In [51]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import ElasticNet
from sklearn.linear_model import BayesianRidge
from sklearn.metrics import r2_score as r2
from sklearn.ensemble import RandomForestRegressor
```

In [28]:

```
df=pd.read_excel(r'C:\Users\Shubham\Desktop\DS-assignment\DS - Assignment Part 1 data set.xlsx')
```

In [29]:

```
df.head()
```

Out[29]:

	Transaction date	House Age	Distance from nearest Metro station (km)	Number of convenience stores	latitude	longitude	Number of bedrooms	House size (sqft)	House price of unit area
0	2012.916667	32.0	84.87882	10	24.98298	121.54024	1	575	37.9
1	2012.916667	19.5	306.59470	9	24.98034	121.53951	2	1240	42.2
2	2013.583333	13.3	561.98450	5	24.98746	121.54391	3	1060	47.3
3	2013.500000	13.3	561.98450	5	24.98746	121.54391	2	875	54.8
4	2012.833333	5.0	390.56840	5	24.97937	121.54245	1	491	43.1

In [30]:

```
df.describe()
```

Out[30]:

	Transaction date	House Age	Distance from nearest Metro station (km)	Number of convenience stores	latitude	longitude	Number of bedrooms	House size (sqft)	House price of unit area
count	414.000000	414.000000	414.000000	414.000000	414.000000	414.000000	414.000000	414.000000	414.000000
mean	2013.148953	17.712560	1083.885689	4.094203	24.969030	121.533361	1.987923	931.475845	37.980193
std	0.281995	11.392485	1262.109595	2.945562	0.012410	0.015347	0.818875	348.910269	13.606488
min	2012.666667	0.000000	23.382840	0.000000	24.932070	121.473530	1.000000	402.000000	7.600000
25%	2012.916667	9.025000	289.324800	1.000000	24.963000	121.528085	1.000000	548.000000	27.700000
50%	2013.166667	16.100000	492.231300	4.000000	24.971100	121.538630	2.000000	975.000000	38.450000
75%	2013.416667	28.150000	1454.279000	6.000000	24.977455	121.543305	3.000000	1234.750000	46.600000
max	2013.583333	43.800000	6488.021000	10.000000	25.014590	121.566270	3.000000	1500.000000	117.500000

In [31]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 414 entries, 0 to 413
Data columns (total 9 columns):
 #   Column                                  Non-Null Count  Dtype  
---  ------                                  --------------  -----  
 0   Transaction date                        414 non-null    float64
 1   House Age                               414 non-null    float64
 2   Distance from nearest Metro station (km) 414 non-null    float64
 3   Number of convenience stores            414 non-null    int64  
 4   latitude                                414 non-null    float64
 5   longitude                               414 non-null    float64
 6   Number of bedrooms                      414 non-null    int64  
 7   House size (sqft)                       414 non-null    int64  
 8   House price of unit area                414 non-null    float64
dtypes: float64(6), int64(3)
memory usage: 29.2 KB
```

In [33]:

```
df.drop(columns='Transaction date',inplace=True)
```

In [34]:

```
# showing correlation between 'House price of unit area' with other columns
corr= df.corr()
print(corr['House price of unit area'].sort_values(ascending=False))
```

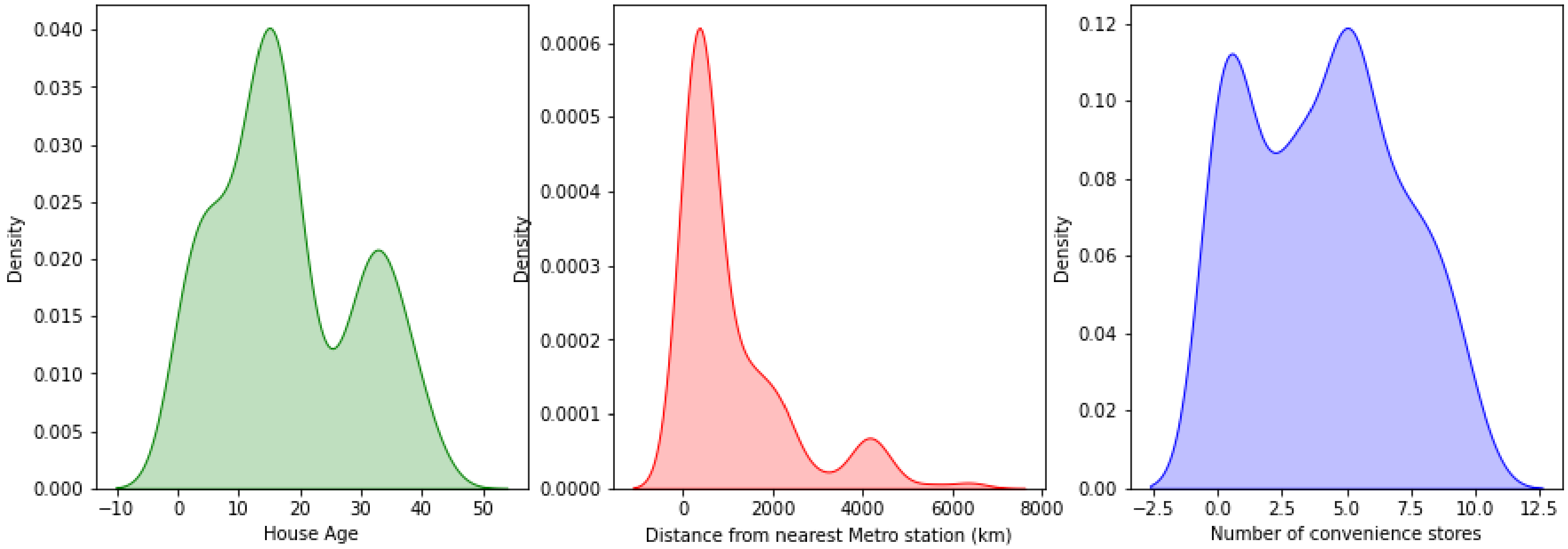
```
House price of unit area                      1.000000
Number of convenience stores                  0.571005
latitude                                      0.546307
longitude                                     0.523287
Number of bedrooms                            0.050265
House size (sqft)                             0.046489
House Age                                    -0.210567
Distance from nearest Metro station (km)     -0.673613
Name: House price of unit area, dtype: float64
```

In [55]:

```
# Checking the distribution

%matplotlib inline

plt.figure(figsize = (20,5))

plt.subplot(1,4,1)
sns.kdeplot(df['House Age'], shade = True, color = "g")

plt.subplot(1,4,2)
sns.kdeplot(df["Distance from nearest Metro station (km)"], shade = True, color = "r")

plt.subplot(1,4,3)
sns.kdeplot(df['Number of convenience stores'], shade = True, color = "b")
```

Out[55]:

```
<AxesSubplot:xlabel='Number of convenience stores', ylabel='Density'>
```

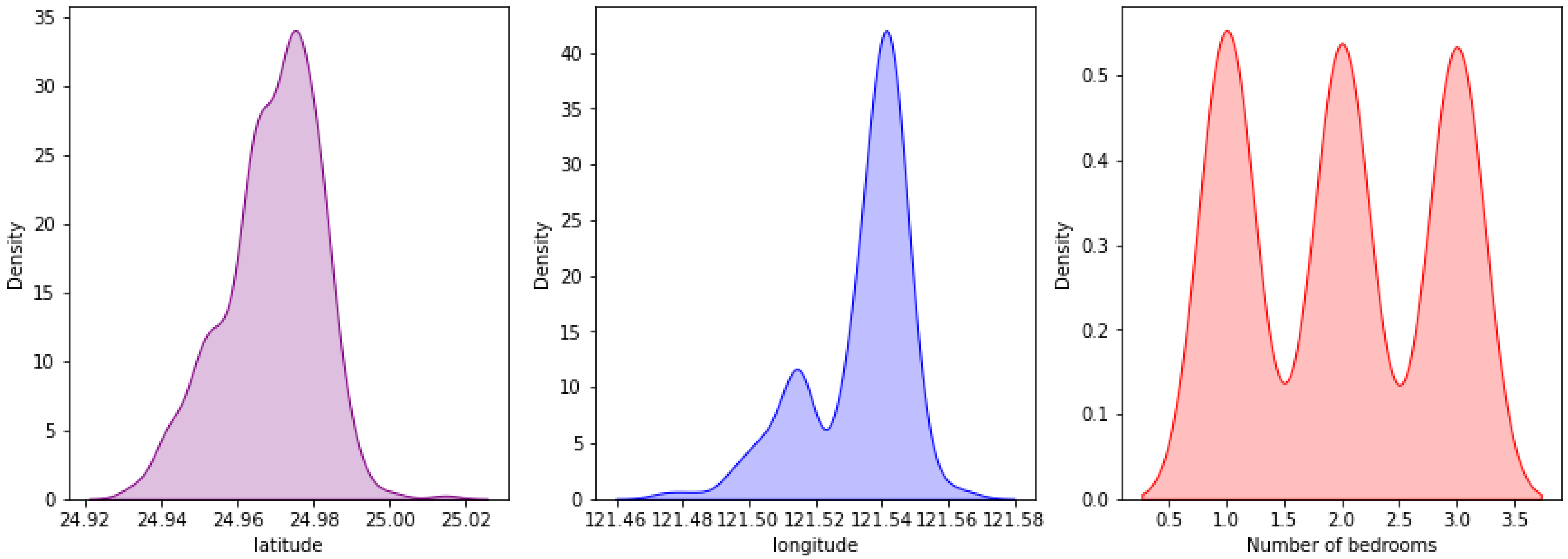


In [44]:

```
plt.figure(figsize = (20,5))

plt.subplot(1,4,1)
sns.kdeplot(df.latitude, shade = True, color = "purple")

plt.subplot(1,4,2)
sns.kdeplot(df.longitude, shade = True, color = "b")

plt.subplot(1,4,3)
sns.kdeplot(df['Number of bedrooms'], shade = True, color = "r")
```

Out[44]:

```
<AxesSubplot:xlabel='Number of bedrooms', ylabel='Density'>
```

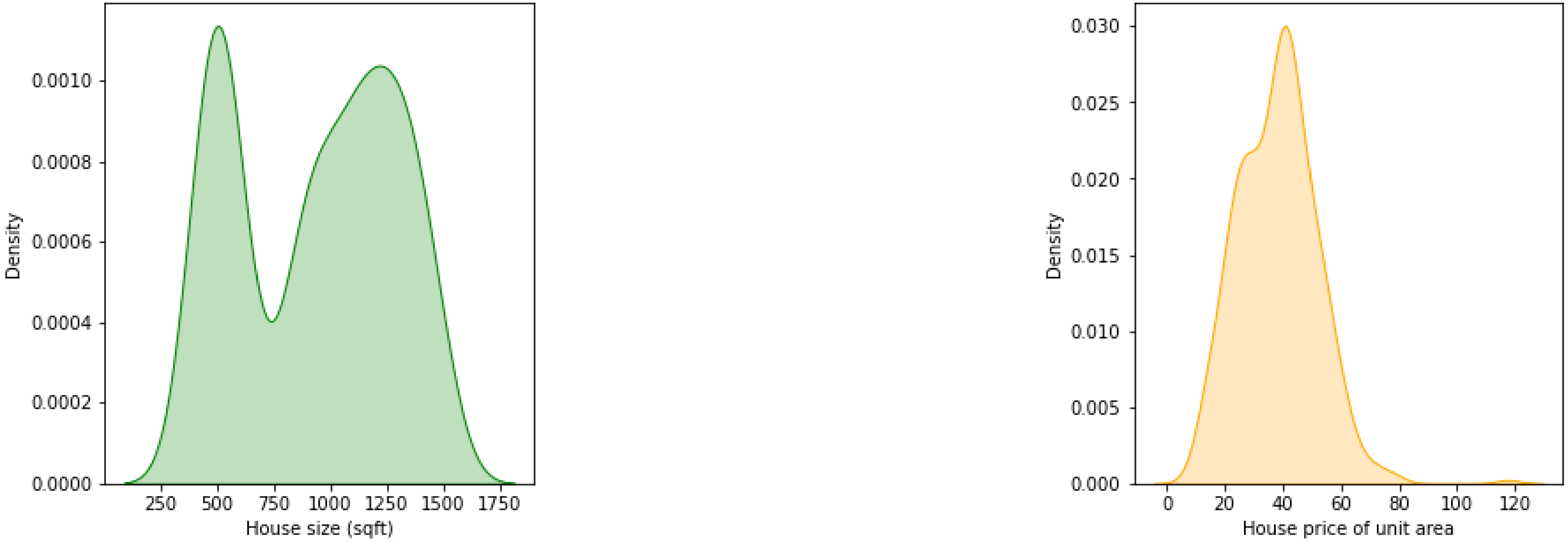


In [47]:

```
plt.figure(figsize = (20,5))

plt.subplot(1,4,1)
sns.kdeplot(df['House size (sqft)'], shade = True, color = "g")

plt.subplot(1,4,3)
sns.kdeplot(df['House price of unit area'], shade = True, color = "orange")
```

Out[47]:

```
<AxesSubplot:xlabel='House price of unit area', ylabel='Density'>
```



In [48]:

```
# Dividing data into test and train

from sklearn.model_selection import train_test_split

X_var = df[['House Age', 'Distance from nearest Metro station (km)', 'Number of convenience stores', 'latitude','longitude','Numl
y_var = df['House price of unit area'].values

X_train, X_test, y_train, y_test = train_test_split(X_var, y_var, test_size = 0.2, random_state = 100)
```

Checking different models for prediction

In [53]:

```
lr = LinearRegression()
lr.fit(X_train, y_train)
lr_yhat = lr.predict(X_test)



bs = BayesianRidge()
bs.fit(X_train, y_train)
bs_yhat = bs.predict(X_test)
```

```

en = ElasticNet(alpha = 0.01)
en.fit(X_train, y_train)
en_yhat = en.predict(X_test)


RFR = RandomForestRegressor(n_estimators=50)
RFR.fit(X_train, y_train)
RFR_yhat = RFR.predict(X_test)
```

In [54]:

```
# Finding Scores

print('Score of linear regression model is:',(r2(y_test, lr_yhat)))

print('Score of bayesian ridge model is:',(r2(y_test, bs_yhat)))

print('Score of elastic net model is:',(r2(y_test, en_yhat)))

print('Score of random fores regressor model is:',(r2(y_test, RFR_yhat)))
```

```
Score of linear regression model is: 0.6706304461257995
Score of bayesian ridge model is: 0.639153931657249
Score of elastic net model is: 0.6466951999153748
Score of random fores regressor model is: 0.8370383173986403
```

In [19]:

```
# Best model is Random Forest
```