ASL – Alphabet Image Recognition

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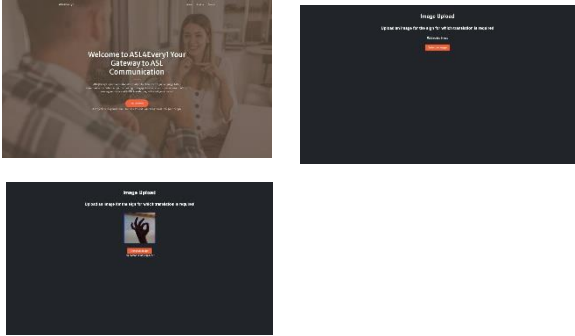
Model Performance Testing

Parameter	Values	Screenshot
Metrics	Confusion Matrix	

| | Accuracy Score | ```python
metrics = pd.DataFrame(model.history.history)
print("The model metrics are")
metrics
``` |
| | | The model metrics are |
				loss	accuracy	val_loss	val_accuracy
			0	1.093370	0.672299	0.286788	0.909157
			1	0.158349	0.948424	0.106573	0.965900
			2	0.078258	0.975172	0.193878	0.947663
			3	0.049385	0.984581	0.053560	0.982988
			4	0.044546	0.985665	0.031719	0.988391
			5	0.030379	0.990788	0.040670	0.987433
			6	0.037448	0.988752	0.047627	0.983716

Classification Report

```python
print(classification_report(y_test,predictions.argmax(axis=1)))
```

```
              precision    recall  f1-score   support

           0       1.00      0.97      0.99       900
           1       0.96      0.99      0.98       900
           2       0.99      1.00      1.00       900
           3       0.98      1.00      0.99       900
           4       1.00      0.95      0.97       900
           5       0.99      1.00      1.00       900
           6       0.99      1.00      0.99       900
           7       1.00      1.00      1.00       900
           8       0.98      1.00      0.99       900
           9       1.00      0.99      1.00       900
          10       1.00      0.91      0.95       900
          11       0.99      1.00      1.00       900
          12       0.96      1.00      0.98       900
          13       0.99      0.99      0.99       900
          14       0.99      0.99      0.99       900
          15       0.98      1.00      0.99       900
          16       1.00      0.97      0.99       900
          17       0.92      1.00      0.96       900
          18       1.00      0.96      0.98       900
          19       1.00      0.97      0.99       900
          20       1.00      0.89      0.94       900
          21       0.89      0.99      0.93       900
          22       1.00      0.99      1.00       900
          23       0.98      0.99      0.98       900
          24       0.98      0.99      0.99       900
          25       1.00      1.00      1.00       900
          26       1.00      1.00      1.00       900
          27       1.00      1.00      1.00       900
          28       1.00      0.99      1.00       900

    accuracy                           0.98     26100
   macro avg       0.98      0.98      0.98     26100
weighted avg       0.98      0.98      0.98     26100
```

Tune the Model	Hyper Parameter Tuning	
| | | ```python
model = Sequential()

model.add(Conv2D(32, (5, 5), input_shape=(64, 64, 3)))
model.add(Activation('relu'))
model.add(MaxPooling2D((2, 2)))

model.add(Conv2D(64, (3, 3)))
model.add(Activation('relu'))
model.add(MaxPooling2D((2, 2)))

model.add(Conv2D(64, (3, 3)))
model.add(Activation('relu'))
model.add(MaxPooling2D((2, 2)))

model.add(Flatten())

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

model.add(Dense(29, activation='softmax'))

model.summary()
``` |
| | | ```
Model: "sequential"

 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 60, 60, 32)        2432

 activation (Activation)     (None, 60, 60, 32)        0

 max_pooling2d (MaxPooling2   (None, 30, 30, 32)        0
 D)

 conv2d_1 (Conv2D)           (None, 28, 28, 64)        18496

 activation_1 (Activation)   (None, 28, 28, 64)        0

 max_pooling2d_1 (MaxPoolin   (None, 14, 14, 64)        0
 g2D)

 conv2d_2 (Conv2D)           (None, 12, 12, 64)        36928

 activation_2 (Activation)   (None, 12, 12, 64)        0

 max_pooling2d_2 (MaxPoolin   (None, 6, 6, 64)          0
 g2D)

 flatten (Flatten)           (None, 2304)              0

 dense (Dense)               (None, 128)               295040

 dense_1 (Dense)             (None, 29)                3741

=================================================================
Total params: 356637 (1.36 MB)
Trainable params: 356637 (1.36 MB)
Non-trainable params: 0 (0.00 Byte)
``` |

Model Performance Test

S. No.	Parameter	Screenshot Values
1	Dashboard Design	These are some of the screenshots of the dashboard design of the website.
2	Data Responsiveness	The result of the image is made by the model in under 2-3 seconds with an accuracy of 98.87%.
3	Amount of Data to be rendered	DB2 Metrics: More than 50,000 images
4	Utilization of Data Filters	Data filters applied for hand shapes, gestures
5	Effective User Story	No of Scenes Added: 10
6	Descriptive Reports	No of Visualizations: 5