In [1]:
```
"""
Author: Chidura Santosh

Date: 12-April-2019

Assignment: Additional Assignmenst Session 23
"""
```

Out[1]:
```
'\nAuthor: Chidura Santosh\n\nDate: 12-April-2019\n\n'
```

In [2]:
```
#Importing Required Libraries
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import sklearn
from pandas import Series, DataFrame
from pylab import rcParams
from sklearn import preprocessing
import xgboost as xgb
model = xgb.XGBClassifier()
from xgboost.sklearn import XGBClassifier
from sklearn.cross_validation import train_test_split
from sklearn import metrics
from sklearn.metrics import classification_report
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\cross_validation.py:41: DeprecationWarning: This module was deprecated in version 0.18 in favor of the model_selection module into which all the refactored classes and functions are moved. Also note that the interface of the new CV iterators are different from that of this module. This module will be removed in 0.20.
  "This module will be removed in 0.20.", DeprecationWarning)
```

In [3]:
```
Url="https://raw.githubusercontent.com/BigDataGal/Python-for-Data-Science/master/titanic-train.csv"
titanic = pd.read_csv(Url)
titanic.columns =['PassengerId','Survived','Pclass','Name','Sex','Age','SibSp','Parch','Ticket','Fare','Cabin','Embarked']
```

In [4]:
```
titanic.head()
```

Out[4]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S

In [5]:
```
#as ask to use fewer colium
df = titanic.drop(columns = ['PassengerId','Ticket','Name','Cabin','Embarked'])
```

In [6]:
```
df.head()
```

Out[6]:

	Survived	Pclass	Sex	Age	SibSp	Parch	Fare
0	0	3	male	22.0	1	0	7.2500
1	1	1	female	38.0	1	0	71.2833
2	1	3	female	26.0	0	0	7.9250
3	1	1	female	35.0	1	0	53.1000
4	0	3	male	35.0	0	0	8.0500

In [7]:
```
# Verify the null values count
df.isnull().values.sum()
```

Out[7]:
```
177
```

In [8]:
```
#Data frame Info like column types and counts
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 7 columns):
Survived    891 non-null int64
Pclass      891 non-null int64
Sex         891 non-null object
Age         714 non-null float64
SibSp       891 non-null int64
Parch       891 non-null int64
Fare        891 non-null float64
dtypes: float64(2), int64(4), object(1)
memory usage: 48.8+ KB
```

In [9]:
```
#Function to remove the null values from age column and making it as categorical type
def removenullfromAge(df):
    df.Age = df.Age.fillna(-0.5)
    bins = (-1, 0, 5, 12, 18, 25, 35, 60, 120)
    group_names = ['Unknown', 'Baby', 'Child', 'Teenager', 'Student', 'Young Adult', 'Adult', 'Senior']
    categories = pd.cut(df.Age, bins, labels=group_names)
    df.Age = categories
    return df
```

In [10]:
```
# Calling the null removalfrom age column function
df=removenullfromAge(df)
```

In [11]:
```
# verifying null values in the dataframe
df.isnull().sum()
```

Out[11]:
```
Survived    0
Pclass      0
Sex         0
Age         0
SibSp       0
Parch       0
Fare        0
dtype: int64
```

In [12]:
```
# Making fares column as categorical using Bins
bins = (-1, 0, 8, 15, 31, 1000)
group_names = ['Unknown', 'Low_Fare', 'Med_fare', 'High_Fare', 'Very_High_Fare']
categories = pd.cut(df.Fare, bins, labels=group_names)
df.Fare = categories
```

In [13]:
```
df['Sex'],uniq = pd.factorize(df['Sex'])
df['Fare'],uniq = pd.factorize(df['Fare'])
df['Age'],uniq = pd.factorize(df['Age'])
```

In [14]:
```
df.head()
```

Out[14]:

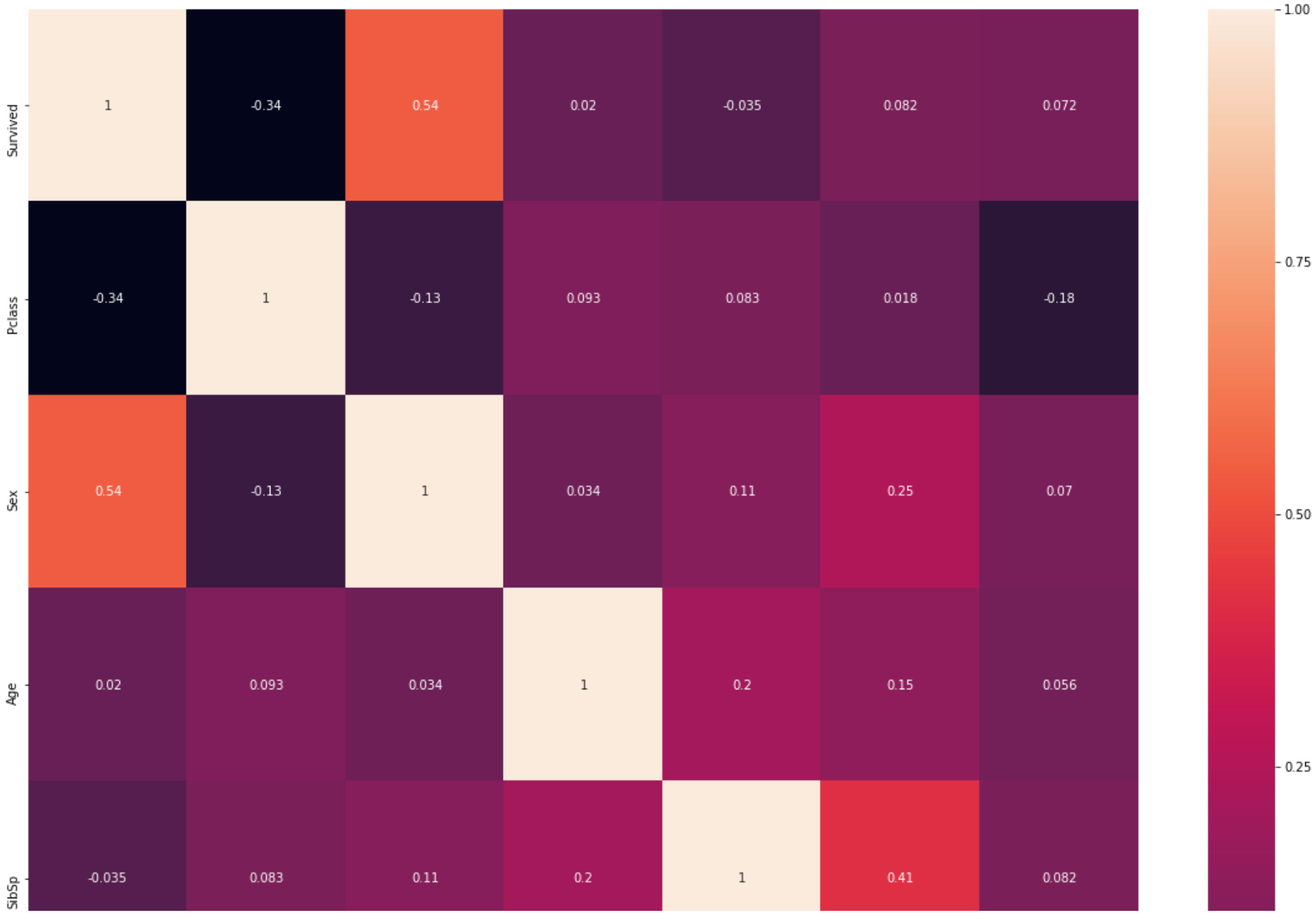
	Survived	Pclass	Sex	Age	SibSp	Parch	Fare
0	0	3	0	0	1	0	0
1	1	1	1	1	1	0	1
2	1	3	1	2	0	0	0
3	1	1	1	2	1	0	1
4	0	3	0	2	0	0	2

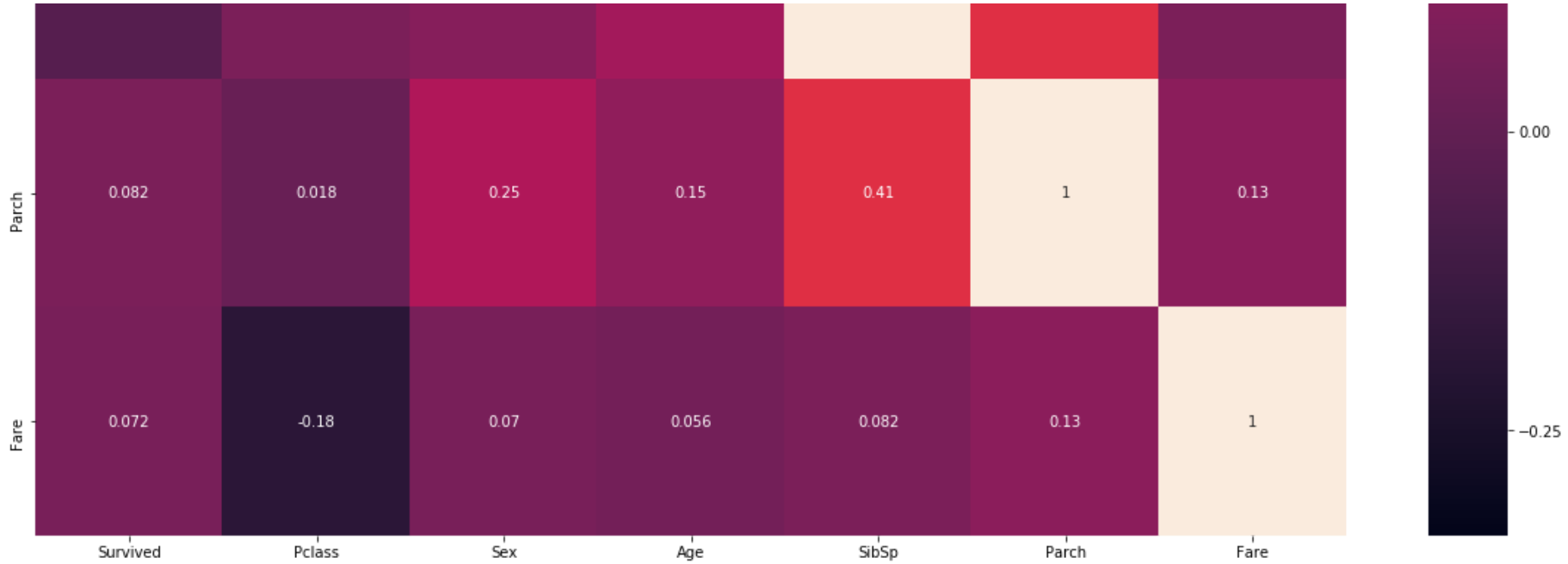
In [15]:
```
# Classifying dependent and independent variables in to Y,X
y=df['Survived']
X=df.drop('Survived',axis=1)
```

In [16]:
```
#Splitting train and test data
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=.30, random_state=1234)
```

In [17]:
```
f, ax = plt.subplots(figsize=(20, 20))
sns.heatmap(df.corr(),annot=True)
```

Out[17]: <matplotlib.axes._subplots.AxesSubplot at 0x29c433bae10>





In [21]:
```
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import GridSearchCV
```

In [19]:
```
sc=StandardScaler()
X=sc.fit_transform(X)
```

In [22]:
```
learning_rate = [0.0001, 0.001, 0.01, 0.1, 0.2, 0.3]
param_grid = dict(learning_rate=learning_rate)
grid_search = GridSearchCV(model, param_grid, scoring="neg_log_loss", n_jobs=-1, cv=10)
```

In [23]:
```
# learning the training data and fitting them
grid_search.fit(X_train, y_train)
```

Out[23]:
```
GridSearchCV(cv=10, error_score='raise',
       estimator=XGBClassifier(base_score=0.5, booster='gbtree', colsample_bylevel=1,
       colsample_bytree=1, gamma=0, learning_rate=0.1, max_delta_step=0,
       max_depth=3, min_child_weight=1, missing=None, n_estimators=100,
       n_jobs=1, nthread=None, objective='binary:logistic', random_state=0,
       reg_alpha=0, reg_lambda=1, scale_pos_weight=1, seed=None,
       silent=True, subsample=1),
       fit_params=None, iid=True, n_jobs=-1,
       param_grid={'learning_rate': [0.0001, 0.001, 0.01, 0.1, 0.2, 0.3]},
       pre_dispatch='2*n_jobs', refit=True, return_train_score='warn',
       scoring='neg_log_loss', verbose=0)
```

In [24]:
```
top_param=grid_search.best_estimator_
```

In [25]:
```
best_model=XGBClassifier(learning_rate=top_param.learning_rate,booster=top_param.booster,gamma=top_param.gamma,n_estimator
```

In [26]:
```
best_model.fit(X_train, y_train)
```

Out[26]:
```
XGBClassifier(base_score=0.5, booster='gbtree', colsample_bylevel=1,
       colsample_bytree=1, gamma=0, learning_rate=0.1, max_delta_step=0,
       max_depth=3, min_child_weight=1, missing=None, n_estimators=100,
       n_jobs=1, nthread=None, objective='binary:logistic', random_state=0,
       reg_alpha=0, reg_lambda=1, scale_pos_weight=1, seed=None,
       silent=True, subsample=1)
```

In [27]:
```
best_model.score(X_train, y_train)
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\preprocessing\label.py:151: DeprecationWarning: The truth value of
an empty array is ambiguous. Returning False, but in future this will result in an error. Use `array.size > 0` to chec
k that an array is not empty.
  if diff:
```

Out[27]:
```
0.8523274478330658
```

In [28]:
```
# fitting againist test data
best_model.score(X_test,y_test)
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\preprocessing\label.py:151: DeprecationWarning: The truth value of
an empty array is ambiguous. Returning False, but in future this will result in an error. Use `array.size > 0` to chec
k that an array is not empty.
  if diff:
```

Out[28]:
```
0.8283582089552238
```

In [ ]:
```

```