Gender Prediction

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [5]:
```
data=pd.read_csv("C:/Users/rockz/OneDrive/Documents/Gender Prediction.csv")
```

In [6]:
```
data
```

Out[6]:

	long_hair	forehead_width_cm	forehead_height_cm	nose_wide	nose_long	lips_thin	dista
0	1	11.8	6.1	1	0	1	
1	0	14.0	5.4	0	0	1	
2	0	11.8	6.3	1	1	1	
3	0	14.4	6.1	0	1	1	
4	1	13.5	5.9	0	0	0	
...	...	...	...	...	...	...	
4996	1	13.6	5.1	0	0	0	
4997	1	11.9	5.4	0	0	0	
4998	1	12.9	5.7	0	0	0	
4999	1	13.2	6.2	0	0	0	
5000	1	15.4	5.4	1	1	1	

5001 rows × 8 columns

In [7]:
```
data.columns
```

Out[7]:
```
Index(['long_hair', 'forehead_width_cm', 'forehead_height_cm', 'nose_wide',
       'nose_long', 'lips_thin', 'distance_nose_to_lip_long', 'gender'],
      dtype='object')
```

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

Out[8]:

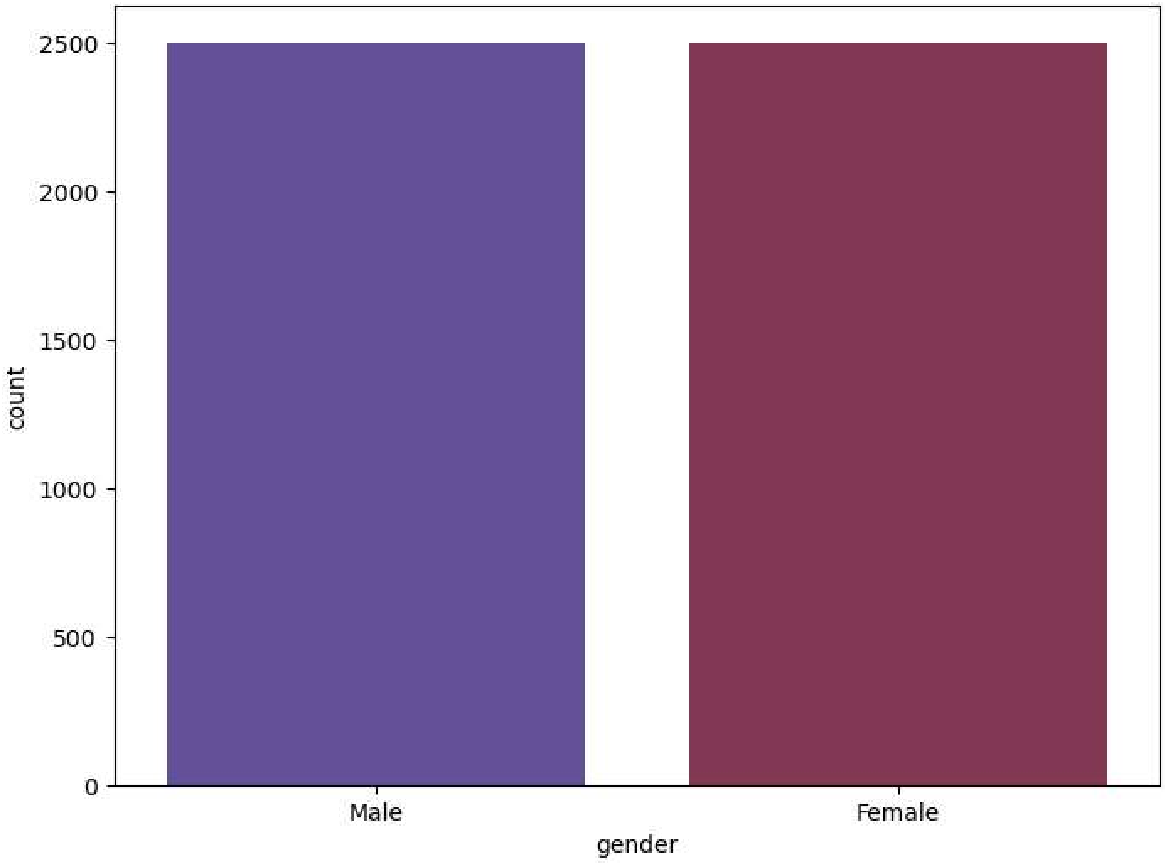
	long_hair	forehead_width_cm	forehead_height_cm	nose_wide	nose_long	lips_
count	5001.000000	5001.000000	5001.000000	5001.000000	5001.000000	5001.000
mean	0.869626	13.181484	5.946311	0.493901	0.507898	0.493
std	0.336748	1.107128	0.541268	0.500013	0.499988	0.500
min	0.000000	11.400000	5.100000	0.000000	0.000000	0.000
25%	1.000000	12.200000	5.500000	0.000000	0.000000	0.000
50%	1.000000	13.100000	5.900000	0.000000	1.000000	0.000
75%	1.000000	14.000000	6.400000	1.000000	1.000000	1.000
max	1.000000	15.500000	7.100000	1.000000	1.000000	1.000

In [9]:
```
data['gender'].value_counts()
```

Out[9]:
```
Female    2501
Male      2500
Name: gender, dtype: int64
```

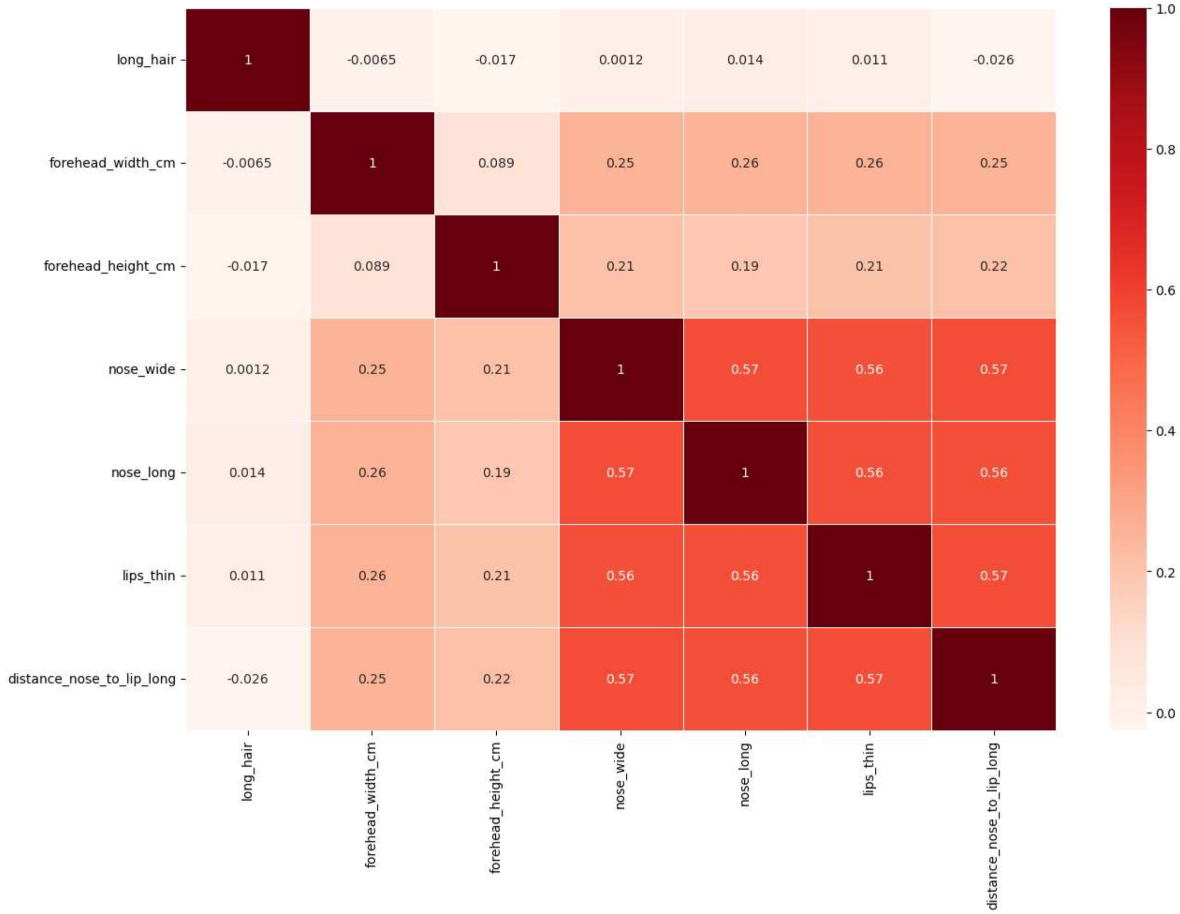
In [57]:
```
plt.figure(figsize=(8,6))
sns.countplot(x="gender",data=data,palette="twilight")
```

Out[57]:
```
<AxesSubplot:xlabel='gender', ylabel='count'>
```



In [11]:
```
plt.figure(figsize=(15,10))
sns.heatmap(data.corr(),annot=True,linewidths=0.5,cmap="Reds")
```

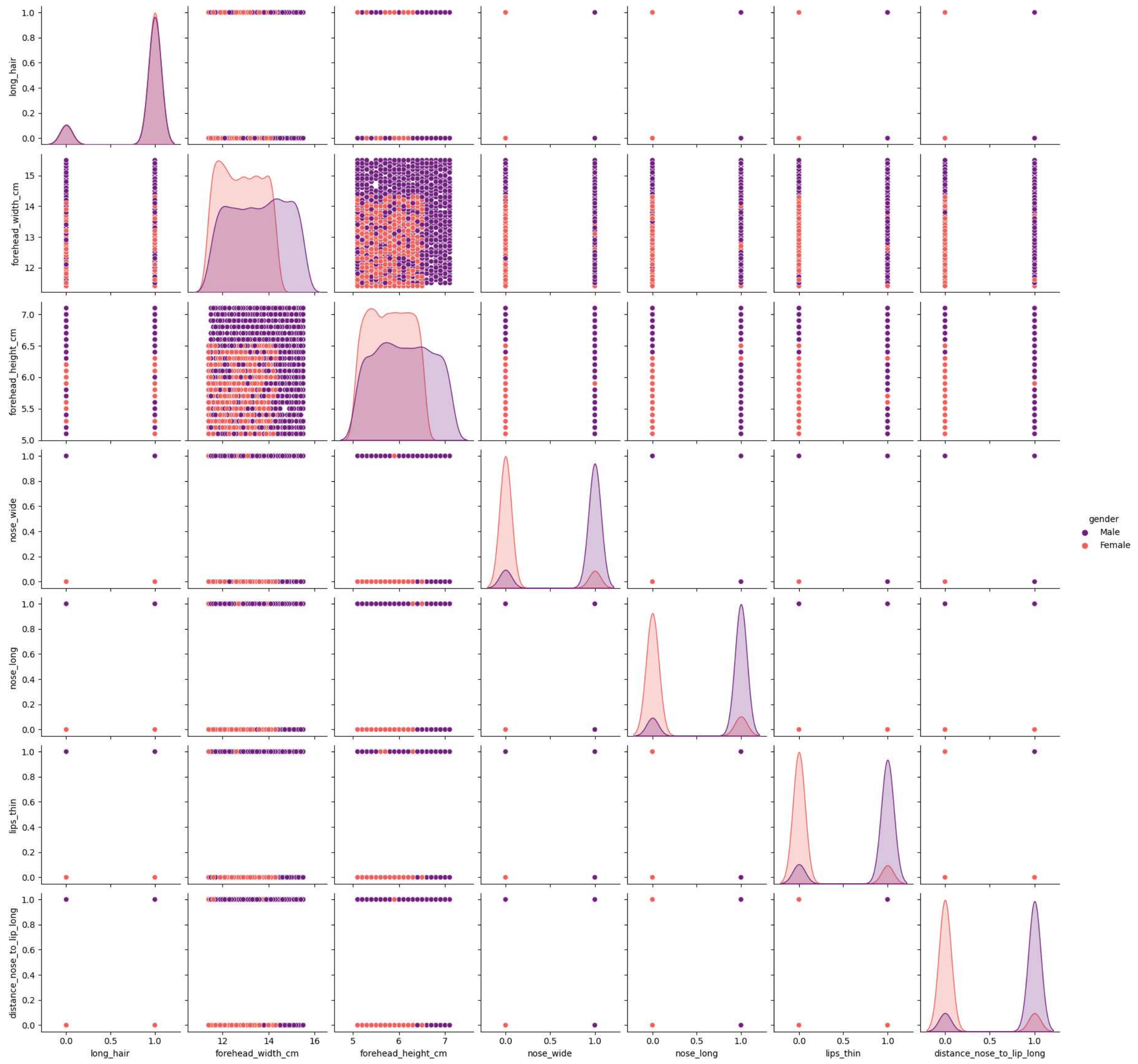
Out[11]:
```
<AxesSubplot:>
```



In [12]:
```
m_col=['long_hair','forehead_width_cm','forehead_height_cm','nose_wide','nose_
```

In [13]:
```
sns.pairplot(data[m_col],hue='gender',palette='magma')
```

Out[13]:
```
<seaborn.axisgrid.PairGrid at 0x25a1285b1f0>
```



In [14]:
```
x=data.drop('gender',axis=1)
y=data['gender']
```

In [15]:
```
x
```

Out[15]:

	long_hair	forehead_width_cm	forehead_height_cm	nose_wide	nose_long	lips_thin	dista
0	1	11.8	6.1	1	0	1	
1	0	14.0	5.4	0	0	1	
2	0	11.8	6.3	1	1	1	
3	0	14.4	6.1	0	1	1	
4	1	13.5	5.9	0	0	0	
...	...	...	...	...	...	...	
4996	1	13.6	5.1	0	0	0	
4997	1	11.9	5.4	0	0	0	
4998	1	12.9	5.7	0	0	0	
4999	1	13.2	6.2	0	0	0	
5000	1	15.4	5.4	1	1	1	

5001 rows × 7 columns

In [16]:
```
y
```

Out[16]:
```
0         Male
1       Female
2         Male
3         Male
4       Female
         ...
4996    Female
4997    Female
4998    Female
4999    Female
5000      Male
Name: gender, Length: 5001, dtype: object
```

In [25]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.40,random_state
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix,classification_report
```

LOGISTIC REGRESSION

In [21]:
```
from sklearn.linear_model import LogisticRegression
log=LogisticRegression()
log.fit(x_train,y_train)
```

Out[21]:
```
LogisticRegression()
```

```
In [33]: logpredict=log.predict(x_train)
         log_acc=accuracy_score(y_train,logpredict)
         log_acc
```

```
Out[33]: 0.9673333333333334
```

```
In [26]: confusion_matrix(y_train,logpredict)
```

```
Out[26]: array([[1453,   47],
                [  51, 1449]], dtype=int64)
```

```
In [28]: classification_report(y_train,logpredict)
```

```
Out[28]: '              precision    recall  f1-score   support\n\n      Female
         0.97      0.97      0.97      1500\n        Male       0.97      0.97      0.
         97      1500\n\n    accuracy                           0.97      3000\n   mac
         ro avg       0.97      0.97      0.97      3000\nweighted avg       0.97
         0.97      0.97      3000\n'
```

K NEAREST NEIGHBORS

```
In [31]: from sklearn.neighbors import KNeighborsClassifier
         knn=KNeighborsClassifier()
         knn.fit(x_train,y_train)
```

```
Out[31]: KNeighborsClassifier()
```

```
In [34]: knnpredict=knn.predict(x_train)
         knn_acc=accuracy_score(y_train,knnpredict)
         knn_acc
```

```
         C:\Users\rockz\anaconda3\lib\site-packages\sklearn\neighbors\_classification.
         py:228: FutureWarning: Unlike other reduction functions (e.g. `skew`, `kurtos
         is`), the default behavior of `mode` typically preserves the axis it acts alo
         ng. In SciPy 1.11.0, this behavior will change: the default value of `keepdim
         s` will become False, the `axis` over which the statistic is taken will be el
         iminated, and the value None will no longer be accepted. Set `keepdims` to Tr
         ue or False to avoid this warning.
           mode, _ = stats.mode(_y[neigh_ind, k], axis=1)
```

```
Out[34]: 0.976
```

```
In [35]: confusion_matrix(y_train,knnpredict)
```

```
Out[35]: array([[1476,   24],
                [  48, 1452]], dtype=int64)
```

```
In [36]: classification_report(y_train,knnpredict)
```

```
Out[36]: '              precision    recall  f1-score   support\n\n      Female
         0.97      0.98      0.98      1500\n        Male       0.98      0.97      0.
         98      1500\n\n    accuracy                           0.98      3000\n   mac
         ro avg       0.98      0.98      0.98      3000\nweighted avg       0.98
         0.98      0.98      3000\n'
```

RANDOM FORESTS

```
In [37]: from sklearn.ensemble import RandomForestClassifier
         ran=RandomForestClassifier()
         ran.fit(x_train,y_train)
```

```
Out[37]: RandomForestClassifier()
```

```
In [40]: ranpredict=ran.predict(x_train)
         ran_acc=accuracy_score(y_train,rpredict)
         ran_acc
```

```
Out[40]: 0.9986666666666667
```

```
In [41]: confusion_matrix(y_train,ranpredict)
```

```
Out[41]: array([[1500,    0],
                [   4, 1496]], dtype=int64)
```

```
In [42]: classification_report(y_train,ranpredict)
```

```
Out[42]: '              precision    recall  f1-score   support\n\n      Female
         1.00      1.00      1.00      1500\n        Male       1.00      1.00      1.
         00      1500\n\n    accuracy                           1.00      3000\n   mac
         ro avg       1.00      1.00      1.00      3000\nweighted avg       1.00
         1.00      1.00      3000\n'
```

SVM

```
In [45]: from sklearn.svm import SVC
         svm=SVC()
         svm.fit(x_train,y_train)
```

```
Out[45]: SVC()
```

```
In [46]: svmpredict=svm.predict(x_train)
         svm_acc=accuracy_score(y_train,svmpredict)
         svm_acc
```

```
Out[46]: 0.9696666666666667
```

```
In [47]: confusion_matrix(y_train,svmpredict)
```

```
Out[47]: array([[1459,   41],
                [  50, 1450]], dtype=int64)
```

```
In [48]: classification_report(y_train,svmpredict)
```

```
Out[48]: '              precision    recall  f1-score   support\n\n      Female
         0.97      0.97      0.97      1500\n        Male       0.97      0.97      0.
         97      1500\n\n    accuracy                           0.97      3000\n   mac
         ro avg       0.97      0.97      0.97      3000\nweighted avg       0.97
         0.97      0.97      3000\n'
```

Result

```
In [50]: print(log_acc)
         print(knn_acc)
         print(ran_acc)
         print(svm_acc)
```

```
0.9673333333333334
0.976
0.9986666666666667
0.9696666666666667
```

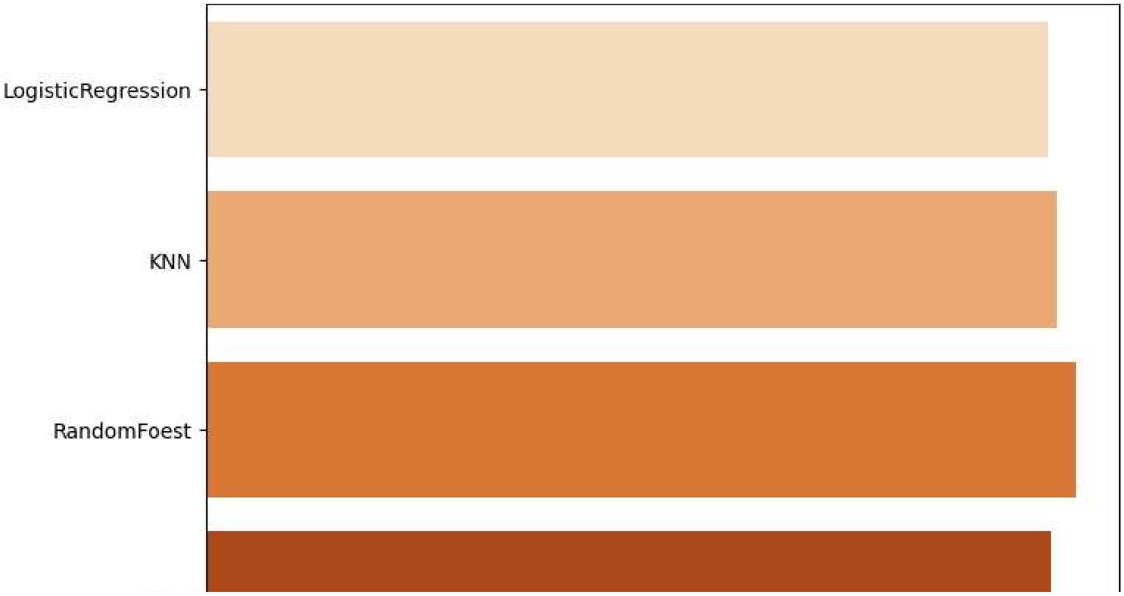
The accuracy of Logistic Regression Model is 96.73% The accuracy of KNN Model is 97.60% The accuracy of Random Forest Model is 99.86% The accuracy of SVM Model is 96.96%

In [55]:

```
plt.figure(figsize=(8,6))
model_acc=[log_acc,knn_acc,ran_acc,svm_acc]
model_name=["LogisticRegression","KNN","RandomFoest","SVM"]
sns.barplot(x=model_acc,y=model_name,palette="Oranges")
```

Out[55]:

```
<AxesSubplot:>
```



CONCLUSION

Random Forest Model gave best performance with an accuracy of 99.86%