

Model Development Phase Template

Date	15 March 2024
Team ID	SWUID20240034617
Project Title	CovidVision : Advanced COVID-19 Detection for Lung X-rays with Deep Learning
Maximum Marks	10 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

Initial Model Training Code (5 marks):

Paste the screenshot of the model training code

Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics
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Model 1

```
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense, BatchNormalization, Activation

model = Sequential([
    Conv2D(32, (3, 3), input_shape=(150, 150, 3)),
    BatchNormalization(),
    Activation('relu'),
    MaxPooling2D(pool_size=(2, 2)),

    Conv2D(64, (3, 3)),
    BatchNormalization(),
    Activation('relu'),
    MaxPooling2D(pool_size=(2, 2)),

    Conv2D(128, (3, 3)),
    BatchNormalization(),
    Activation('relu'),
    MaxPooling2D(pool_size=(2, 2)),

    Flatten(),
    Dense(256),
    BatchNormalization(),
    Activation('relu'),
    Dense(1, activation='sigmoid')
])

model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
model.summary()
```

Model: "sequential_4"

Layer (type)	Output Shape	Param #
conv2d_12 (Conv2D)	(None, 148, 148, 32)	896
batch_normalization_16 (Batch Normalization)	(None, 148, 148, 32)	128
activation_16 (Activation)	(None, 148, 148, 32)	0
max_pooling2d_12 (MaxPooling2D)	(None, 74, 74, 32)	0
conv2d_13 (Conv2D)	(None, 72, 72, 64)	18496
batch_normalization_17 (Batch Normalization)	(None, 72, 72, 64)	256
activation_17 (Activation)	(None, 72, 72, 64)	0
max_pooling2d_13 (MaxPooling2D)	(None, 36, 36, 64)	0
conv2d_14 (Conv2D)	(None, 34, 34, 128)	73856
batch_normalization_18 (Batch Normalization)	(None, 34, 34, 128)	512
activation_18 (Activation)	(None, 34, 34, 128)	0
max_pooling2d_14 (MaxPooling2D)	(None, 17, 17, 128)	0
flatten_4 (Flatten)	(None, 36992)	0
dense_8 (Dense)	(None, 256)	9470208
batch_normalization_19 (Batch Normalization)	(None, 256)	1024
activation_19 (Activation)	(None, 256)	0
dense_9 (Dense)	(None, 1)	257

Total params: 9565633 (36.49 MB)
 Trainable params: 9564673 (36.49 MB)
 Non-trainable params: 960 (3.75 KB)

Model 2

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense

df = pd.read_csv('kaggle/input/corona-virus-report/country_wise_latest.csv')

X = df.select_dtypes(include=[np.number]).drop('deaths', axis=1)
y = df['deaths']

X.replace([np.inf, -np.inf], np.nan, inplace=True)
X.fillna(X.mean(), inplace=True)

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

model = Sequential([
    Dense(64, activation='relu', input_shape=X_scaled.shape[1:]),
    Dense(32, activation='relu'),
    Dense(1)
])
```

Model: "sequential_1"

Layer (type)	Output Shape	Param #
dense_3 (Dense)	(None, 64)	832
dense_4 (Dense)	(None, 32)	2080
dense_5 (Dense)	(None, 1)	33

Total params: 2945 (11.50 KB)
 Trainable params: 2945 (11.50 KB)
 Non-trainable params: 0 (0.00 Byte)

	<pre> model.compile(optimizer='adam', loss='mean_squared_error', metrics=['mean_absolute_error']) model.summary() history = model.fit(X_scaled, y, epochs=50, batch_size=32, validation_split=0.2) loss, mae = model.evaluate(X_scaled, y) print(f'Test Mean Absolute Error: {mae}') </pre>	
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