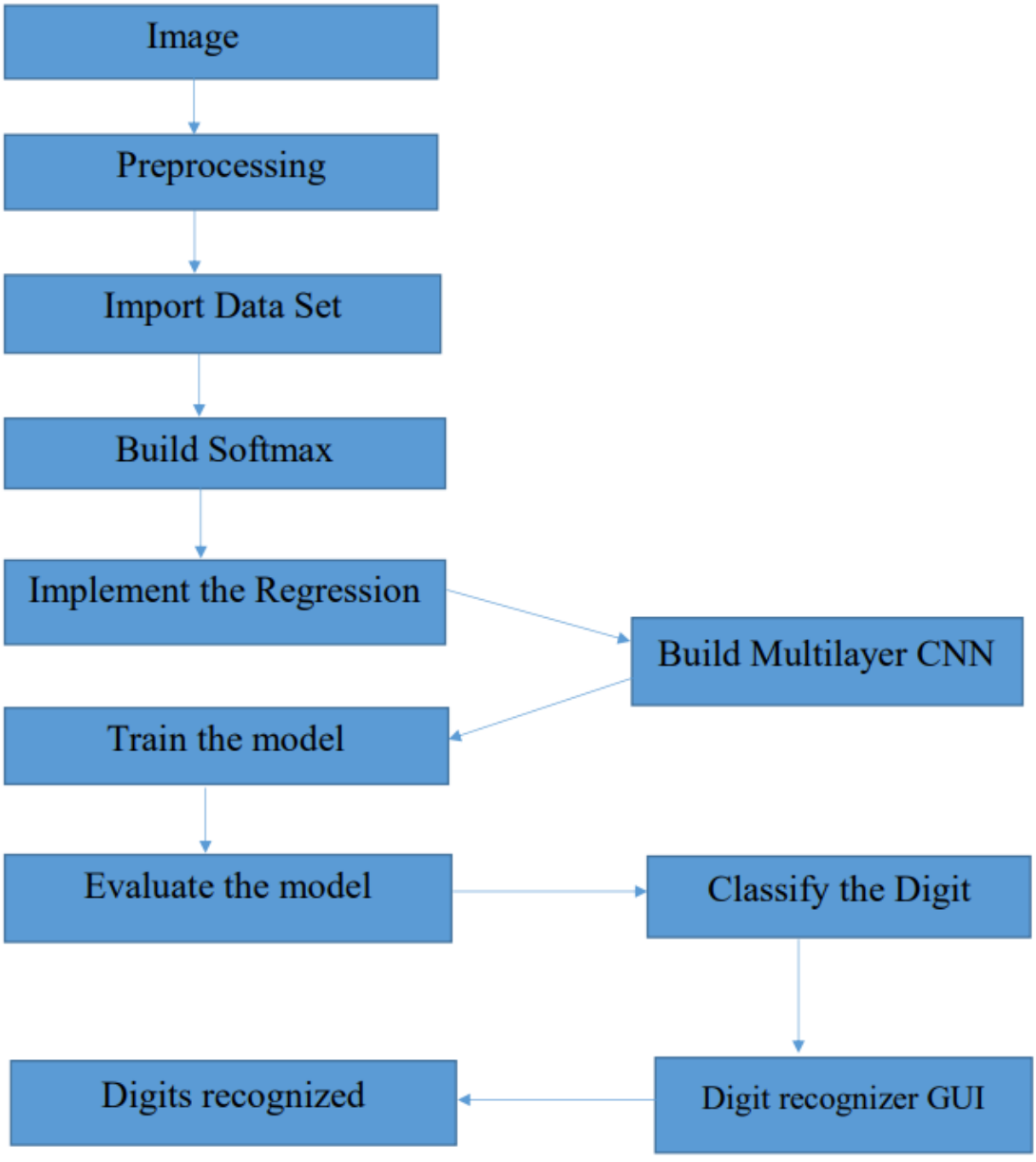
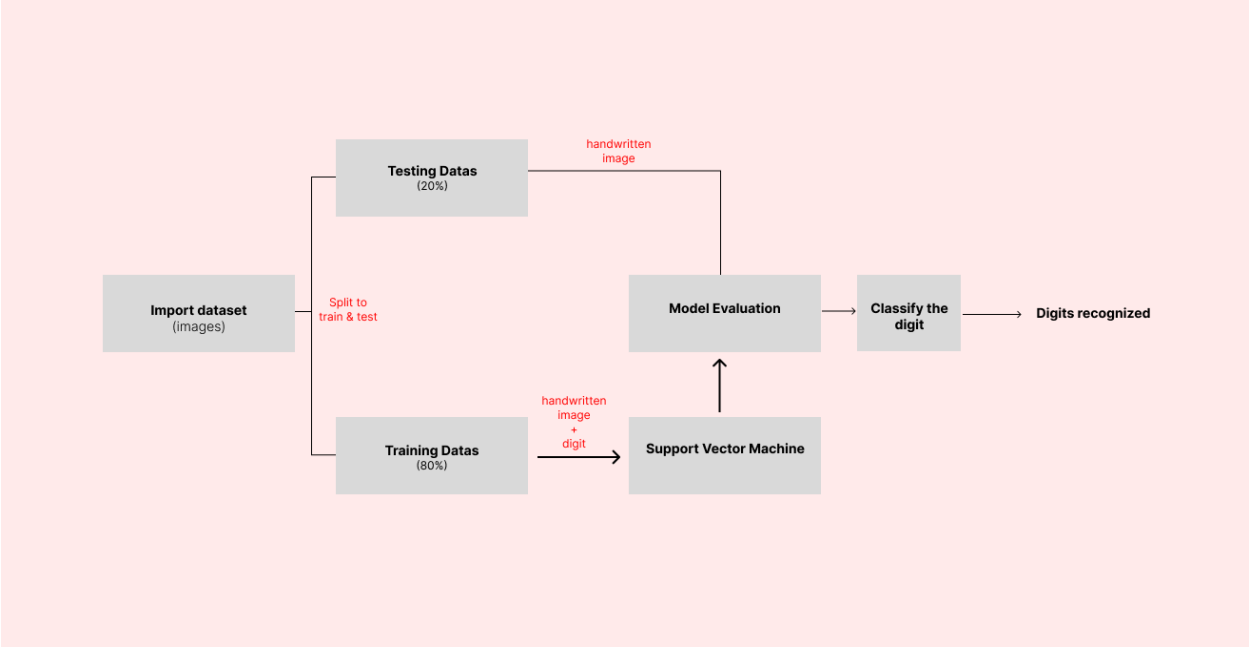
Handwritten Digit Recognition using SVM

Diagram:



Flow chart:



Code:

import modules

In [1]:
```
# import necessery modules

# loading and processing
import numpy as np
import pandas as pd

# for use inbuilt the dataset
from sklearn.datasets import load_digits

# train test split
from sklearn.model_selection import train_test_split

# find accuray score
from sklearn.metrics import accuracy_score

# Build the SVM model
from sklearn import svm

# visualization
import matplotlib.pyplot as plt

# Skip warnings
import warnings
warnings.filterwarnings('ignore')
```

load the dataset

In [2]:
```
dataset=load_digits()
dataimagelength=len(dataset.images)
```

split the input

In [3]:
```
x=dataset.images.reshape((dataimagelength,-1))
y=dataset.target
```

Model train test and split

```
In [4]: x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=0)
```

Build the SVM model

```
In [5]: model=svm.SVC(kernel='linear')
        model.fit(x_train,y_train)
```

```
Out[5]: SVC
        SVC(kernel='linear')
```

Outcome

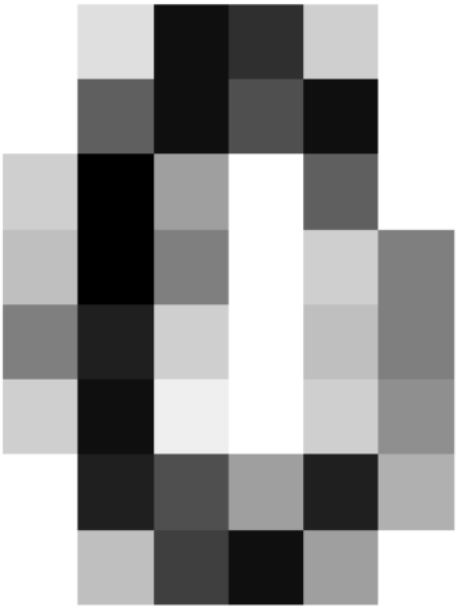
```
In [6]: prediction=model.predict(x_test)
```

```
In [7]: print ("Accuracy score:",(accuracy_score(y_test,prediction)*100))
```

```
Accuracy score: 97.11111111111111
```

Output:

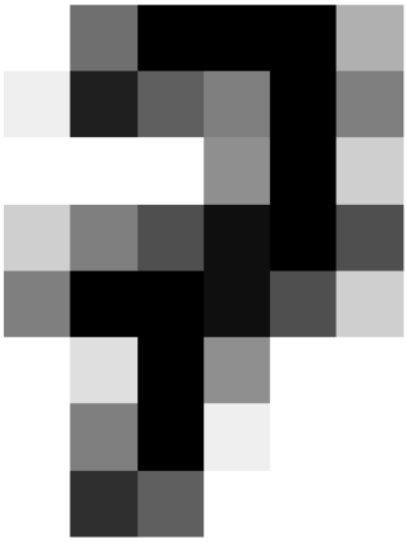
```
In [15]: n=48
         result=model.predict(dataset.images[n].reshape((1,-1)))
         plt.imshow(dataset.images[n],cmap=plt.cm.gray_r,interpolation='nearest')
         plt.axis("off")
         plt.show()
         print('The digit is:',int(result))
```



```
The digit is: 0
```

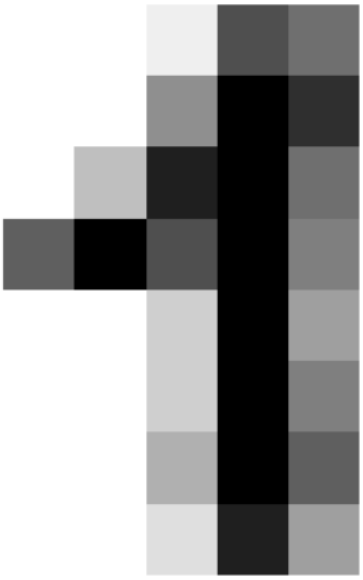
In [16]:

```
n=44
result=model.predict(dataset.images[n].reshape((1,-1)))
plt.imshow(dataset.images[n],cmap=plt.cm.gray_r,interpolation='nearest')
plt.axis("off")
plt.show()
print('The digit is:',int(result))
```



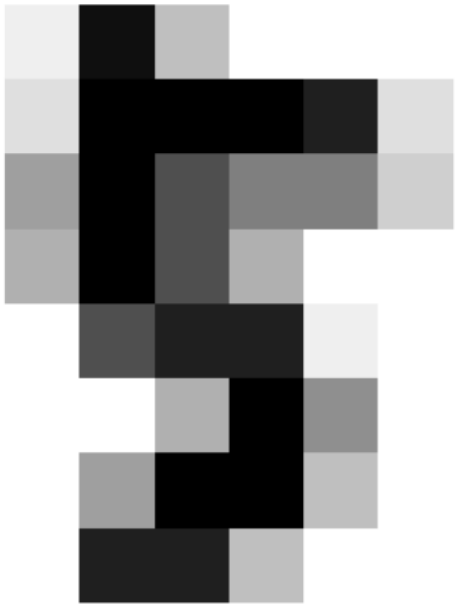
```
The digit is: 7
```

In [19]:
```
n=47
result=model.predict(dataset.images[n].reshape((1,-1)))
plt.imshow(dataset.images[n],cmap=plt.cm.gray_r,interpolation='nearest')
plt.axis("off")
plt.show()
print('The digit is:',int(result))
```



```
The digit is: 1
```

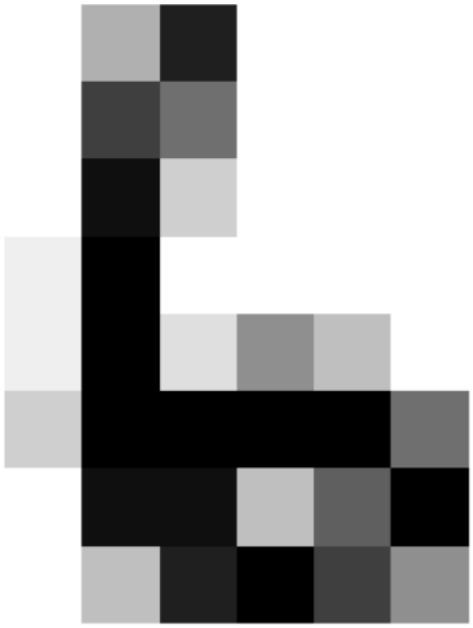
In [18]:
```
n=40
result=model.predict(dataset.images[n].reshape((1,-1)))
plt.imshow(dataset.images[n],cmap=plt.cm.gray_r,interpolation='nearest')
plt.axis("off")
plt.show()
print('The digit is:',int(result))
```



```
The digit is: 5
```

In [22]:

```
n=67
result=model.predict(dataset.images[n].reshape((1,-1)))
plt.imshow(dataset.images[n],cmap=plt.cm.gray_r,interpolation='nearest')
plt.axis("off")
plt.show()
print('The digit is:',int(result))
```



```
The digit is: 6
```

Code link: https://github.com/AkashV-MLEngr/HandwrittenDigitRecognition