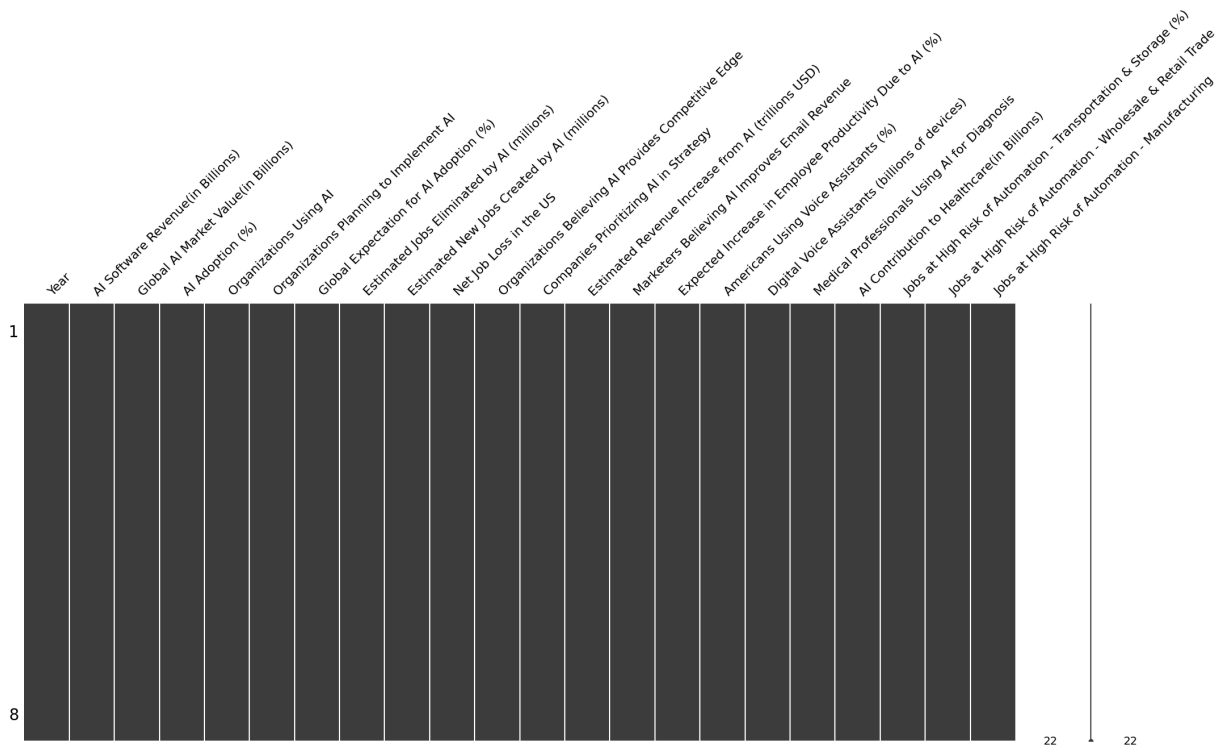
```
Out[94]: 0
```

```
In [95]: df.isnull().sum()
```

```
Out[95]: Year 0
AI Software Revenue(in Billions) 0
Global AI Market Value(in Billions) 0
AI Adoption (%) 0
Organizations Using AI 0
Organizations Planning to Implement AI 0
Global Expectation for AI Adoption (%) 0
Estimated Jobs Eliminated by AI (millions) 0
Estimated New Jobs Created by AI (millions) 0
Net Job Loss in the US 0
Organizations Believing AI Provides Competitive Edge 0
Companies Prioritizing AI in Strategy 0
Estimated Revenue Increase from AI (trillions USD) 0
Marketers Believing AI Improves Email Revenue 0
Expected Increase in Employee Productivity Due to AI (%) 0
Americans Using Voice Assistants (%) 0
Digital Voice Assistants (billions of devices) 0
Medical Professionals Using AI for Diagnosis 0
AI Contribution to Healthcare(in Billions) 0
Jobs at High Risk of Automation - Transportation & Storage (%) 0
Jobs at High Risk of Automation - Wholesale & Retail Trade (%) 0
Jobs at High Risk of Automation - Manufacturing (%) 0
dtype: int64
```

```
In [96]: msno.matrix(df)
```

```
Out[96]: <Axes: >
```




Chapter Three | Analysis

[Table of Content  ]

1. Correlation

```
In [97]: numeric_df = df_cleaned.select_dtypes(include=[float, int])
correlation_matrix = numeric_df.corr().T

fig = px.imshow(correlation_matrix, text_auto=True, aspect="auto",
               title='Correlation Matrix',
               color_continuous_scale='viridis')
fig.show()
```

 **Insights :** Estimated jobs Created by AI and Net job loss in the us is negatively related

2. Trend Analysis of AI Software Revenue and Global

AI Market Value

```
In [98]: # Create traces for each line
trace1 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['AI Software Revenue(in Billions)'],
    mode='lines+markers',
    name='AI Software Revenue (Billions)'
)

trace2 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Global AI Market Value(in Billions)'],
    mode='lines+markers',
    name='Global AI Market Value (Billions)'
)

trace3 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Marketers Believing AI Improves Email Revenue'],
    mode='lines+markers',
    name='Marketers Believing AI Improves Email Revenue'
)

# Create a figure and add the traces
fig = go.Figure(data=[trace1, trace2, trace3])

# Update layout for titles and axes labels
fig.update_layout(
    title='Trend Analysis of AI Software Revenue and Global AI Market Value',
    xaxis_title='Year',
    yaxis_title='Value in Billions',
    legend_title='Metrics',
    template='plotly_white',
    width=1000,
    height=600
)

# Show gridlines
fig.update_xaxes(showgrid=True)
fig.update_yaxes(showgrid=True)

# Display the plot
fig.show()
```

3. Trends Over the Years for Various AI Metrics

```
In [99]: fig = go.Figure()

# Loop through all columns except 'Year' and add a trace for each
```

```

for column in df.columns:
    if column != 'Year':
        fig.add_trace(go.Scatter(x=df['Year'], y=df[column], mode='lines', r

# Update layout with a title and labels
fig.update_layout(
    title='Trends Over the Years for Various AI Metrics',
    xaxis_title='Year',
    yaxis_title='Value',
    legend_title='Metrics',
    template='plotly_white'
)

# Show the plot
fig.show()

```

☀️ **Insights :** Adoption of AI in healthcare is growing

⚡ 4. Global Exception & Software Revenue

```

In [100... dfn = df.dropna()

# Create a scatter plot
fig = px.scatter(
    data_frame=dfn,
    x='Year',
    y='AI Adoption (%)',
    color='Global Expectation for AI Adoption (%)',
    symbol='AI Software Revenue(in Billions)',
    size='Global AI Market Value(in Billions)',
    size_max=30,
)

# Update the layout
fig.update_layout(
    title='AI World',
    title_font={'size': 24, 'family': 'Serif'},
    width=1200,
    height=500,
    showlegend=True,
)

# Show the plot
fig.show()

```

⚡ 5. Job Created and Eliminated by AI % Revenue

```

In [101]: # Create traces for each line
trace1 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Estimated Jobs Eliminated by AI (millions)'],
    mode='lines+markers',
    name='Jobs Eliminated'
)

trace2 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Estimated New Jobs Created by AI (millions)'],
    mode='lines+markers',
    name='New Jobs Created'
)

trace3 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Estimated Revenue Increase from AI (trillions USD)'],
    mode='lines+markers',
    name='Revenue Increase from AI'
)

trace4 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Net Job Loss in the US'],
    mode='lines+markers',
    name='Net Job Loss'
)

# Create a figure and add the traces
fig = go.Figure(data=[trace1, trace2, trace3, trace4])

# Update layout for titles and axes labels
fig.update_layout(
    title='Estimated Jobs Created and Eliminated by AI',
    xaxis_title='Year',
    yaxis_title='Estimated Values',
    legend_title='Metrics',
    template='plotly_white',
    width=1000,
    height=600
)

# Show gridlines
fig.update_xaxes(showgrid=True)
fig.update_yaxes(showgrid=True)

# Display the plot
fig.show()

```

🌟 **Insights :** Job eliminated by Ai > New Job Created

⚡ 6. Trend Analysis of AI Adoption and Global Expectation for AI Adoption

```
In [102... import plotly.graph_objs as go
import pandas as pd

# Assuming your data is in a DataFrame called 'df_cleaned'

# Create traces for each line
trace1 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['AI Adoption (%)'],
    mode='lines+markers',
    name='AI Adoption (%)'
)

trace2 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Global Expectation for AI Adoption (%)'],
    mode='lines+markers',
    name='Global Expectation for AI Adoption (%)'
)

# Create a figure and add the traces
fig = go.Figure(data=[trace1, trace2])

# Update layout for titles and axes labels
fig.update_layout(
    title='Trend Analysis of AI Adoption and Global Expectation for AI Adopt
    xaxis_title='Year',
    yaxis_title='Percentage (%)',
    legend_title='Metrics',
    template='plotly_white',
    width=1000,
    height=600
)

# Show gridlines
fig.update_xaxes(showgrid=True)
fig.update_yaxes(showgrid=True)

# Display the plot
fig.show()
```

⚡ 7. Jobs at High Risks

```
In [103... # Create traces for each line
trace1 = go.Scatter(
```

```

        x=df_cleaned['Year'],
        y=df_cleaned['Jobs at High Risk of Automation - Manufacturing'],
        mode='lines+markers',
        name='Manufacturing'
    )

    trace2 = go.Scatter(
        x=df_cleaned['Year'],
        y=df_cleaned['Jobs at High Risk of Automation - Transportation & Storage'],
        mode='lines+markers',
        name='Transportation & Storage'
    )

    trace3 = go.Scatter(
        x=df_cleaned['Year'],
        y=df_cleaned['Jobs at High Risk of Automation - Wholesale & Retail Trade'],
        mode='lines+markers',
        name='Wholesale & Retail Trade',
    )
    # Create a figure and add the traces
    fig = go.Figure(data=[trace1, trace2, trace3])

    # Update layout for titles and axes labels
    fig.update_layout(
        title='Jobs At High Risks for Ai automation',
        xaxis_title='Year',
        yaxis_title='High Risk Percentage (%)',
        legend_title='Metrics',
        template='plotly_white',
        width=1000,
        height=600
    )

    # Show gridlines
    fig.update_xaxes(showgrid=True)
    fig.update_yaxes(showgrid=True)

    # Display the plot
    fig.show()

```

🌟 **Insights :** Transportation & storage is very high risks in this ai world

⚡ 8. AI voice Assistants

```

In [104... # Create traces for each line
tracel = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Digital Voice Assistants (billions of devices)'],
    mode='lines+markers',
    name='Voice Assistants'

```

```

)

trace2 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Americans Using Voice Assistants (%)'],
    mode='lines+markers',
    name='Americans using Voice Assistants'
)

# Create a figure and add the traces
fig = go.Figure(data=[trace1, trace2])

# Update layout for titles and axes labels
fig.update_layout(
    title='Voice Assistants Trend Analysis of AI Adoption ',
    xaxis_title='Year',
    yaxis_title='Percentage (%)',
    legend_title='Metrics',
    template='plotly_white',
    width=1000,
    height=600
)

# Show gridlines
fig.update_xaxes(showgrid=True)
fig.update_yaxes(showgrid=True)

# Display the plot
fig.show()

```

9. Companies and Organizations Implementation

```

In [105... # Create traces for each line
trace1 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Companies Prioritizing AI in Strategy'],
    mode='lines+markers',
    name='Companies Prioritizing AI in Strategy'
)

trace2 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Organizations Believing AI Provides Competitive Edge'],
    mode='lines+markers',
    name='Organizations Believing AI Provides Competitive Edge'
)

trace3 = go.Scatter(
    x=df_cleaned['Year'],
    y=df_cleaned['Organizations Planning to Implement AI'],
    mode='lines+markers',

```



```

        name='Organizations Planning to Implement AI'
    )

    trace4 = go.Scatter(
        x=df_cleaned['Year'],
        y=df_cleaned['Organizations Using AI'],
        mode='lines+markers',
        name='Organizations Using AI',
    )

    # Create a figure and add the traces
    fig = go.Figure(data=[trace1, trace2, trace3, trace4])

    # Update layout for titles and axes labels
    fig.update_layout(
        title='Voice Assistants Trend Analysis of AI Adoption ',
        xaxis_title='Year',
        yaxis_title='Percentage (%)',
        legend_title='Metrics',
        template='plotly_white',
        width=1000,
        height=600
    )

    # Show gridlines
    fig.update_xaxes(showgrid=True)
    fig.update_yaxes(showgrid=True)

    # Display the plot
    fig.show()

```

🌟 **Insights :** Organizations Believing AI Provides Competitive Edge

⚡ 10. Ai adoptions in Healthcare

```

In [106... # Create traces for each line
    trace1 = go.Scatter(
        x=df_cleaned['Year'],
        y=df_cleaned['AI Contribution to Healthcare(in Billions)'],
        mode='lines+markers',
        name='AI Contribution to Healthcare'
    )

    trace2 = go.Scatter(
        x=df_cleaned['Year'],
        y=df_cleaned['Medical Professionals Using AI for Diagnosis'],
        mode='lines+markers',
        name='Medical Professionals Using AI for Diagnosis'
    )

```

```

# Create a figure and add the traces
fig = go.Figure(data=[trace1, trace2])

# Update layout for titles and axes labels
fig.update_layout(
    title='Ai in Healthcare ',
    xaxis_title='Year',
    yaxis_title='Percentage (%)',
    legend_title='Metrics',
    template='plotly_white',
    width=1000,
    height=600
)

# Show gridlines
fig.update_xaxes(showgrid=True)
fig.update_yaxes(showgrid=True)

# Display the plot
fig.show()

```

⚡ 11. Growth of different field over the years

```

In [107... # Loop through all columns except 'Year' and create individual plots
for column in df.columns:
    if column != 'Year':
        # Create a line plot for each metric
        fig = px.line(df, x='Year', y=column,
                      title=f'{column} Over the Years',
                      labels={column: column, 'Year': 'Year'})

        # Show each plot
        fig.show()

```

Last but not least, the final chapter

| Draw an Conclusion 

[Table of Content  ]

Summary:

1. **Estimated Jobs Created vs. Net Job Loss:**

- There is a negative relationship between the estimated new jobs created by AI and the net job loss in the US. This indicates that while some jobs are being created due to AI, a higher number of jobs may be at risk of elimination, leading to a net job loss.

2. **Job Elimination Outpaces Job Creation:**

- The number of jobs eliminated by AI is higher than the number of new jobs created. This suggests that AI's impact on the job market is more disruptive than generative, posing challenges in employment sectors.

3. **Growth in AI Adoption in Healthcare:**

- The adoption of AI in healthcare is on the rise. This trend indicates increasing reliance on AI technologies for diagnosis, treatment planning, and operational efficiency in the medical field.

4. **High-Risk Sectors for Automation:**

- The transportation and storage sectors face a very high risk of job automation in the AI era. Workers in these industries are more likely to experience job displacement due to automation and AI advancements.

5. **AI as a Competitive Advantage:**

- Many organizations believe that AI provides a significant competitive edge. This indicates that companies are increasingly integrating AI into their strategies to improve performance, decision-making, and innovation.

Conclusions:

1. **Employment Impact:** While AI is generating some new opportunities, the overall impact appears to be a net reduction in jobs, particularly in sectors like transportation, storage, and manufacturing.
2. **Need for Workforce Upskilling:** As AI adoption grows, there is an urgent need for reskilling and upskilling programs to prepare workers for new job roles created by AI technologies.

3. **Healthcare Transformation:** The increasing use of AI in healthcare represents a significant shift in how medical professionals operate, potentially leading to more accurate diagnoses and efficient patient care.
4. **Risk Management in High-Risk Sectors:** Companies in high-risk industries should prioritize strategies for managing job displacement and exploring ways to leverage AI while minimizing its negative impact on employment.
5. **Strategic AI Integration:** Organizations that embrace AI and integrate it into their strategic priorities are likely to gain a competitive advantage in the market, making AI adoption a critical factor for long-term success.

These points highlight the mixed implications of AI on job markets, emphasizing the need for balanced strategies to harness AI's benefits while mitigating its risks.