In [1]:

```
import numpy as np
from sklearn import preprocessing
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from sklearn import model_selection
from sklearn.metrics import classification_report, accuracy_score
from pandas.plotting import scatter_matrix
import matplotlib.pyplot as plt
import pandas as pd
from sklearn import metrics
from sklearn.preprocessing import StandardScaler
```

In [2]:

```
a=pd.read_csv("Breast_cancer_data.csv")
```

In [3]:

```
a.head()
```

Out[3]:

	mean_radius	mean_texture	mean_perimeter	mean_area	mean_smoothness	diagnosis
0	17.99	10.38	122.80	1001.0	0.11840	0
1	20.57	17.77	132.90	1326.0	0.08474	0
2	19.69	21.25	130.00	1203.0	0.10960	0
3	11.42	20.38	77.58	386.1	0.14250	0
4	20.29	14.34	135.10	1297.0	0.10030	0

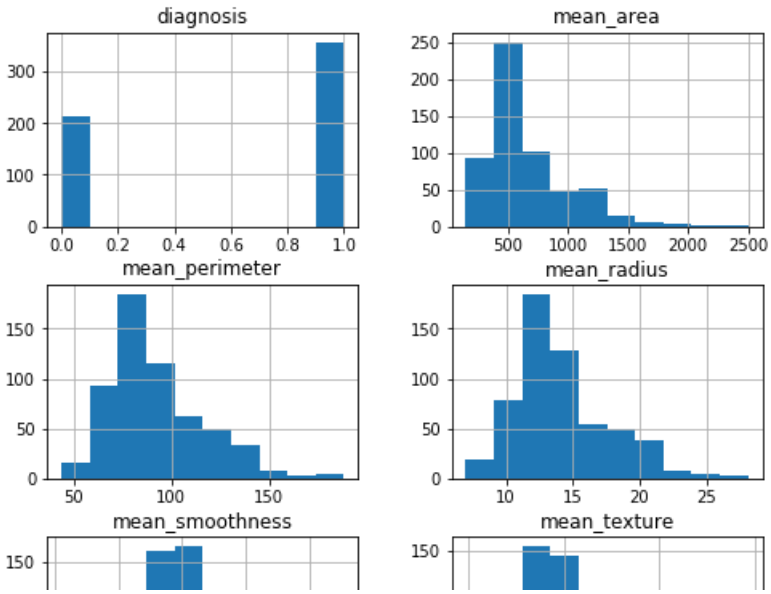
In [4]:

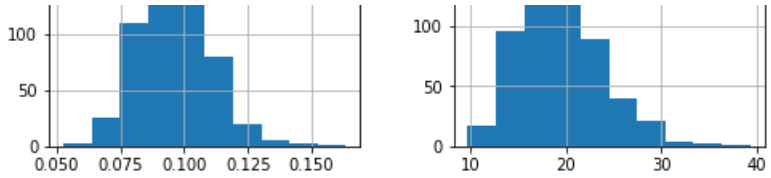
```
print(a.shape)
```

```
(569, 6)
```

In [5]:

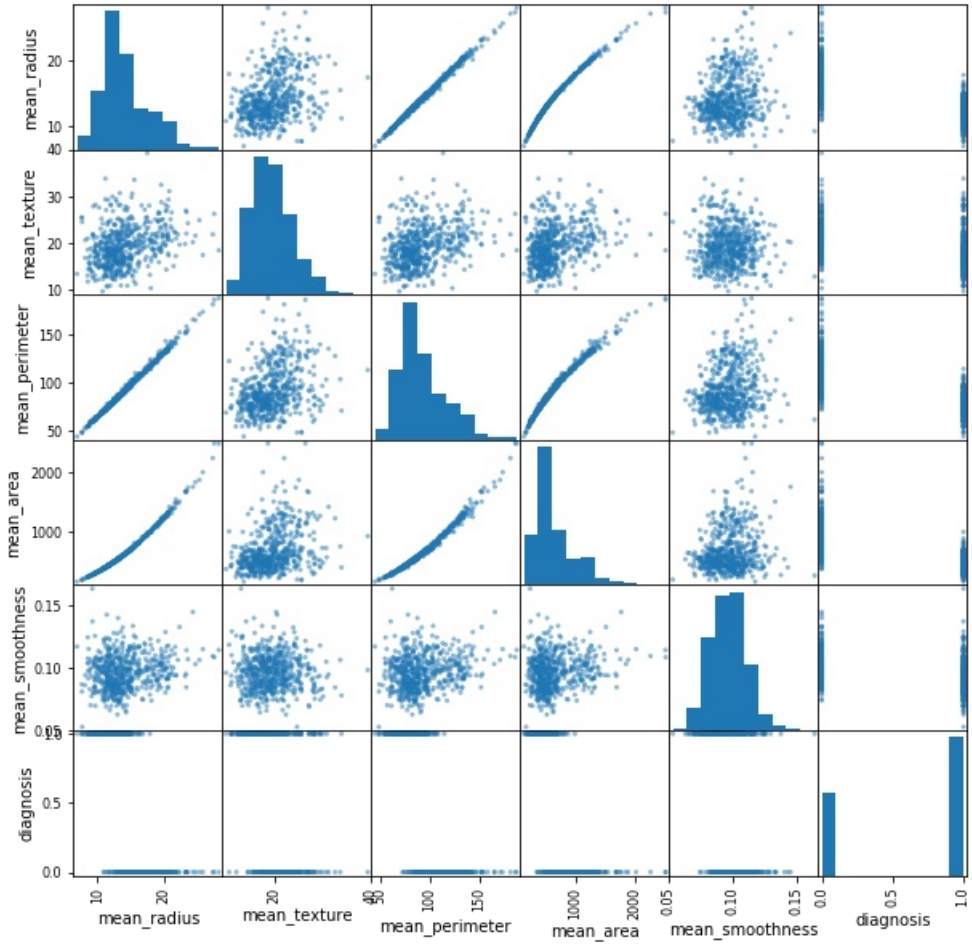
```
a.hist(figsize = (8,8))
plt.show()
```





In [6]:

```
scatter_matrix(a, figsize = (10,10))
plt.show()
```



In [7]:

```
X = a.iloc[:,:-1].values
y = a.iloc[:,5].values
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=0)
```

In [8]:

```
cls = KNeighborsClassifier(n_neighbors=5, metric="minkowski",p=2)
cls.fit(X_train, y_train)
```

Out[8]:

```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
                     metric_params=None, n_jobs=None, n_neighbors=5, p=2,
                     weights='uniform')
```

In [9]:

```
clf=SVC()
clf.fit(X_train,y_train)
```

Out[9]:

```
SVC(C=1.0, break_ties=False, cache_size=200, class_weight=None, coef0=0.0,
    decision_function_shape='ovr', degree=3, gamma='scale', kernel='rbf',
    max_iter=-1, probability=False, random_state=None, shrinking=True,
    tol=0.001, verbose=False)
```

In [10]:

```
models=[]
models.append(("KNN",cls))
models.append(("SVM",clf))
```

In [20]:

```
for name, model in models:
       y_pred = model.predict(X_test)
       print(name)
       print(accuracy_score(y_test, y_pred))
       print(classification_report(y_test, y_pred))
```

```
KNN
0.9122807017543859
              precision    recall  f1-score   support

           0       0.93      0.85      0.89        47
           1       0.90      0.96      0.93        67

    accuracy                           0.91       114
   macro avg       0.92      0.90      0.91       114
weighted avg       0.91      0.91      0.91       114

SVM
0.8771929824561403
              precision    recall  f1-score   support

           0       0.97      0.72      0.83        47
           1       0.84      0.99      0.90        67

    accuracy                           0.88       114
   macro avg       0.90      0.85      0.87       114
weighted avg       0.89      0.88      0.87       114
```

In [15]:

```
accuracy = clf.score(X_test, y_test)
print(accuracy)
scoring='accuracy'
seed=8
```

```
0.8771929824561403
```

In [19]:

```
results=[]
names=[]
for name, model in models:
       kfold = model_selection.KFold(n_splits = 10)
       # Evaluate score by Cross-Validation
       cv_results = model_selection.cross_val_score(model, X_train, y_train, cv = kfold, scoring =
scoring)
       results.append(cv_results)
       names.append(name)
       msg = "%s: %f (%f)" % (name, cv_results.mean(), cv_results.std())
       print(msg)
```

```
KNN: 0.879275 (0.037652)
SVM: 0.870386 (0.031487)
```

In [14]:

```
print("Example Test Case")
arr=np.array([[17.95,20.01,114.2,982,0.08402]])
arr=arr.reshape(len(arr), -1)
prediction = clf.predict(arr)
if prediction==0:
       print('Malignant')
elif prediction==1:
       print('Benign')
```

```
Example Test Case
Malignant
```

In [ ]:

```
```