In [1]:
```
print("hello world")
```

```
hello world
```

In [2]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [3]:
```
df = pd.read_csv('Ecommerce Customers.csv')
```

In [5]:
```
df.head ()
```

Out[5]:

	Email	Address	Avatar	Avg Session Length
0	mstephenson@fernandez.com	835 Frank Tunnel\nWrightmouth, MI 82180-9605	Violet	34.497268
1	hduke@hotmail.com	4547 Archer Common\nDiazchester, CA 06566-8576	DarkGreen	31.926272
2	pallen@yahoo.com	24645 Valerie Unions Suite 582\nCobbborough, D...	Bisque	33.000915
3	riverarebecca@gmail.com	1414 David Throughway\nPort Jason, OH 22070-1220	SaddleBrown	34.305557
4	mstephens@davidson-herman.com	14023 Rodriguez Passage\nPort Jacobville, PR 3...	MediumAquaMarine	33.330673

In [7]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 500 entries, 0 to 499
Data columns (total 8 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Email                 500 non-null    object 
 1   Address               500 non-null    object 
 2   Avatar                500 non-null    object 
 3   Avg. Session Length   500 non-null    float64
 4   Time on App           500 non-null    float64
 5   Time on Website       500 non-null    float64
 6   Length of Membership  500 non-null    float64
 7   Yearly Amount Spent   500 non-null    float64
dtypes: float64(5), object(3)
memory usage: 31.4+ KB
```

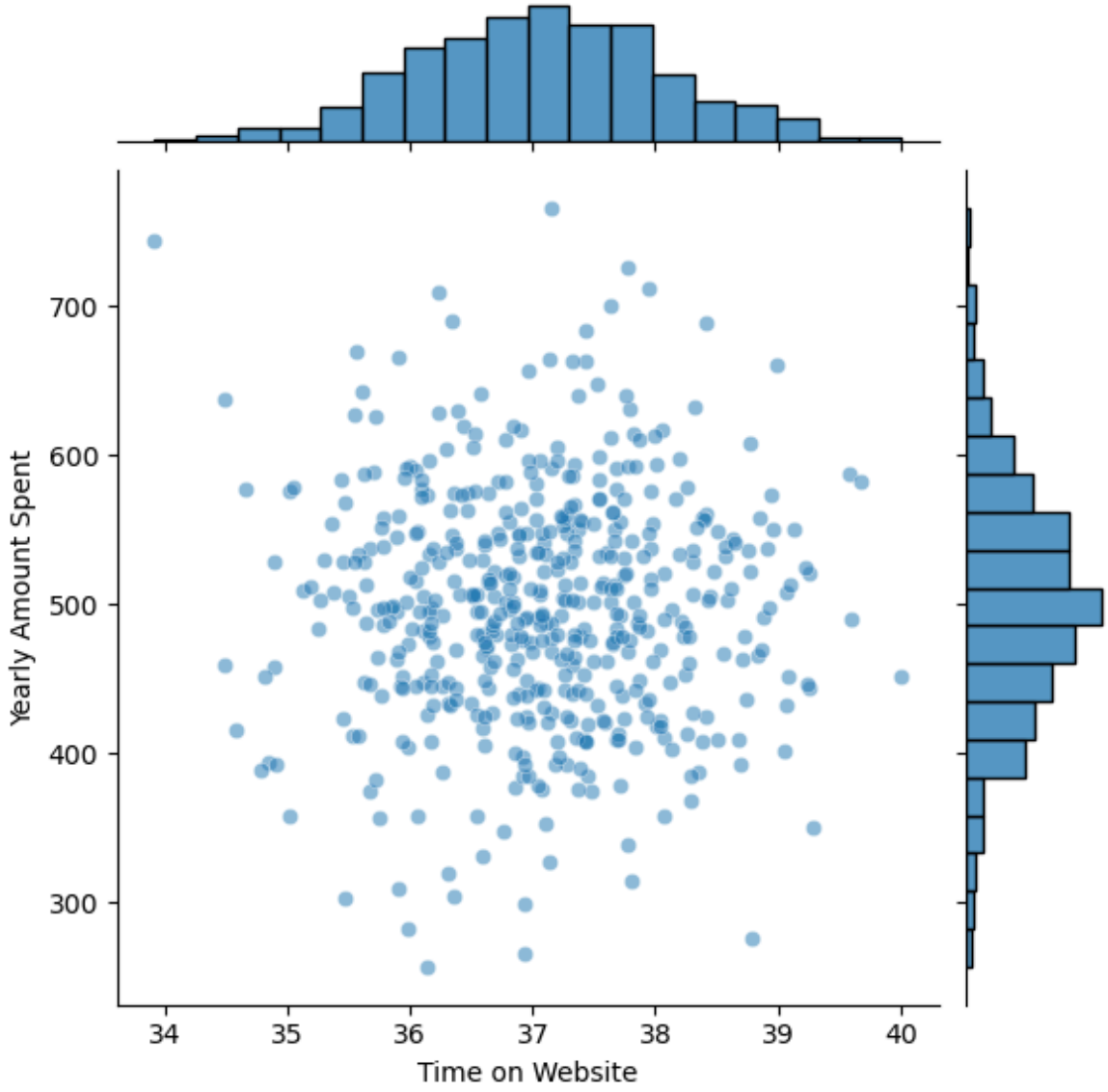
In [8]:
```
df.describe()
```

Out[8]:

	Avg. Session Length	Time on App	Time on Website	Length of Membership	Yearly Amount Spent
count	500.000000	500.000000	500.000000	500.000000	500.000000
mean	33.053194	12.052488	37.060445	3.533462	499.314038
std	0.992563	0.994216	1.010489	0.999278	79.314782
min	29.532429	8.508152	33.913847	0.269901	256.670582
25%	32.341822	11.388153	36.349257	2.930450	445.038277
50%	33.082008	11.983231	37.069367	3.533975	498.887875
75%	33.711985	12.753850	37.716432	4.126502	549.313828
max	36.139662	15.126994	40.005182	6.922689	765.518462

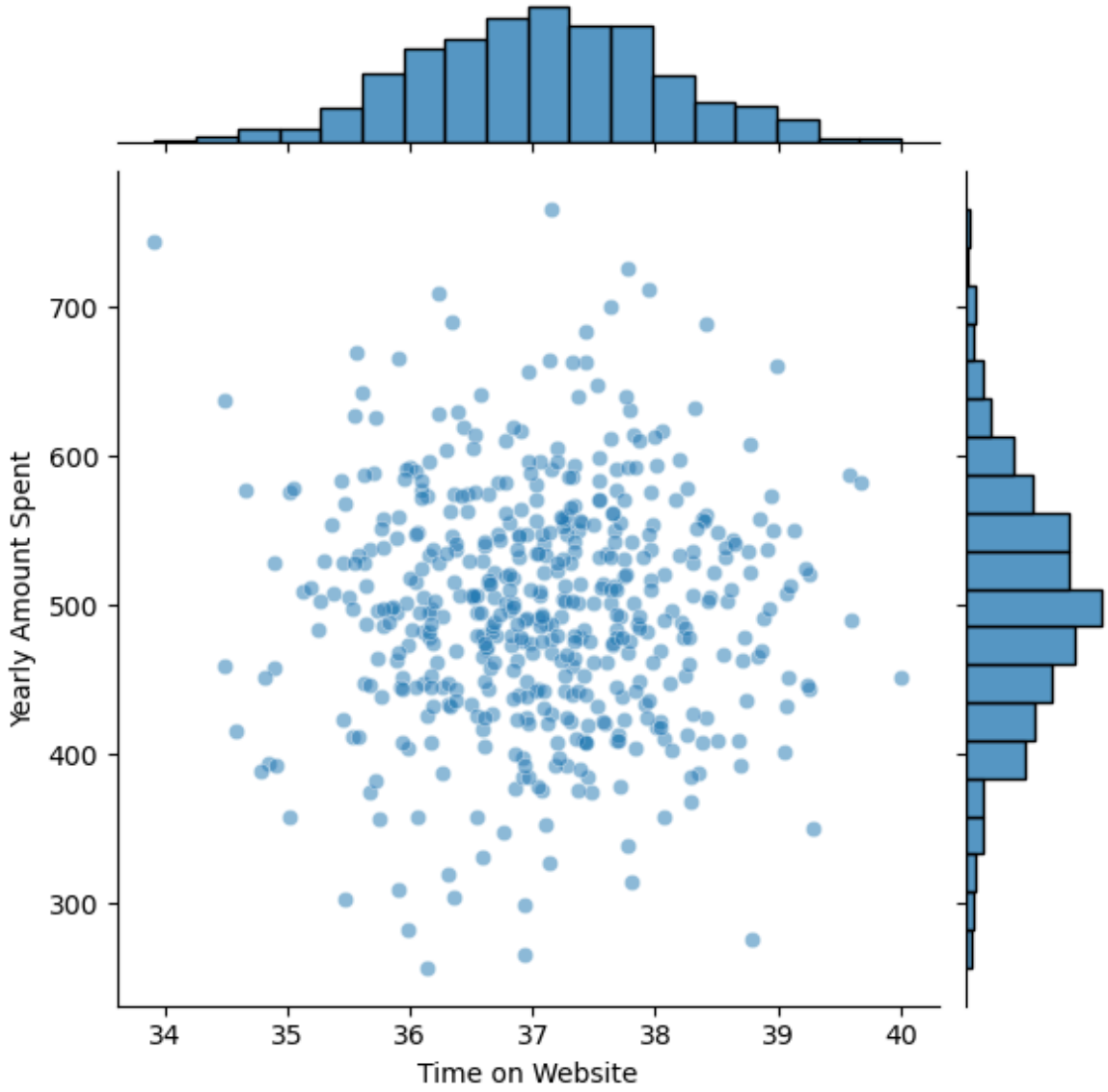
In [10]:
```
sns.jointplot(x = "Time on Website", y = "Yearly Amount Spent", data = df
```

Out[10]:
```
<seaborn.axisgrid.JointGrid at 0x15cf77230>
```



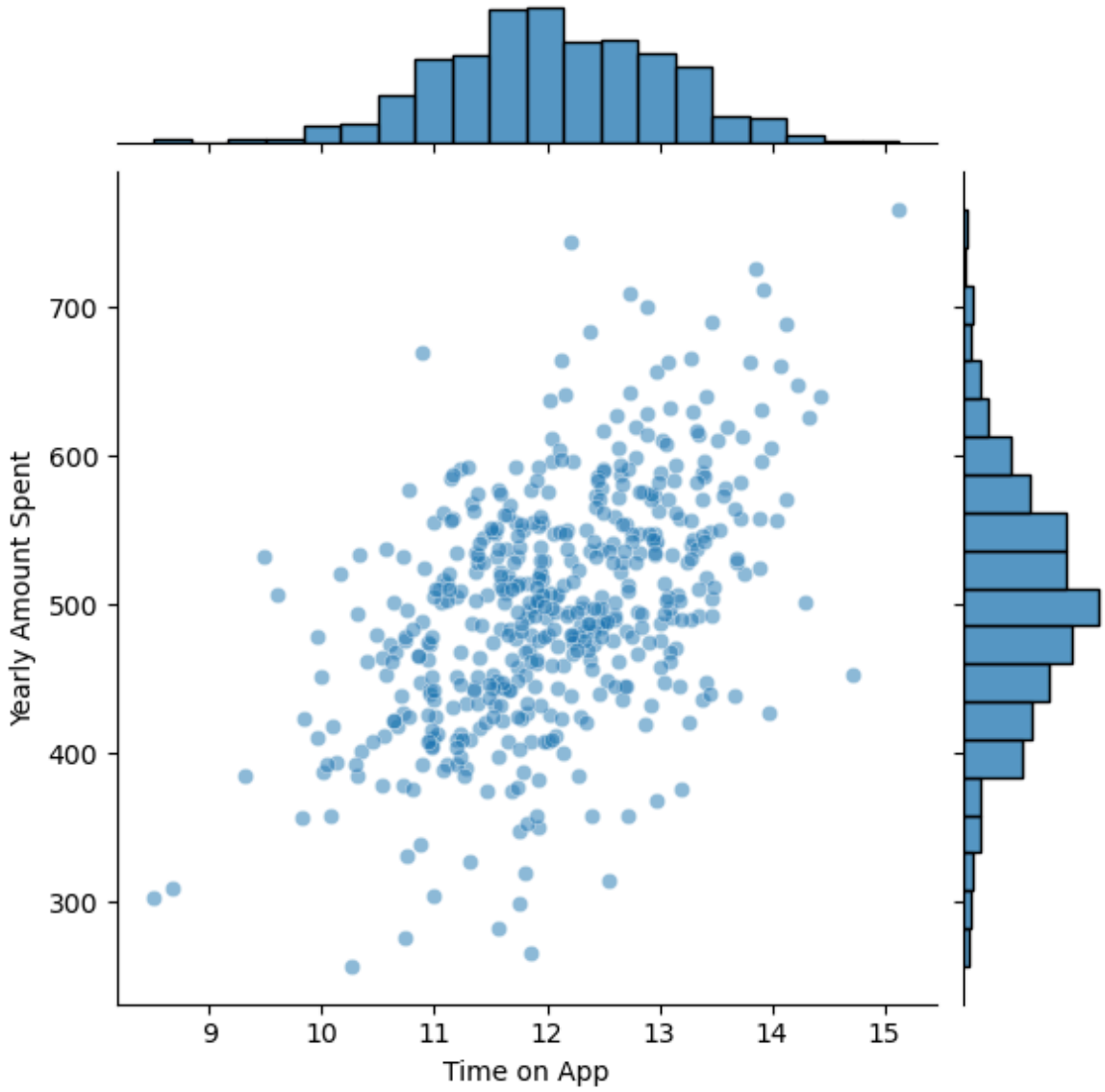
In [10]:
```
sns.jointplot(x = "Time on Website", y = "Yearly Amount Spent", data = df
```

Out[10]: <seaborn.axisgrid.JointGrid at 0x15cf77230>



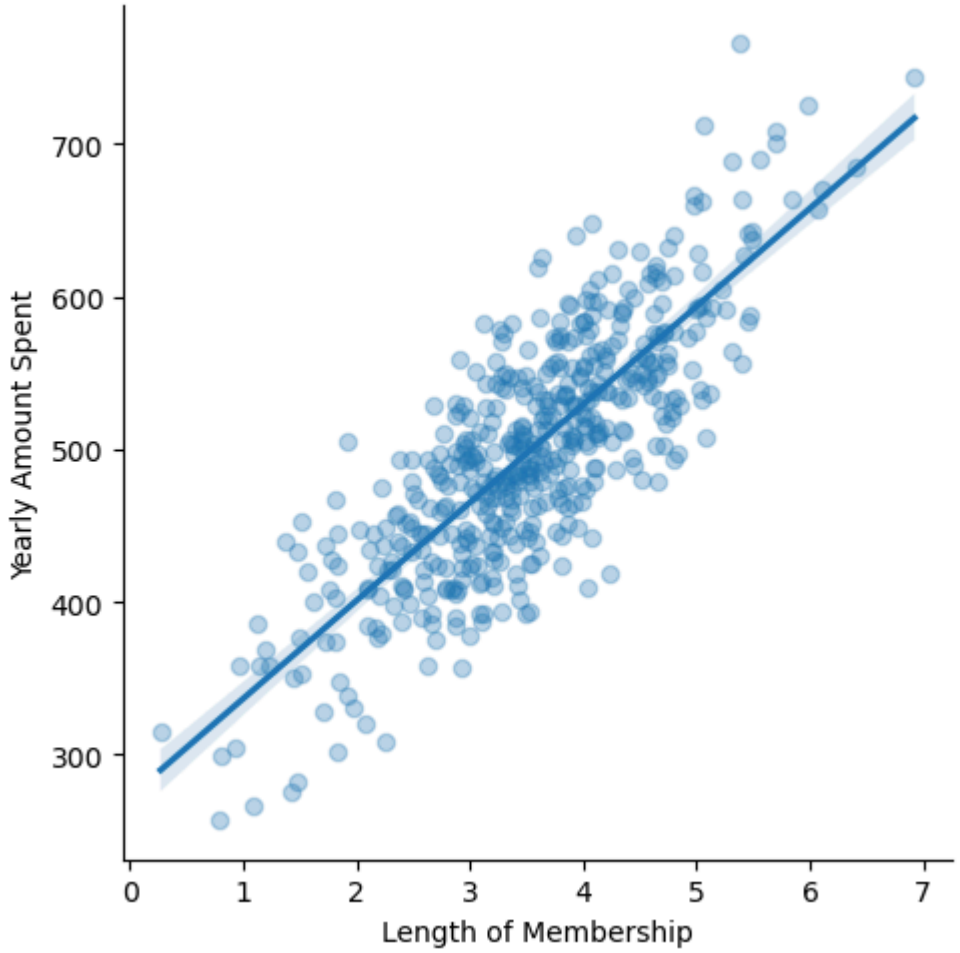
In [11]:
```
sns.jointplot(x = "Time on App", y = "Yearly Amount Spent", data = df, al
```

Out[11]: <seaborn.axisgrid.JointGrid at 0x160ac7110>



In [15]:
```
sns.lmplot(x = 'Length of Membership',
           y = 'Yearly Amount Spent',
           data = df,
           scatter_kws = {'alpha':0.3})
```

Out[15]: <seaborn.axisgrid.FacetGrid at 0x160c706b0>



In [16]:
```
from sklearn.model_selection import train_test_split
```

In [17]:
```
x = df[['Time on Website','Time on App', 'Length of Membership', 'Avg. Se
y = df['Yearly Amount Spent']
```

In [18]:
```
x_train, x_test, y_train, y_test = train_test_split(x,y,test_size = 0.3,r
```

In [22]:
```
from sklearn.linear_model import LinearRegression
```

In [23]:
```
lm = LinearRegression()
```

In [24]:
```
lm.fit(x_train, y_train)
```

Out[24]:
```
LinearRegression()
```

In [25]:
```
lm.coef_
```

Out[25]:
```
array([ 0.45914788, 38.59713548, 61.67473243, 25.72425621])
```

In [29]:
```
cdf = pd.DataFrame(lm.coef_, x.columns, columns=['Coef'])
print(cdf)
```

```
                             Coef
Time on Website          0.459148
Time on App             38.597135
Length of Membership    61.674732
Avg. Session Length     25.724256
```

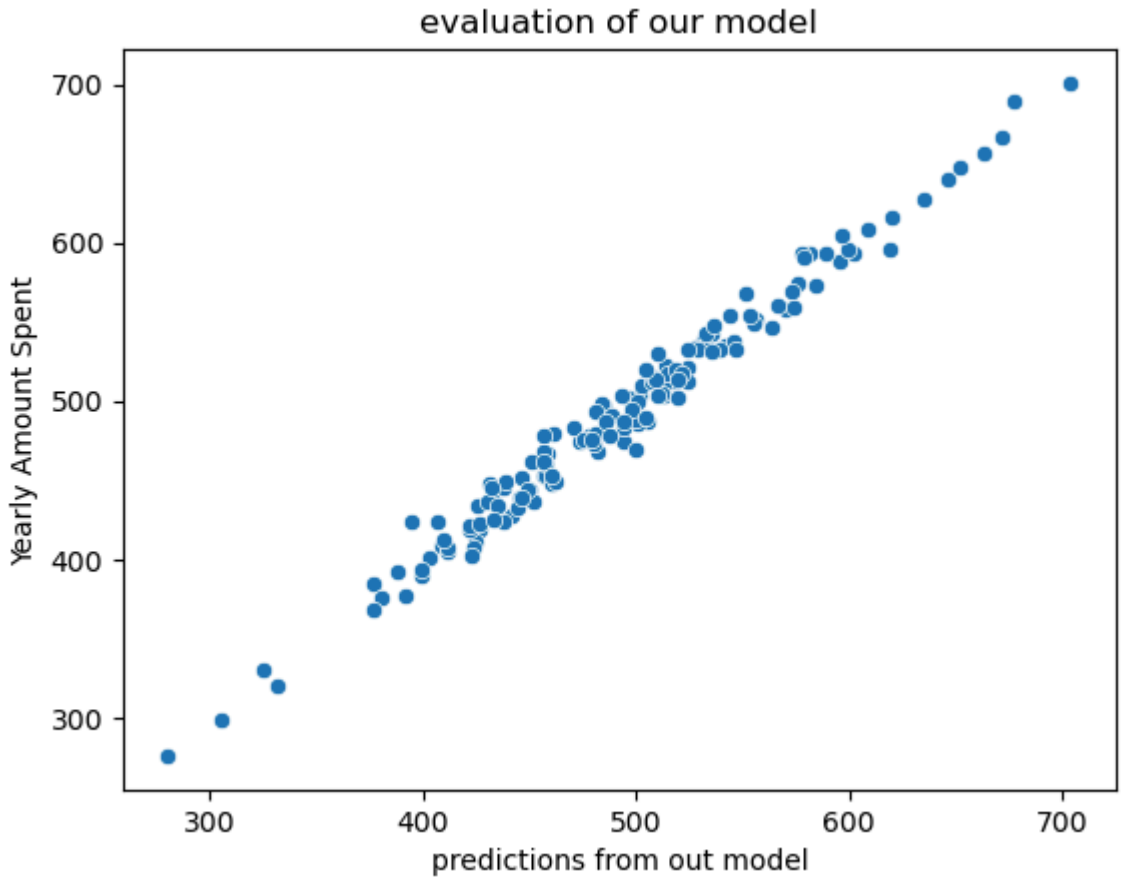
In [30]:
```
predictions = lm.predict(x_test)
```

In [31]:
```
predictions
```

Out[31]:
```
array([403.66993069, 542.57756289, 427.06591658, 502.02460425,
       410.12143559, 569.93442508, 531.93431341, 506.29650969,
       408.71870658, 473.97737105, 441.46912726, 425.33703059,
       425.1297229 , 527.61676714, 431.45684016, 424.0769184 ,
       575.76543296, 484.89856554, 458.35936863, 481.96502182,
       502.32441491, 513.63783554, 507.58877002, 646.57464283,
       450.24372141, 496.27043415, 556.40457807, 554.95630839,
       399.64237199, 325.84623136, 532.89783259, 478.12238702,
       501.05701845, 305.97335848, 505.77244448, 483.79591969,
       518.8331528 , 438.18241857, 456.71094234, 471.04609461,
       494.44008972, 445.31155755, 508.78802753, 501.04594193,
       488.83499673, 535.38079541, 595.20129802, 514.04714872,
       280.76758312, 433.10112367, 421.70823427, 481.23640152,
       584.71372272, 608.7748096 , 563.98513427, 494.72804869,
       394.52133407, 456.4197529 , 573.08767515, 499.6984241 ,
       512.83277025, 392.12434043, 480.05057697, 481.54520299,
       475.1117359 , 546.2717533 , 430.85039085, 602.16082001,
       422.3695128 , 493.57280186, 528.74970313, 581.49002635,
       620.19139276, 512.56880298, 411.76623862, 498.47637494,
       461.51337557, 446.41371051, 448.07229961, 535.44710412,
       599.45225302, 619.33717662, 494.15919062, 671.99976398,
       532.46469814, 438.90606319, 515.04975242, 546.7821954 ,
       331.94282076, 510.51987447, 536.57891032, 500.19533618,
       376.92345776, 573.73961388, 479.68031607, 588.61435483,
       485.69922203, 456.40200844, 399.25197845, 451.5098931 ,
       519.40693826, 434.71194217, 596.13049586, 487.91791966,
       407.46691799, 524.16812757, 504.12982787, 452.11540623,
       524.21791295, 457.59311643, 444.19371592, 457.80432916,
       448.76590761, 438.31789012, 677.04967982, 566.09639245,
       651.93616661, 381.08127926, 577.5577254 , 578.35797052,
       518.61431291, 538.94532336, 377.4301223 , 663.30814872,
       523.83158824, 456.86065622, 446.07594402, 388.55038282,
       521.03242183, 431.94999241, 460.08016327, 426.31959507,
       433.30417088, 634.89577554, 462.41086078, 460.71673829,
       512.49535288, 703.83033889, 411.84238624, 551.54681408,
       553.33669558, 409.68202123, 423.34491341, 509.66438623,
       509.88865178, 543.67591782, 504.31300469, 519.18802223,
       520.03155195, 535.13855037])
```

In [37]:
```
sns.scatterplot(x = predictions,y =  y_test)
plt.xlabel('predictions from out model')
plt.title('evaluation of our model')
```

Out[37]:
```
Text(0.5, 1.0, 'evaluation of our model')
```


evaluation of our model
Yearly Amount Spent
predictions from out model
300
400
500
600
700