ELECTION AD SPENDING ANALYSIS PROJECT

YOUR VOTE IS YOUR VOICE!

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ABOUT THE PROJECT

I have collected contains three files from Dataset:

1 The Advertisers Dataset provides insights into which pages (parties or organizations) spend money on election ads and the volume of ads they run.
2 The Locations Dataset shows how much money was spent on ads in different locations, indicating where the campaigns were focusing their efforts.
3 The Results Dataset provides actual voting data, showing how many people voted in each area and the percentage of voter turnout.

There are three files in the dataset. The advertisers data contains:

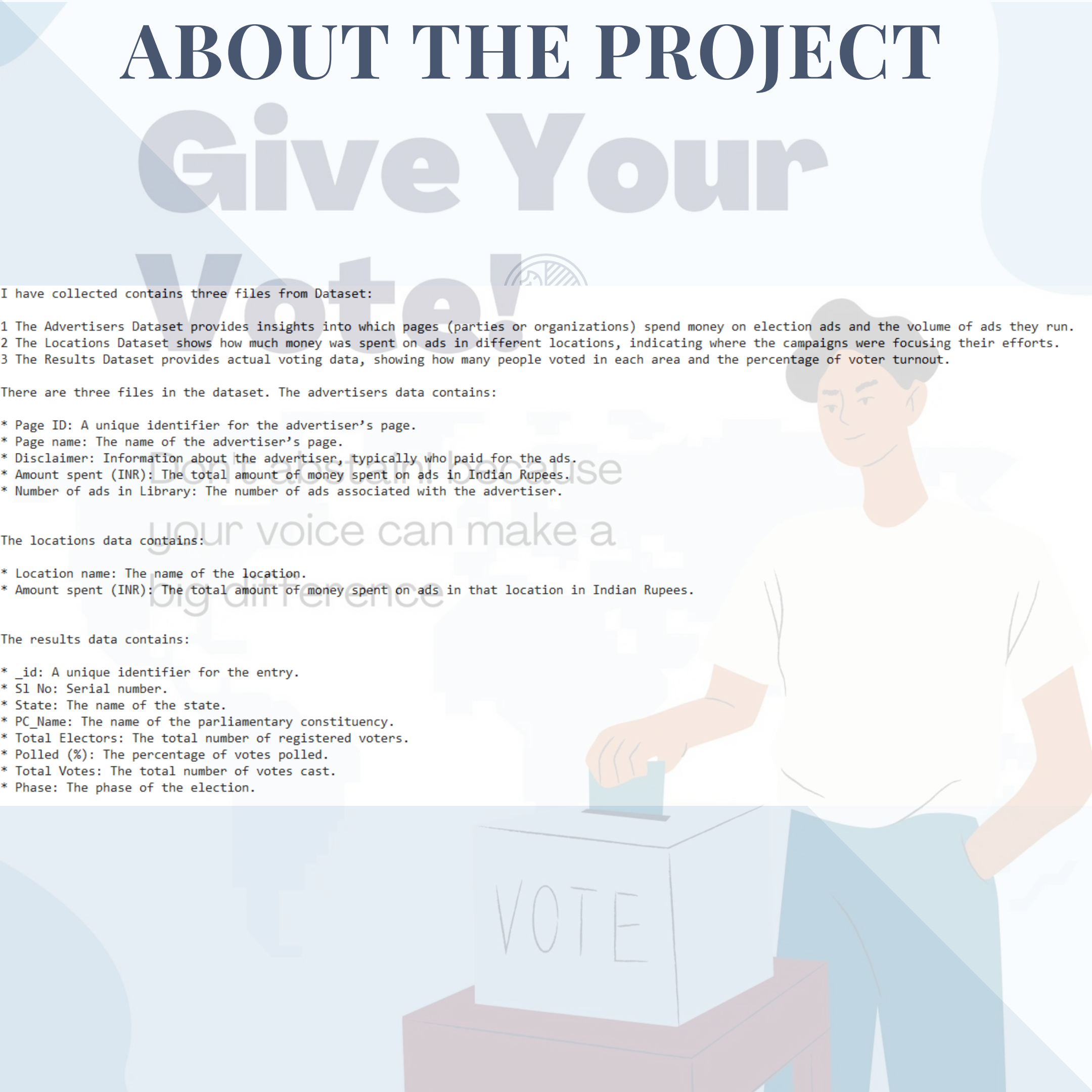
* Page ID: A unique identifier for the advertiser's page.
* Page name: The name of the advertiser's page.
* Disclaimer: Information about the advertiser, typically who paid for the ads.
* Amount spent (INR): The total amount of money spent on ads in Indian Rupees.
* Number of ads in Library: The number of ads associated with the advertiser.

The locations data contains:

* Location name: The name of the location.
* Amount spent (INR): The total amount of money spent on ads in that location in Indian Rupees.

The results data contains:

* _id: A unique identifier for the entry.
* Sl No: Serial number.
* State: The name of the state.
* PC_Name: The name of the parliamentary constituency.
* Total Electors: The total number of registered voters.
* Polled (%): The percentage of votes polled.
* Total Votes: The total number of votes cast.
* Phase: The phase of the election.

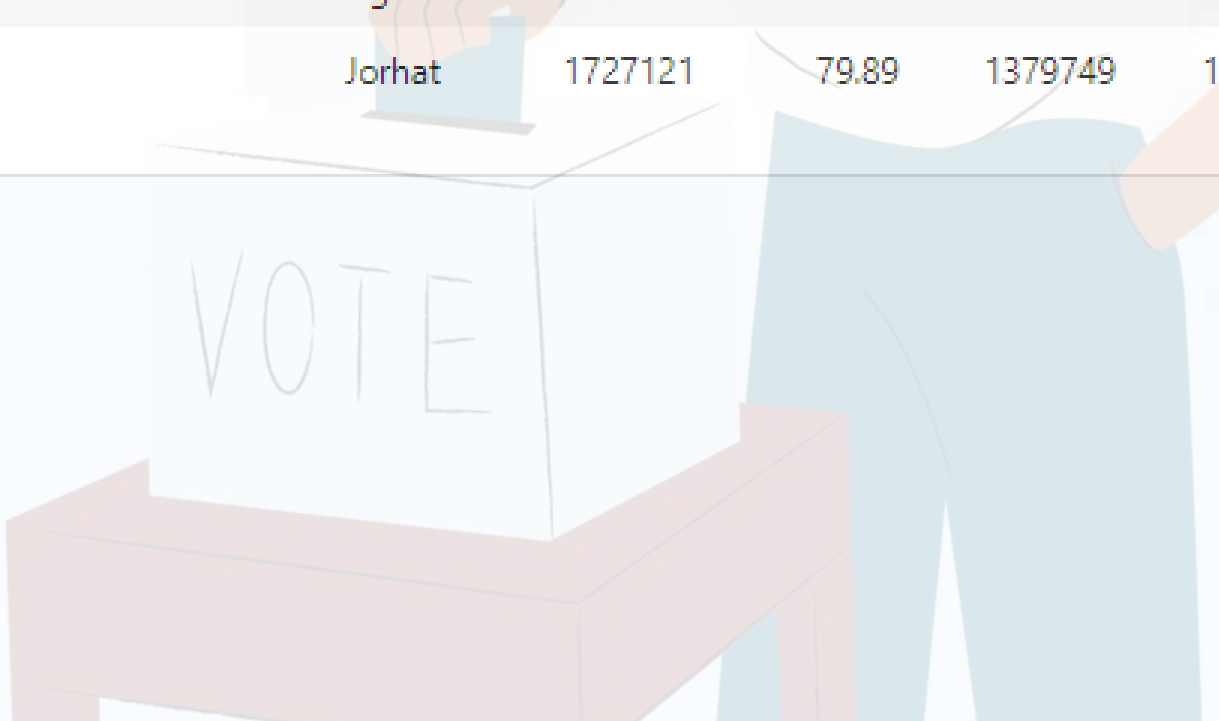


Give Your Vote!

```
import pandas as pd

results = pd.read_csv('results.csv')
advertisers = pd.read_csv('advertisers.csv')
locations = pd.read_csv('locations.csv')

results.head()
```


Don't abstain! because your voice can make a big difference

	_id	Sl No	State	PC_Name	Total Electors	Polled (%)	Total Votes	Phase
0	1	1.0	Andaman & Nicobar Islands	Andaman & Nicobar Islands	315148	64.10	202018	1.0
1	2	2.0	Arunachal Pradesh	Arunachal East	375310	83.31	312658	1.0
2	3	3.0	Arunachal Pradesh	Arunachal West	517384	73.60	380783	1.0
3	4	4.0	Assam	Dibrugarh	1659588	76.75	1273744	1.0
4	5	5.0	Assam	Jorhat	1727121	79.89	1379749	1.0

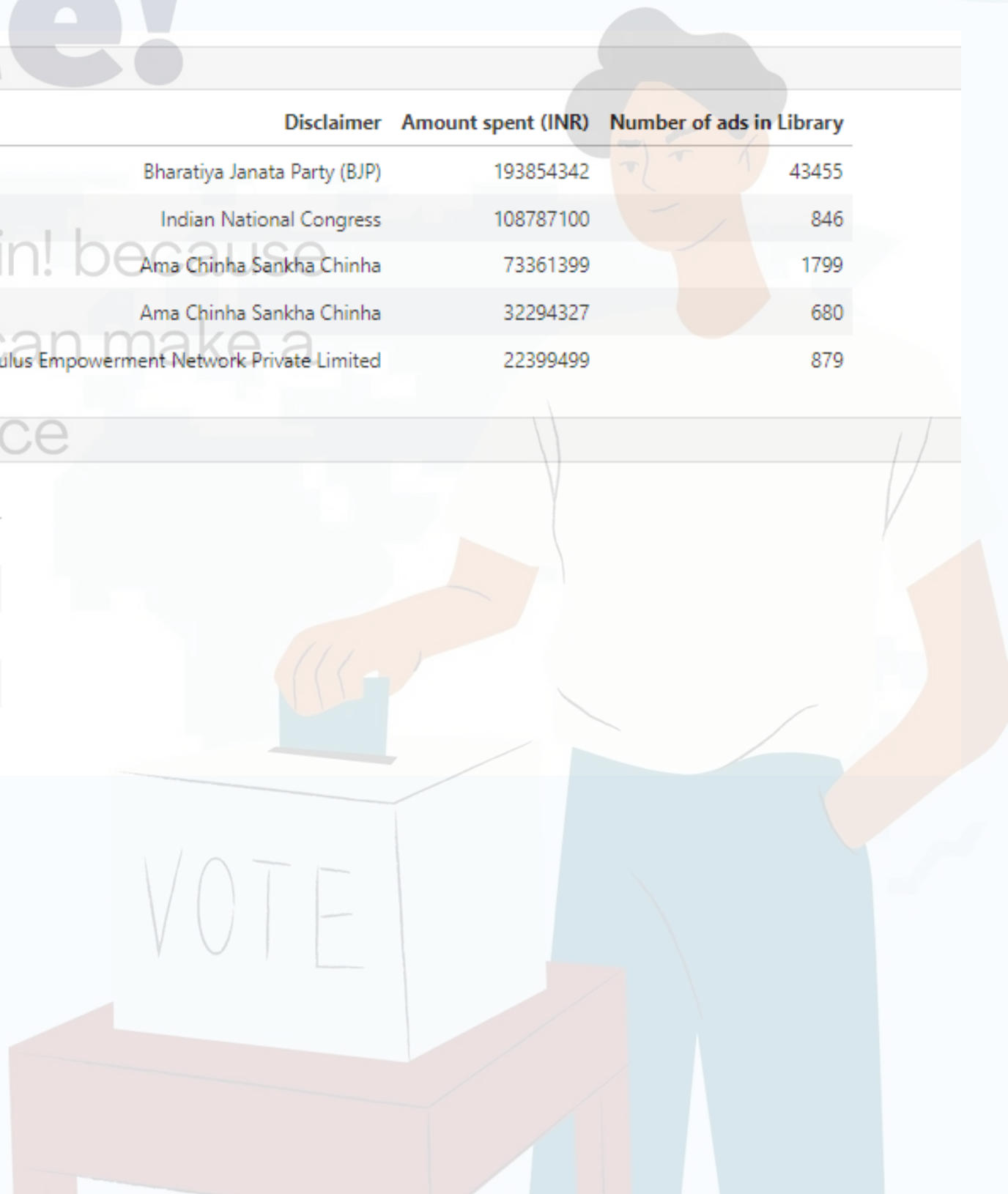


```
advertisers.head()
```

	Page ID	Page name	Disclaimer	Amount spent (INR)	Number of ads in Library
0	121439954563203	Bharatiya Janata Party (BJP)	Bharatiya Janata Party (BJP)	193854342	43455
1	351616078284404	Indian National Congress	Indian National Congress	108787100	846
2	132715103269897	Ama Chinha Sankha Chinha	Ama Chinha Sankha Chinha	73361399	1799
3	192856493908290	Ama Chinha Sankha Chinha	Ama Chinha Sankha Chinha	32294327	680
4	109470364774303	Ellorum Nammudan	Populus Empowerment Network Private Limited	22399499	879


```
locations.head()
```

	Location name	Amount spent (INR)
0	Andaman and Nicobar Islands	377858
1	Andhra Pradesh	100819732
2	Arunachal Pradesh	1385654
3	Assam	17478091
4	Bihar	53619242




```
## The results data has a column named state, and the location data has a column named location name. We will merge these datasets using these columns:

results['State'] = results['State'].str.strip().str.lower()

locations['Location name'] = locations['Location name'].str.strip().str.lower()

merged_data = results.merge(
    locations,
    left_on='State',
    right_on='Location name',
    how='left'
)
```

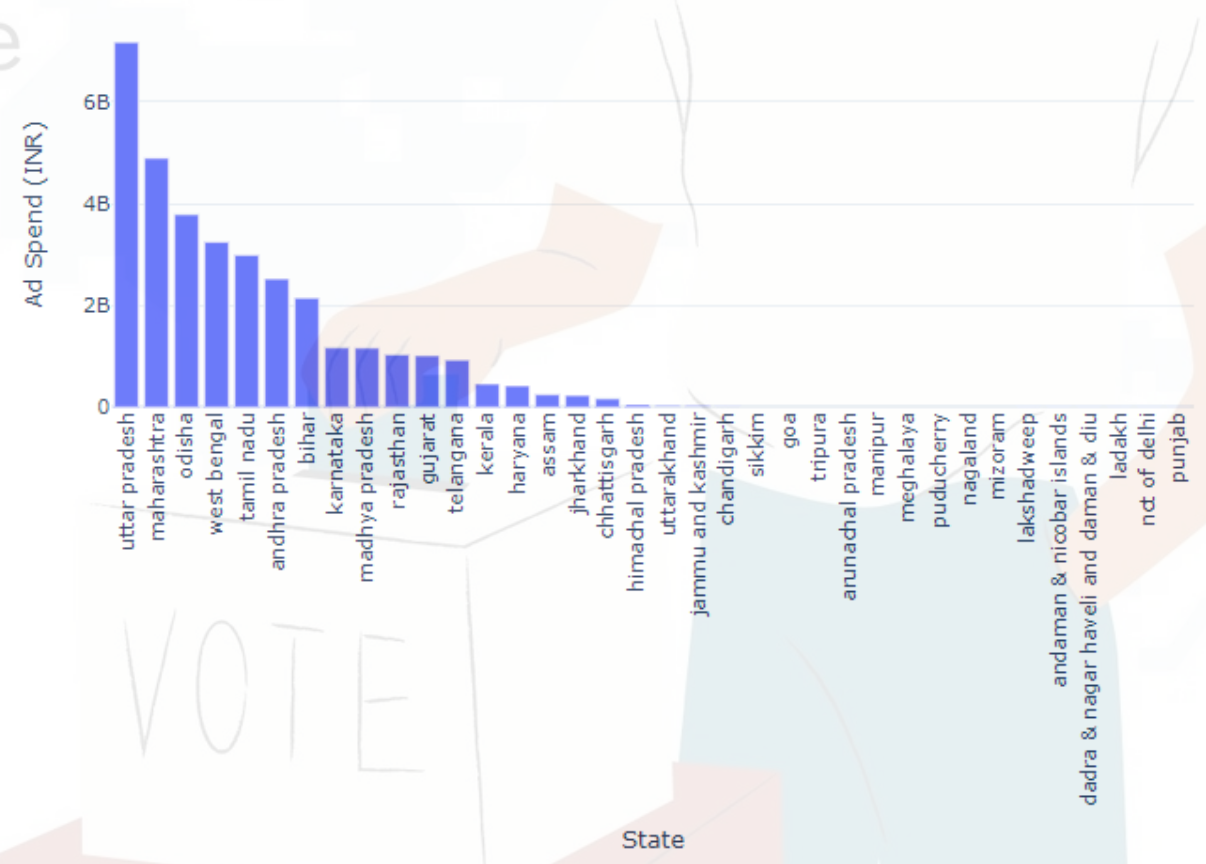
```
merged_data.head()
```

	_id	Sl No	State	PC_Name	Total Electors	Polled (%)	Total Votes	Phase	Location name	Amount spent (INR)
0	1	1.0	andaman & nicobar islands	Andaman & Nicobar Islands	315148	64.10	202018	1.0	NaN	NaN
1	2	2.0	arunachal pradesh	Arunachal East	375310	83.31	312658	1.0	arunachal pradesh	1385654.0
2	3	3.0	arunachal pradesh	Arunachal West	517384	73.60	380783	1.0	arunachal pradesh	1385654.0
3	4	4.0	assam	Dibrugarh	1659588	76.75	1273744	1.0	assam	17478091.0
4	5	5.0	assam	Jorhat	1727121	79.89	1379749	1.0	assam	17478091.0

Let's have a look at the total ad spend by state:

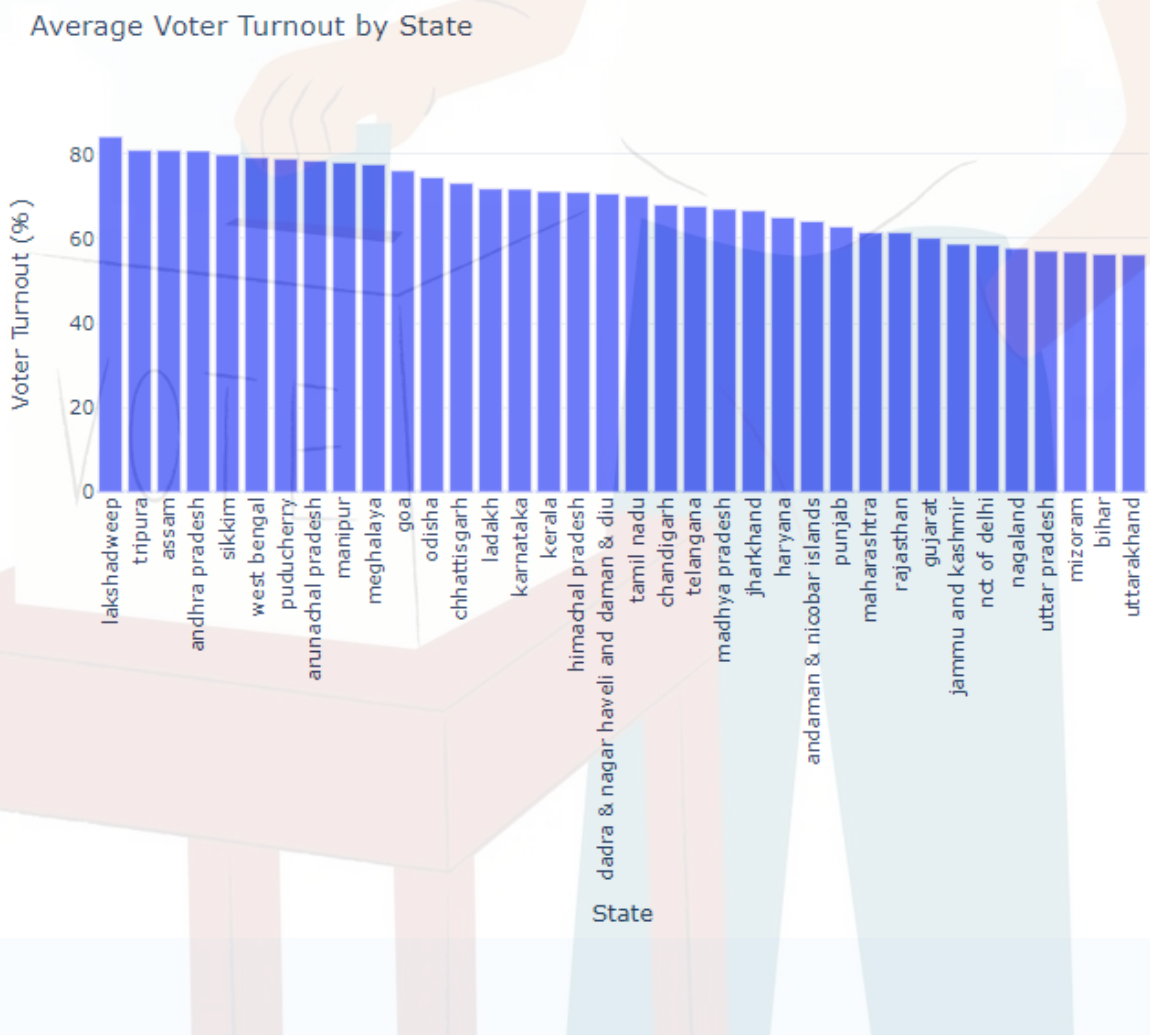
```
import plotly.express as px
import plotly.io as pio
import plotly.graph_objects as go
pio.templates.default = "plotly_white"

state_ad_spend = merged_data.groupby('State')['Amount spent (INR)'].sum().reset_index()

fig = px.bar(state_ad_spend, x='State', y='Amount spent (INR)',
             labels={'State': 'State', 'Amount spent (INR)': 'Ad Spend (INR)'},
             title='Total Ad Spend by State')

fig.update_layout(xaxis={'categoryorder': 'total descending'},
                  xaxis_tickangle=-90,
                  width=800,
                  height=600)

fig.show()
```

Total Ad Spend by State



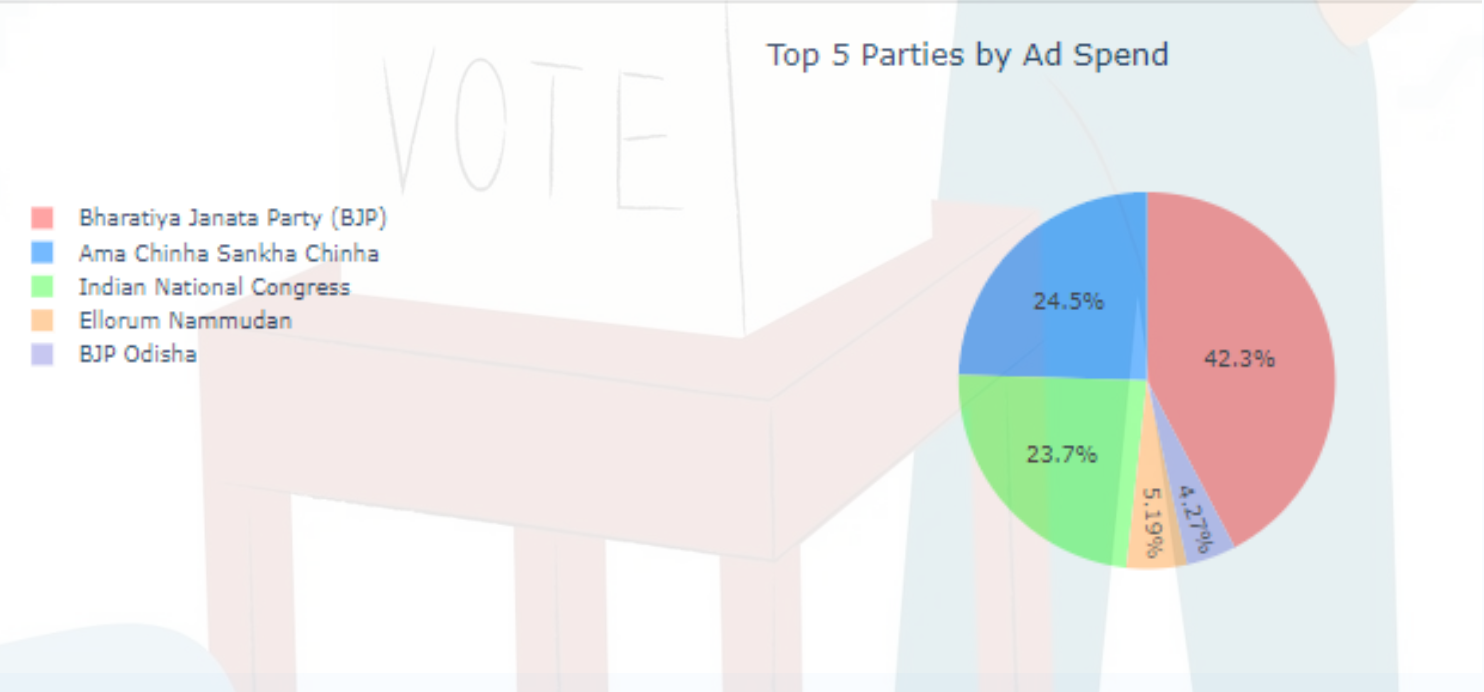
Now, let's have a look at the average voter turnout by state:

```
state_voter_turnout = merged_data.groupby('State')['Polled (%)'].mean().reset_index()

fig = px.bar(state_voter_turnout, x='State', y='Polled (%)',
             labels={'State': 'State', 'Polled (%)': 'Voter Turnout (%)'},
             title='Average Voter Turnout by State')

fig.update_layout(xaxis={'categoryorder': 'total descending'},
                  xaxis_tickangle=-90,
                  width=800,
                  height=600)

fig.show()
```



Now, let's have a look at the top 5 parties by ad spend:

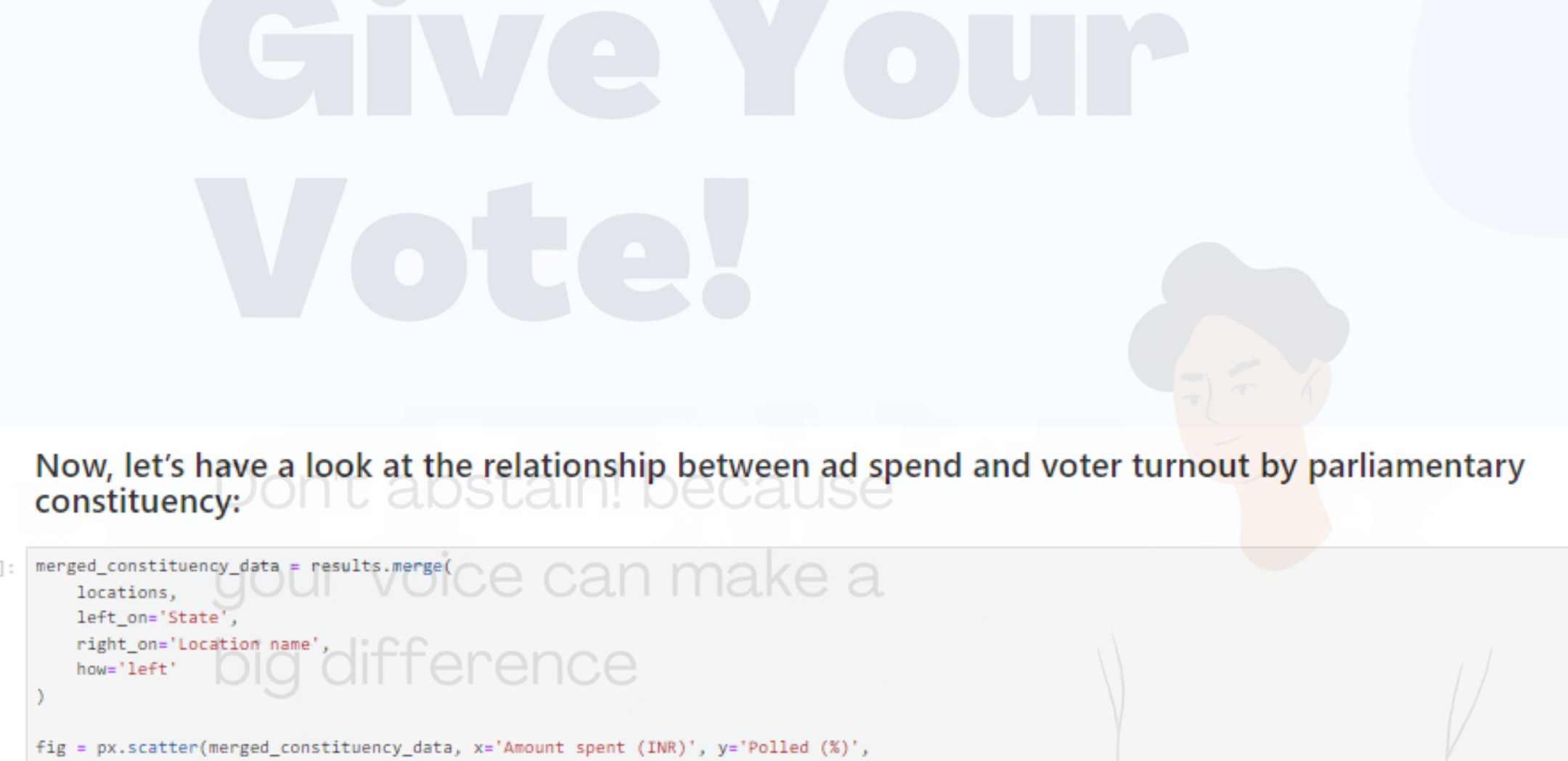
```
]: advertisers['Amount spent (INR)'] = pd.to_numeric(advertisers['Amount spent (INR)'], errors='coerce')

advertisers.dropna(subset=['Amount spent (INR)'], inplace=True)

party_ad_spend = advertisers.groupby('Page name')['Amount spent (INR)'].sum().sort_values(ascending=False)

top_5_parties = party_ad_spend.head(5).reset_index()

colors = ['#ff9999', '#66b3ff', '#99ff99', '#ffcc99', '#c2c2f0']

fig = px.pie(top_5_parties, values='Amount spent (INR)', names='Page name',
             title='Top 5 Parties by Ad Spend', color_discrete_sequence=colors,
             labels={'Page name': 'Political Party', 'Amount spent (INR)': 'Ad Spend (INR)'})

fig.update_traces(textinfo='percent')

fig.update_layout(
    showlegend=True,
    legend=dict(
        orientation="v",
        yanchor="top",
        y=1,
        xanchor="left",
        x=-0.3
    ),
    title=dict(
        y=0.95,
        x=0.5,
        xanchor='center',
        yanchor='top'
    ),
    margin=dict(l=200, r=50, t=100, b=50)
)

fig.show()
```



Now, let's have a look at the correlation between ad spend and voter turnout:

```
# calculate the correlation between ad spend and voter turnout
correlation = merged_data[['Amount spent (INR)', 'Polled (%)']].corr()
print(correlation)
```

```
                    Amount spent (INR)  Polled (%)
Amount spent (INR)            1.000000   -0.010688
Polled (%)                   -0.010688    1.000000
```

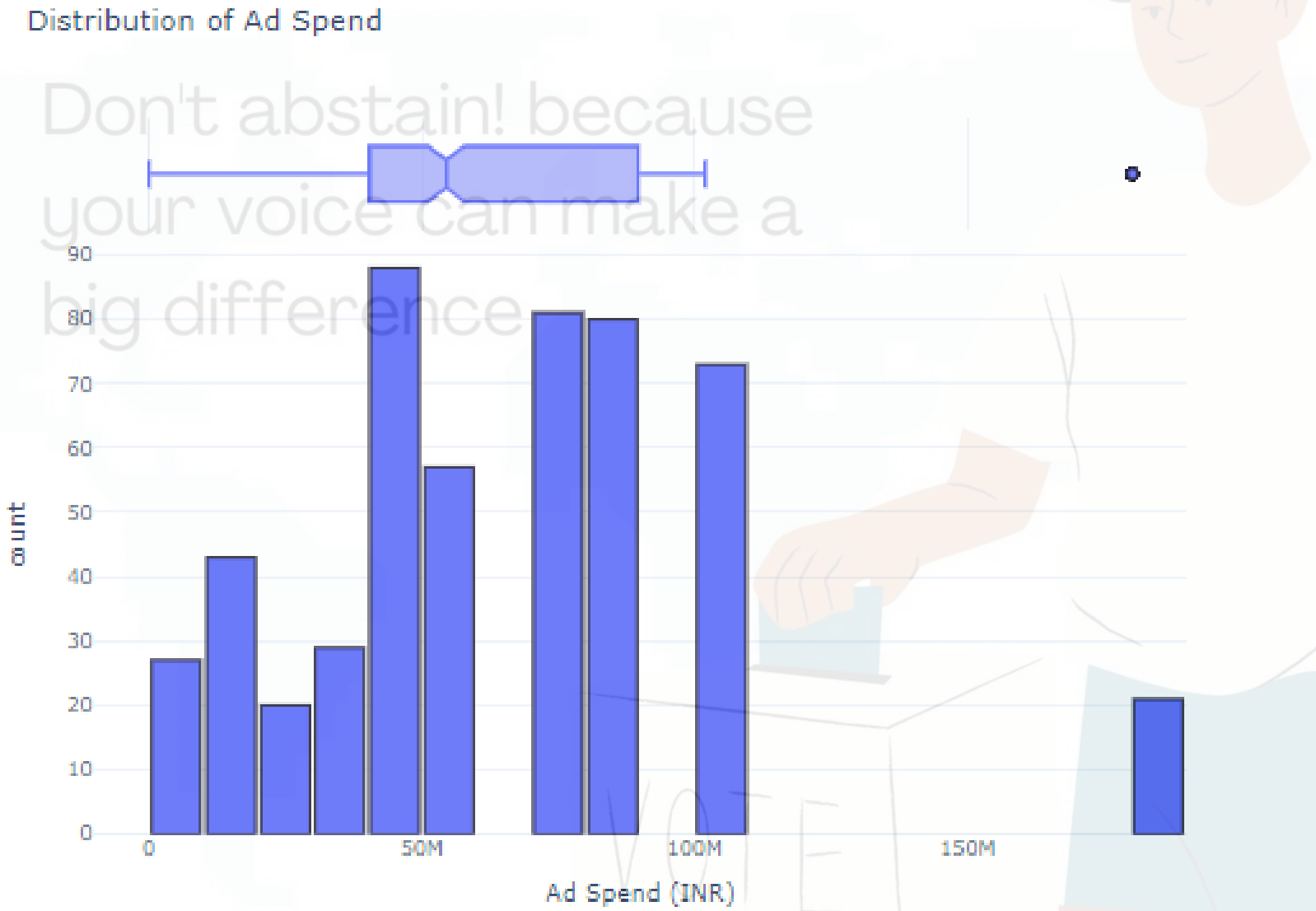


Now, let's have a look at the relationship between ad spend and voter turnout by parliamentary constituency:

```
merged_constituency_data = results.merge(
    locations,
    left_on='State',
    right_on='Location name',
    how='left'
)

fig = px.scatter(merged_constituency_data, x='Amount spent (INR)', y='Polled (%)',
                 color='State',
                 labels={'Amount spent (INR)': 'Ad Spend (INR)', 'Polled (%)': 'Voter Turnout (%)'},
                 title='Ad Spend and Voter Turnout by Parliamentary Constituency')

fig.update_layout(width=800, height=600)

fig.show()
```

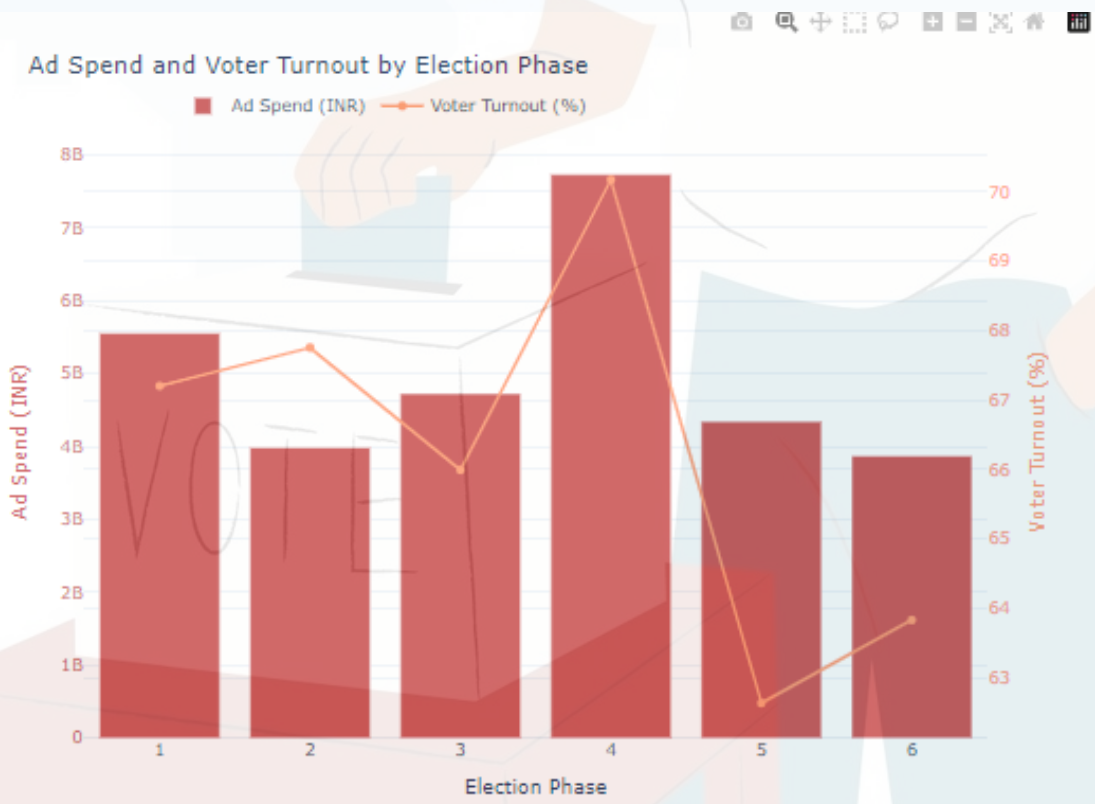
Now, let's have a look at the distribution of ad spending:

```
fig = px.histogram(merged_data, x='Amount spent (INR)', nbins=30, marginal='box',
                   labels={'Amount spent (INR)': 'Ad Spend (INR)'},
                   title='Distribution of Ad Spend')

fig.update_traces(marker=dict(line=dict(color='black', width=1)))
fig.update_layout(bargap=0.1, width=800, height=600)

fig.show()
```



Now, let's analyze ad spending and voter turnout by election phase:

```
import plotly.graph_objects as go

phase_analysis = merged_data.groupby('Phase').agg({
    'Amount spent (INR)': 'sum',
    'Polled (%)': 'mean'
}).reset_index()

fig = go.Figure()

fig.add_trace(go.Bar(
    x=phase_analysis['Phase'],
    y=phase_analysis['Amount spent (INR)'],
    name='Ad Spend (INR)',
    marker_color='indianred',
    yaxis='y1'
))

fig.add_trace(go.Scatter(
    x=phase_analysis['Phase'],
    y=phase_analysis['Polled (%)'],
    name='Voter Turnout (%)',
    marker_color='lightsalmon',
    yaxis='y2'
))

fig.update_layout(
    title='Ad Spend and Voter Turnout by Election Phase',
    xaxis=dict(title='Election Phase'),
    yaxis=dict(
        title='Ad Spend (INR)',
        titlefont=dict(color='indianred'),
        tickfont=dict(color='indianred')
    ),
    yaxis2=dict(
        title='Voter Turnout (%)',
        titlefont=dict(color='lightsalmon'),
        tickfont=dict(color='lightsalmon'),
        overlaying='y',
        side='right'
    ),
    legend=dict(x=0.1, y=1.1, orientation='h'),
    width=800,
    height=600
)

fig.show()
```



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THANK YOU