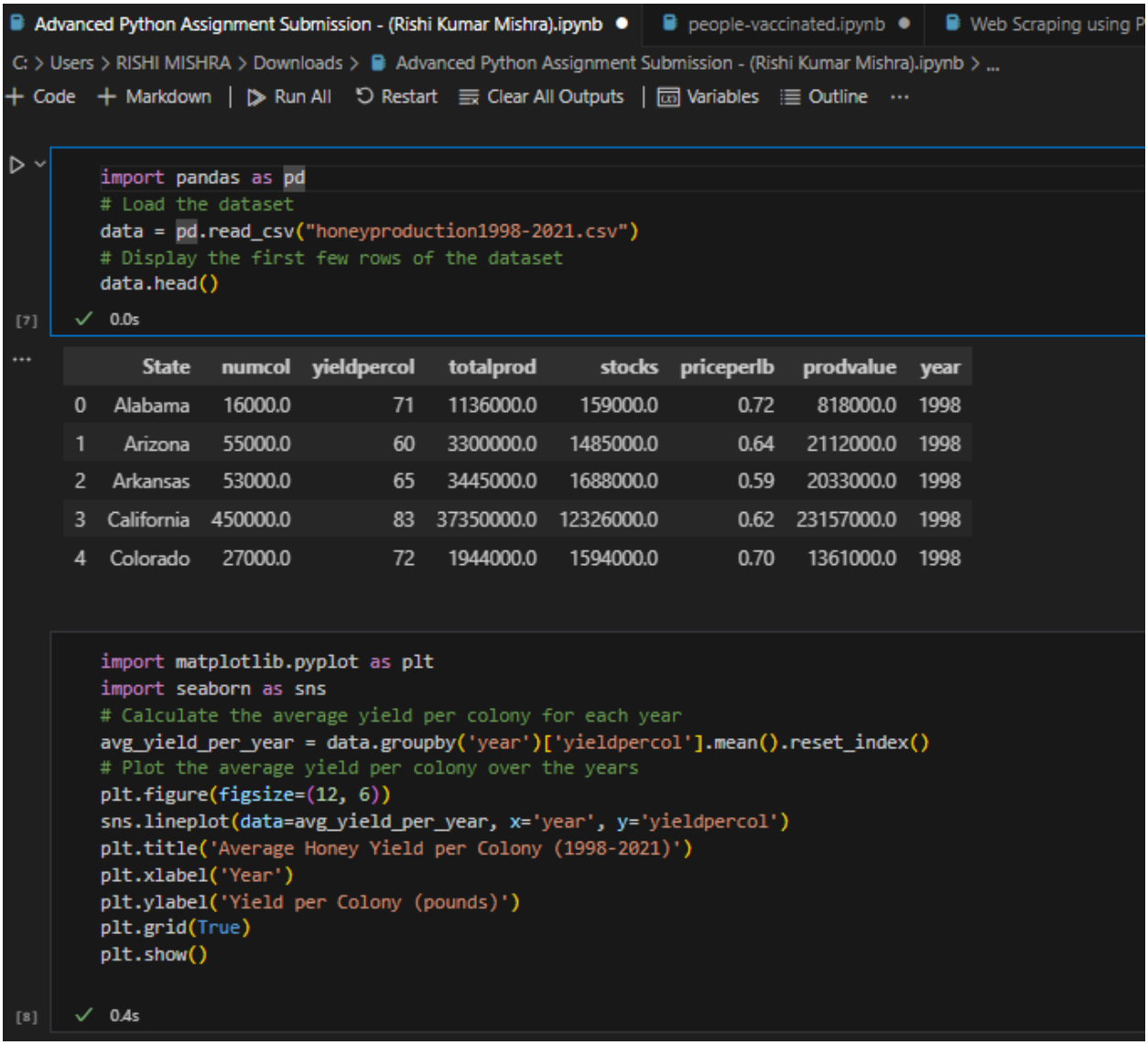
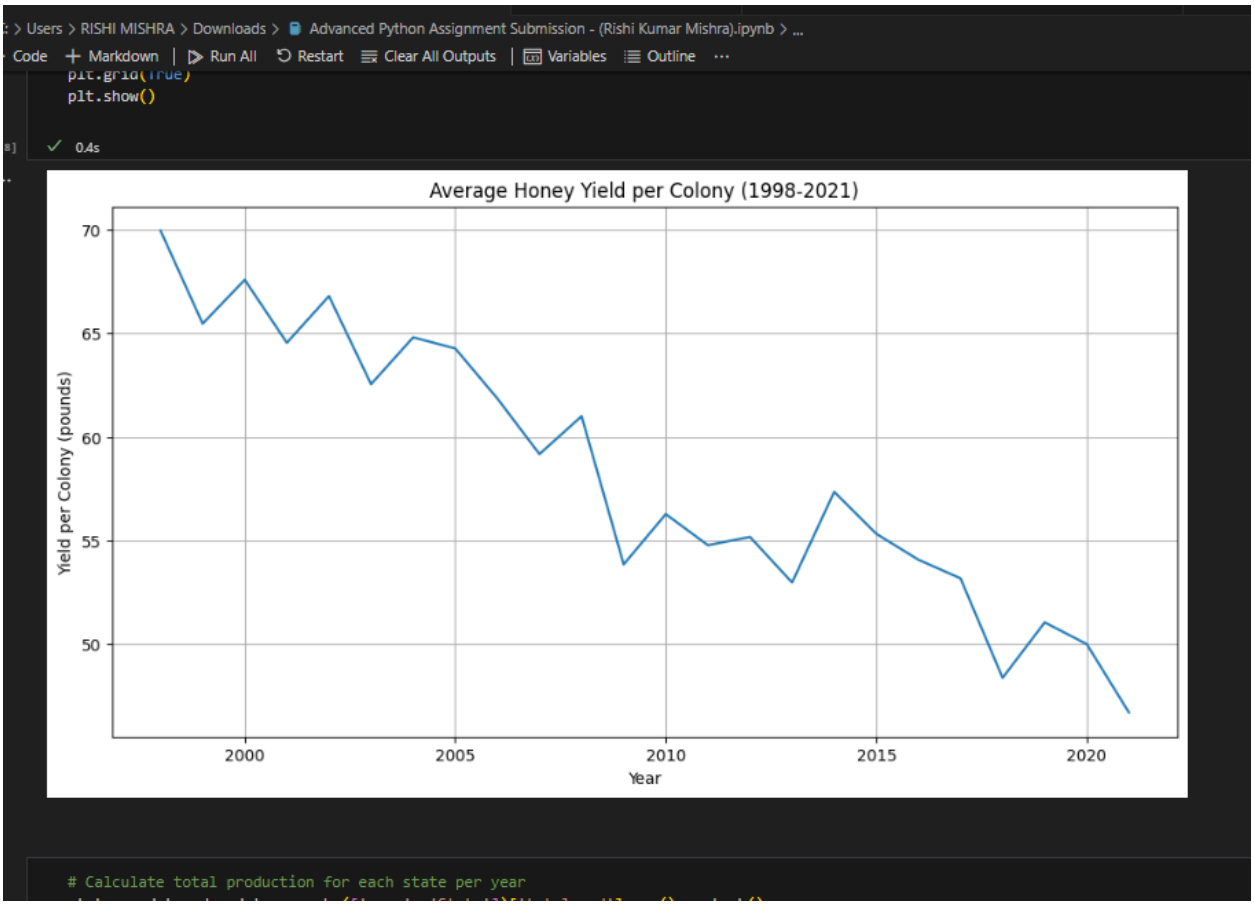
Advanced Python Assignment Submission - (Rishi Kumar Mishra)

EMAIL rishimishra089@gmail.com
Data Science With Python Carrer Program
Mob 9993955483

Q1) How has honey production yield changed from 1998 to 2021?

Honey Yield Change : From the line plot of average honey yield per colony, we can observe the fluctuations over the years. It provides insights into how yield per colony has varied, possibly reflecting environmental or industry changes.



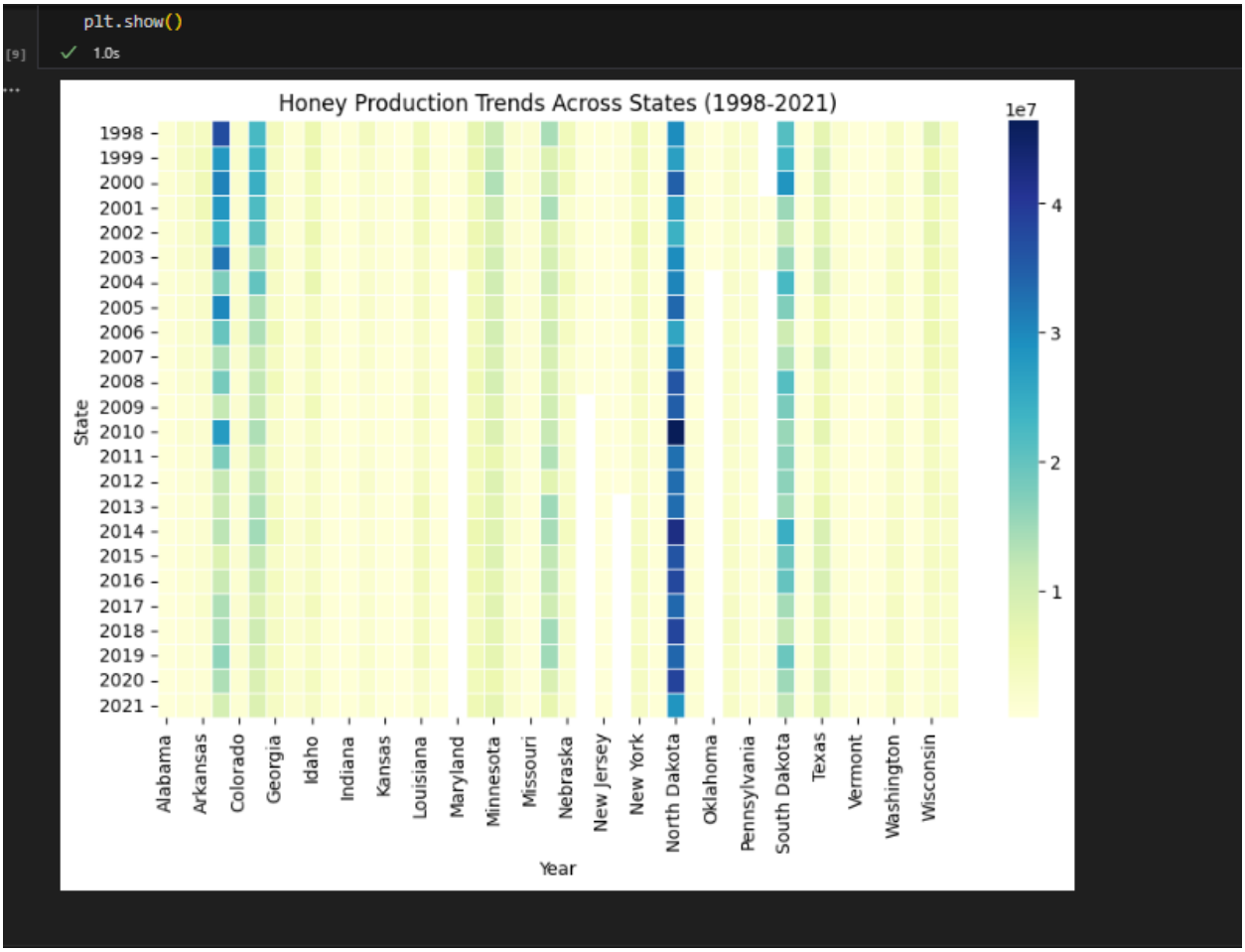


Q2) Over time, what are the major production trends across the states?

Production Trends Across States : The heatmap shows the states with higher and lower production, indicating regional trends and shifts in production.

```
# Calculate total production for each state per year
state_prod_trend = data.groupby(['year', 'State'])['totalprod'].sum().unstack()
# Plot heatmap
plt.figure(figsize=(10, 6))
sns.heatmap(state_prod_trend, cmap='YlGnBu', linewidths=.5)
plt.title('Honey Production Trends Across States (1998-2021)')
plt.xlabel('Year')
plt.ylabel('State')
plt.show()
```

1.0s

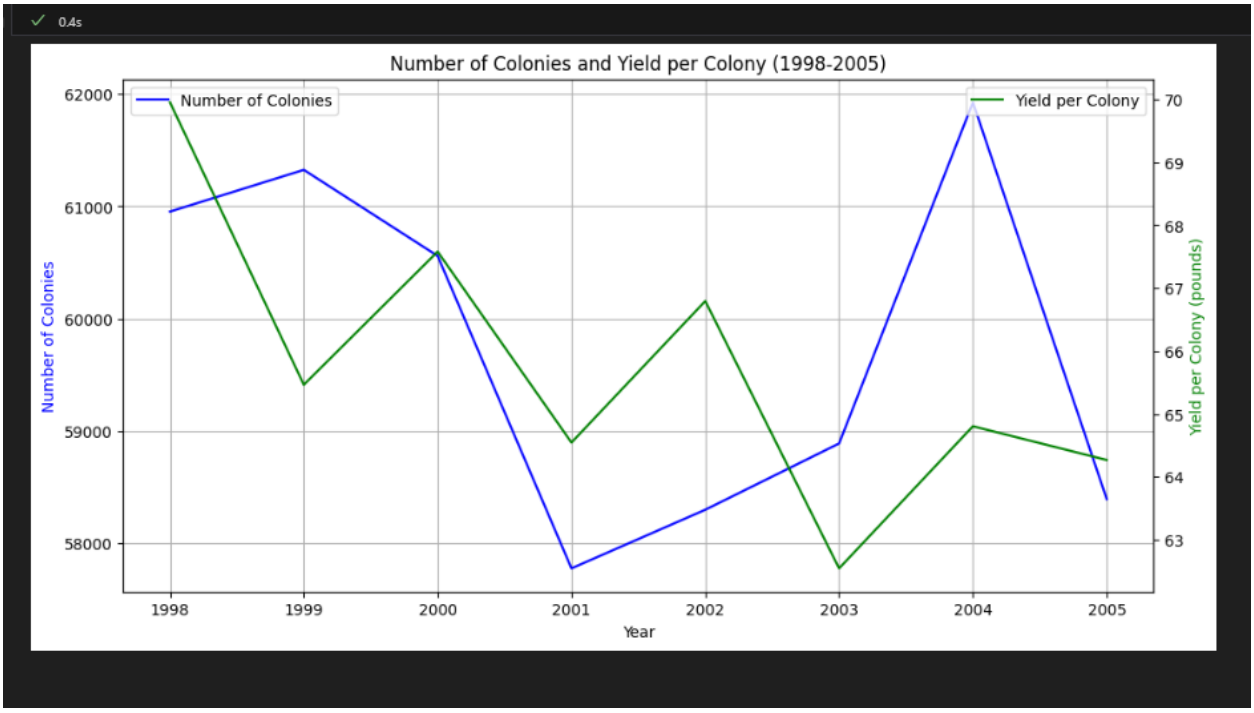


Q3) Does the data show any trends in terms of the number of honey-producing colonies and yield per colony before 2006, which was when concern over Colony Collapse Disorder spread nationwide?

Pre-2006 Trends : The dual-axis plot helps us compare the number of colonies and yield per colony before the widespread concern over Colony Collapse Disorder, highlighting any significant changes or stability in the period leading up to 2006.

```python
# Filter data before 2006
data_before_2006 = data[data['year'] < 2006]

# Calculate the average number of colonies and yield per colony before 2006
avg_colonies_yield_pre2006 = data_before_2006.groupby('year')[['numcol', 'yieldpercol']].mean().reset_index()

# Plot the trends
fig, ax1 = plt.subplots(figsize=(12, 6))

ax2 = ax1.twinx()
sns.lineplot(data=avg_colonies_yield_pre2006, x='year', y='numcol', ax=ax1, color='b', label='Number of Colonies')
sns.lineplot(data=avg_colonies_yield_pre2006, x='year', y='yieldpercol', ax=ax2, color='g', label='Yield per Colony')

ax1.set_xlabel('Year')
ax1.set_ylabel('Number of Colonies', color='b')
ax2.set_ylabel('Yield per Colony (pounds)', color='g')
plt.title('Number of Colonies and Yield per Colony (1998-2005)')
ax1.grid(True)
ax2.grid(False)
plt.show()
```

✓ 0.4s

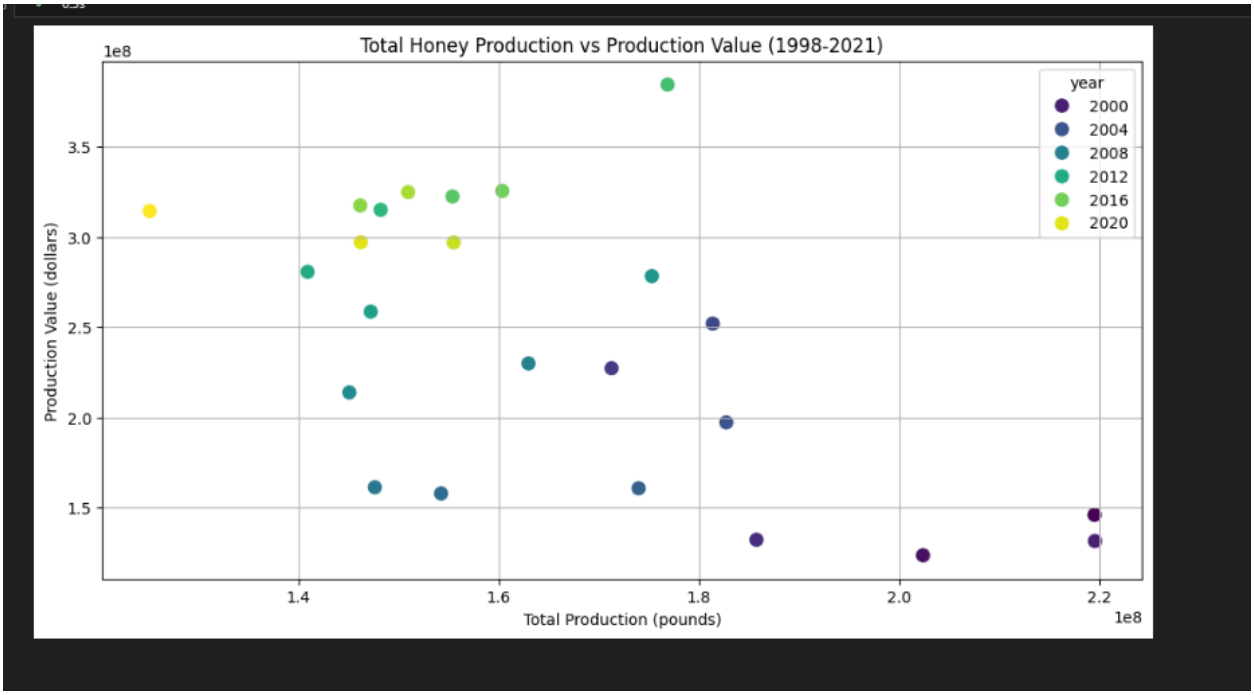


Q4) Are there any patterns that can be observed between total honey production and the value of production every year?

Total Production vs. Value : The scatter plot allows us to see if there is a direct correlation between the total amount of honey produced and its market value each year.

```python
# Calculate total production and production value for each year
total_prod_value_per_year = data.groupby('year')[['totalprod', 'prodvalue']].sum().reset_index()

# Plot total production vs production value
plt.figure(figsize=(12, 6))
sns.scatterplot(data=total_prod_value_per_year, x='totalprod', y='prodvalue', hue='year', palette='viridis', s=100)
plt.title('Total Honey Production vs Production Value (1998-2021)')
plt.xlabel('Total Production (pounds)')
plt.ylabel('Production Value (dollars)')
plt.grid(True)
plt.show()
```

✓ 0.3s

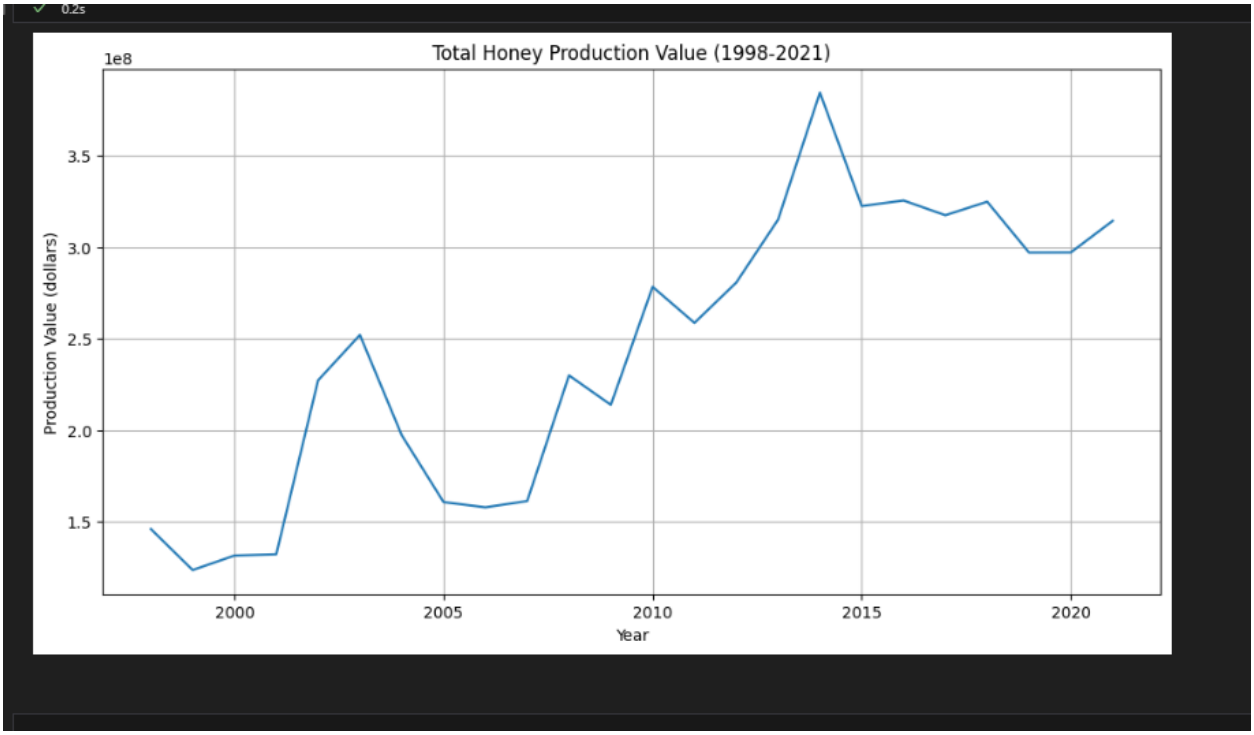


Q5) How has the value of production, which in some sense could be tied to demand, changed every year?

Production Value Trend : The line plot of production value over the years shows how the market value of honey production has changed, indicating possible changes in demand and pricing strategies.

```python
# Plot the production value over the years
plt.figure(figsize=(12, 6))
sns.lineplot(data=total_prod_value_per_year, x='year', y='prodvalue')
plt.title('Total Honey Production Value (1998-2021)')
plt.xlabel('Year')
plt.ylabel('Production Value (dollars)')
plt.grid(True)
plt.show()
```

✓ 0.2s



Q6) Construct the related plots using Seaborn and Matplot apply customization and derive insights from the visualization.

All the relevant plot for visualization has been plotted according to the question asked and related to that I have uploaded in jupyter notebook file and has attached the screenshot of input And output accordingly.