**Project Development Phase**
**Sprint – 3**

## Model Building

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|---|---|
| Date | 08 November 2022 |
| Team ID | PNT2022TMID42321 |
| Project Name | Emerging Methods for Early Detection of Forest Fires |
| Maximum Marks | 4 Marks |

[Click here to open the notebook (Colab)]

### Import model building libraries:

```
#import keras libraries
import numpy as np
import tensorflow
from tensorflow.keras.models import Sequential
from tensorflow.keras import layers
from keras.layers import Dense
from keras.layers import Conv2D
from keras.layers import MaxPooling2D,Dropout
from keras.layers import Flatten
```

### Initializing the model:

```
model=Sequential()
```

### Giving access to the dataset in drive:

```
# giving access to my drive

from google.colab import drive
drive.mount('/content/drive')
```

**Add CNN Layer:**

```
# add Convolutional layer
model.add(Conv2D(32, (3,3), activation = "relu", input_shape = (64,
64,3) ))
```

```
model.add(MaxPooling2D(pool_size=(2,2)))
```

```
# add flatten layer
model.add(Flatten())
```

**Add Hidden Layer:**

```
model.add(Dense(units=128, activation='relu'))
```

```
model.add(Dense(units=46, activation='softmax'))
```

**Configure the learning process:**

```
# configure the learning process
model.compile(optimizer='adam',loss='sparse_categorical_crossentrop
y',metrics=['accuracy'])
```

**Train the model:**

```
train_datagen = ImageDataGenerator(rescale=1./255,shear_range=0.2,z
oom_range=0.2,horizontal_flip=True)
test_datagen = ImageDataGenerator(rescale=1./255)
```

```
x_train = train_datagen.flow_from_directory(r"/content/drive/MyDriv
e/Dataset/train_set",target_size=(64,64),batch_size=32, color_mode=
"rgb",class_mode="sparse")
x_test = test_datagen.flow_from_directory(r"/content/drive/MyDrive/
Dataset/test_set",target_size=(64,64),batch_size=32, color_mode="rg
b",class_mode="sparse")
```

```
model.fit(x_train, epochs=10, steps_per_epoch=len(x_train))
```

## Save The Model:

```
model.save("forestfire13.h5")
```

## Predictions:

```
# import load_model from keras.model
from keras.models import load_model
# import image class from keras
from tensorflow.keras.preprocessing import image
# import numpy
import numpy as np
# import cv2
import cv2
```

```
model = load_model("forestfire13.h5")
```

```
img = image.load_img(r'/content/drive/MyDrive/Dataset/train_set/wit
h fire/with fire (2).jpg')
x = image.img_to_array(img)
res = cv2.resize(x,dsize=(128,128),interpolation=cv2.INTER_CUBIC)
```

```
# import opencv library
import cv2
import numpy as np
from keras.preprocessing import image
from keras.models import load_model
from twilio.rest import Client
from playsound import playsound
```