

UNO_NE_Bridges

September 20, 2017

0.1 Analyze NBI data for Nebraska Bridges from years 1992 to 2016

0.1.1 Connect to MongoDB

```
In [15]: import pymongo
         from pymongo import MongoClient
         client = MongoClient("mongodb://nbi-mongo.admin/")
         db = client.bridge
         collection = db["SampleNbi2"]
         print("Bridge Records in DB: ", collection.count())
```

Bridge Records in DB: 17509885

0.1.2 Search using a Bridge ID or a partial ID

```
In [16]: structureID = "C003211015"
```

```
In [17]: import pandas as pd
         import re
         pattern = re.compile(r'\s*' + re.escape(structureID) + r'.*', re.I)
         records = collection.find({"structureNumber": {"$regex": pattern}})
```

```
In [4]: dataframe = pd.DataFrame(list(records))
         pd.set_option('display.max_columns', None)
         print("# of bridges with " + structureID + " in Structure ID: " + str(len(dataframe.index)))
```

of bridges with C003211015 in Structure ID: 50

0.1.3 List all inspection records

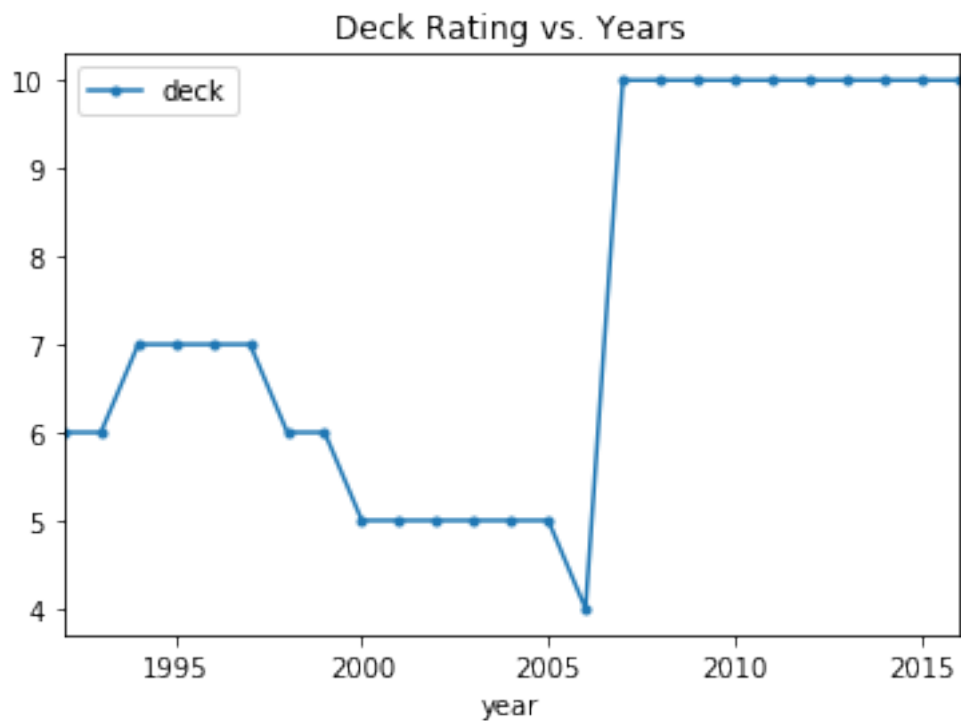
```
In [ ]: dataframe
```

0.1.4 Deck condition over years

```
In [7]: %matplotlib inline
```

```
In [8]: temp = dataframe.groupby(['year'])['deck'].max().reset_index()
temp.loc[temp['deck'] == 'N', 'deck'] = 10
temp.loc[temp['deck'] == '', 'deck'] = 0
temp['deck'] = temp['deck'].astype(int)
temp.plot(y = 'deck', x = 'year', marker = '.', title = "Deck Rating vs. Years")
```

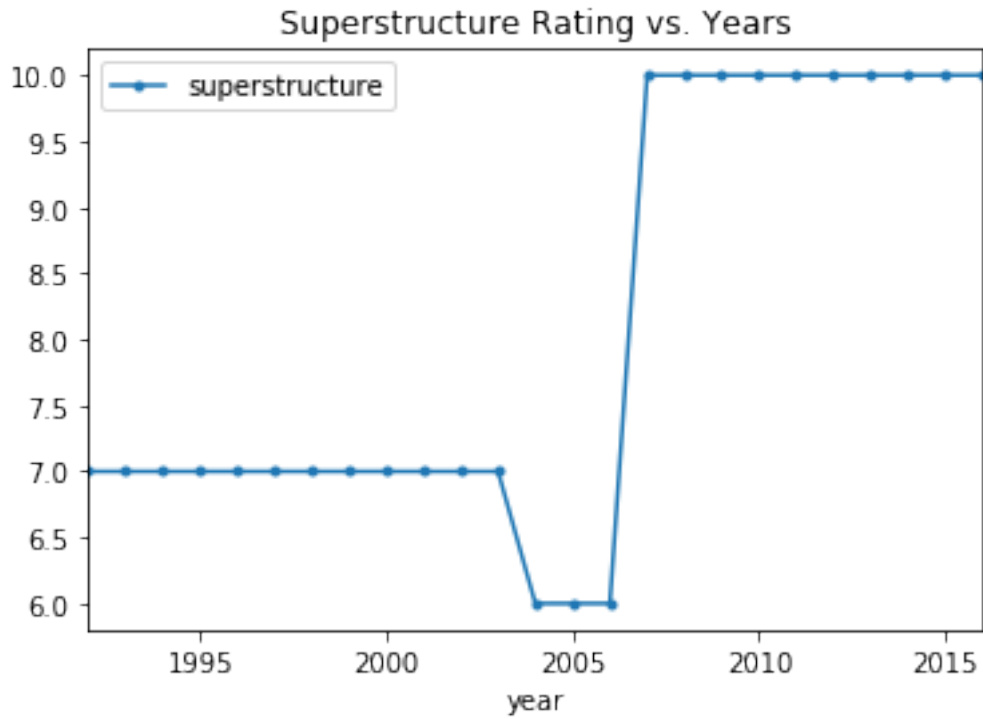
Out[8]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1dc84b2470>



0.1.5 Substructure condition over years

```
In [9]: temp = dataframe.groupby(['year'])['superstructure'].max().reset_index()
temp.loc[temp['superstructure'] == 'N', 'superstructure'] = 10
temp.loc[temp['superstructure'] == '', 'superstructure'] = 0
temp['superstructure'] = temp['superstructure'].astype(int)
temp.plot(y = 'superstructure', x = 'year', marker = '.', title = "Superstructure Rating
```

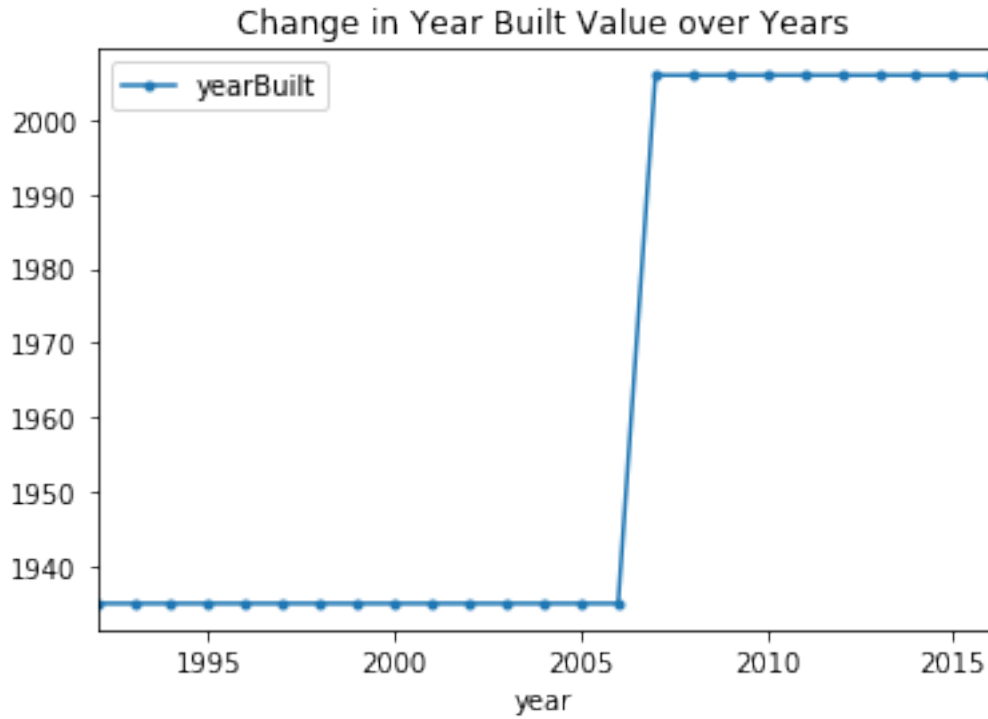
Out[9]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1dc8381a90>



0.1.6 Year Built value change over Years

```
In [10]: temp = dataframe.groupby(['year'])['yearBuilt'].max().reset_index()
temp['yearBuilt'] = temp['yearBuilt'].astype(int)
temp.plot(y='yearBuilt', x='year', marker='.', title = "Change in Year Built Value over
```

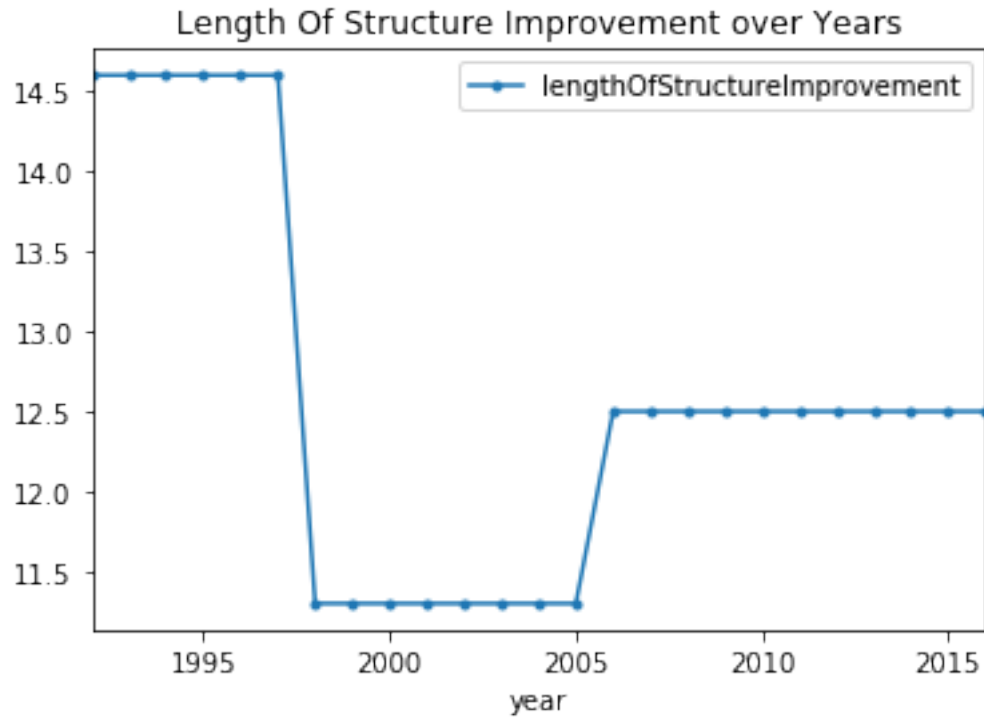
```
Out[10]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1dc4ada390>
```



0.1.7 Length of Structure Improvement over years

```
In [11]: temp = dataframe.groupby(['year'])['lengthOfStructureImprovement'].max().reset_index()
temp['lengthOfStructureImprovement'] = temp['lengthOfStructureImprovement'].astype(float)
temp.plot(y = 'lengthOfStructureImprovement', x = 'year', marker = '.', title = "Length
```

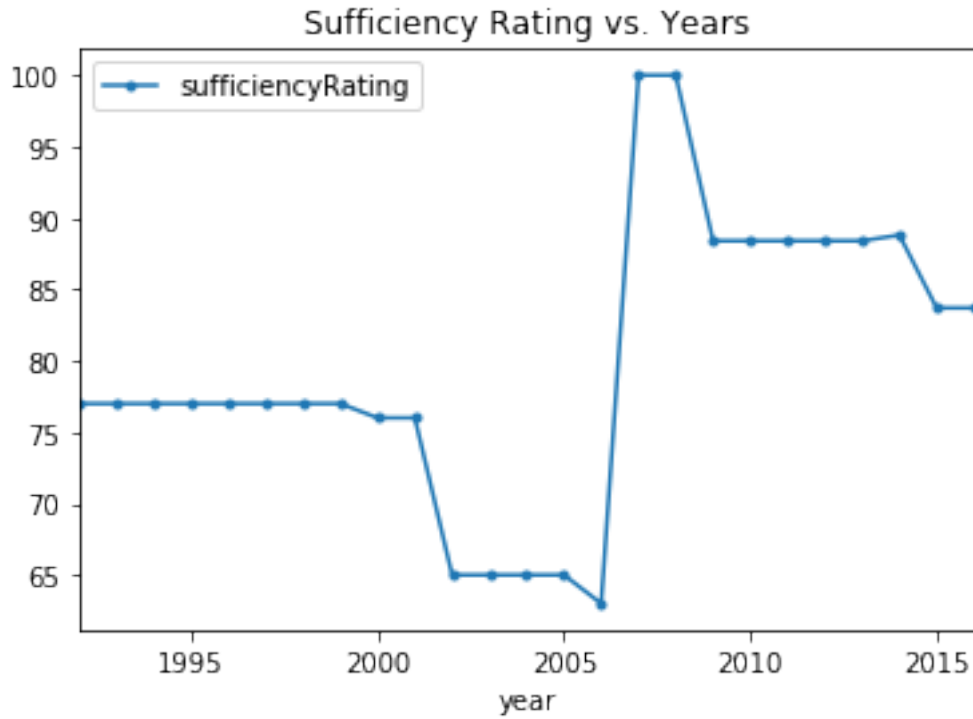
```
Out[11]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1dc4a9c390>
```



0.1.8 Change in Sufficiency Rating Over Years

```
In [12]: temp = dataframe.groupby(['year'])['sufficiencyRating'].max().reset_index()
temp['sufficiencyRating'] = temp['sufficiencyRating'].astype(float)
temp.plot(y = 'sufficiencyRating', x = 'year', marker = '.', title = "Sufficiency Rating Over Years")
```

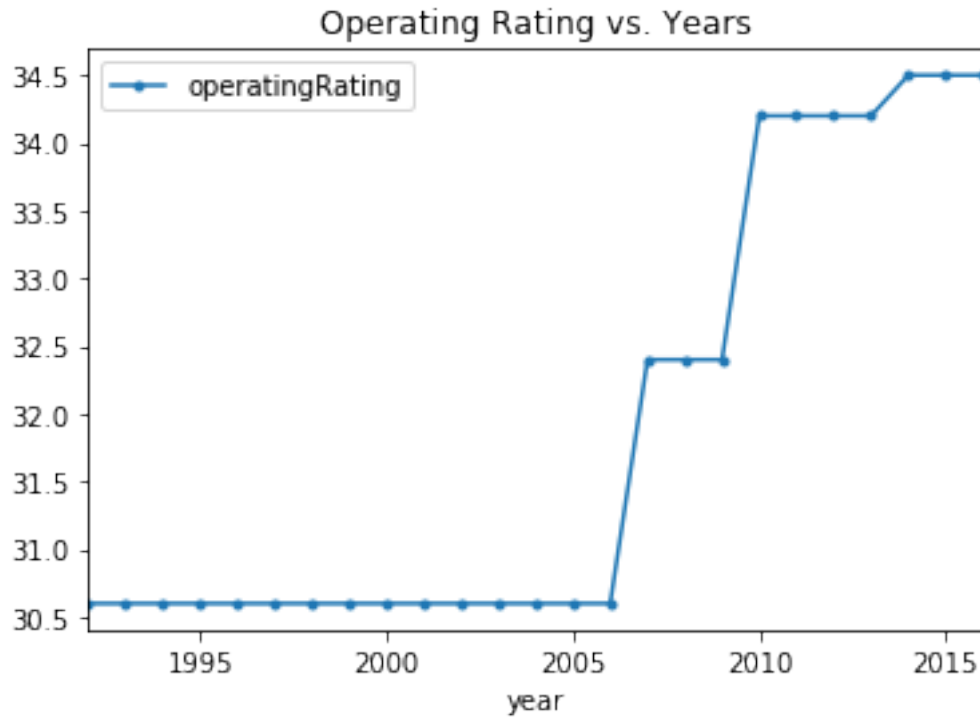
```
Out[12]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1dc84859b0>
```



0.1.9 Change in Operating Rating over years

```
In [13]: temp = dataframe.groupby(['year'])['operatingRating'].max().reset_index()
temp['operatingRating'] = temp['operatingRating'].astype(float)
temp.plot(y = 'operatingRating', x = 'year', marker = '.', title = "Operating Rating vs
```

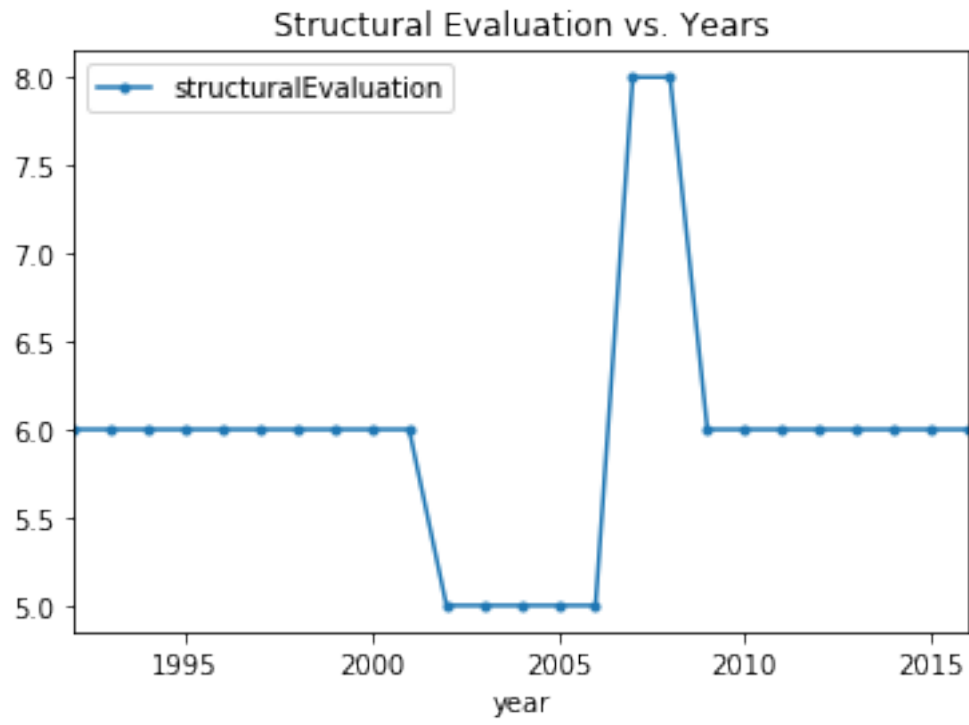
```
Out[13]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1dc4942518>
```



0.1.10 Change in Structural Evaluation Values over years

```
In [14]: temp = dataframe.groupby(['year'])['structuralEvaluation'].max().reset_index()
temp['structuralEvaluation'] = temp['structuralEvaluation'].astype(float)
temp.plot(y = 'structuralEvaluation', x = 'year', marker = '.', title = "Structural Eva
```

```
Out[14]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1dc497df60>
```



In []: