Computer Vision

Sign language to text

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Overview

1. Task Description
2. Demo
3. Contribution
4. Data
5. Project Architecture
6. Methods
7. Results

Task Description

Brief description

Recognize American Sign Language (ASL) gestures in real-time and converting them to text.

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Demo

Github Repository

https://github.com/Mollyamged/Sign_Language_to_text.git

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Contribution

1. Collected and added the data by ourselves.
2. Augmented the percentage of data designated for testing purposes.
3. Added a layer from flatten type
4. Substituted the initial three LSTM layers with Dense layers.

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Data

Dataset:

- The dataset consists images for sign language gestures for nine different words.
- Each word is represented by 30 images, resulting in a total of 270 images in the dataset.
- The images are divided into two parts: training set and testing set.10% of the total images are reserved for testing, while the remaining 90% are used for training.

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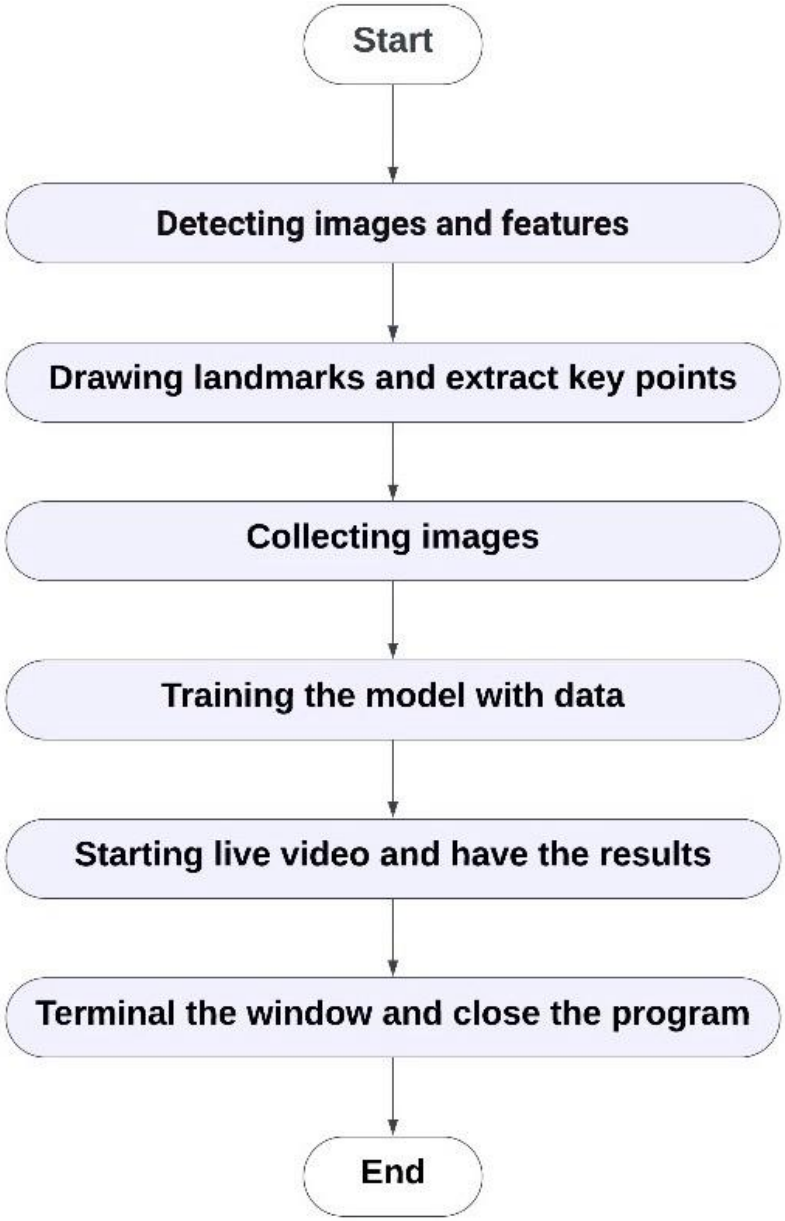
Project Architecture



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Methods

1. **Input Layer (Flatten):**
   - It converts the input data into a 1-dimensional array.
   - input data with dimensions 30x126.
2. **Dense layer(1):**
   - 64 neurons
   - ReLU activation function
3. **Dropout layer(1):**
   - dropout rate of 0.2
   - That mean 20% of the neurons will be randomly dropped during training to prevent overfitting
4. **Dense layer(2):**
   - 128 neurons
   - ReLU activation function
5. **Dropout layer(2):**
   - dropout rate of 0.2

Methods

6. **Dense layer(3):**
   - 64 neurons
   - ReLU activation function
7. **Dropout layer(3):**
   - dropout rate of 0.2
8. **Dense layer(4):**
   - 64 neurons
   - ReLU activation function
9. **Dropout layer(4):**
   - dropout rate of 0.2
10. **Dense layer(5):**
    - 32 neurons
    - ReLU activation function
11. **Dropout layer(5):**
    - dropout rate of 0.2

Methods

12. **Dense layer(Output Layer):**
    - 9 neurons
    - softmax activation function

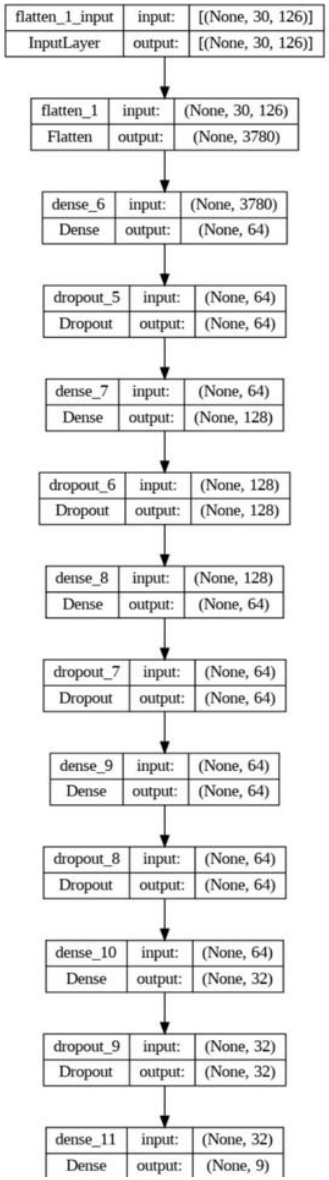
Model Compilation:

- **loss**= 'categorical_crossentropy'
- **optimizer**='adam'
- **metrics**='accuracy'

Model Training:

- **Epochs**=2000
- **batch_size**=32
- **callbacks**=[early_stopping]

Methods


flatten_1_input | input: | [(None, 30, 126)]
InputLayer | output: | [(None, 30, 126)]
flatten_1 | input: | (None, 30, 126)
Flatten | output: | (None, 3780)
dense_6 | input: | (None, 3780)
Dense | output: | (None, 64)
dropout_5 | input: | (None, 64)
Dropout | output: | (None, 64)
dense_7 | input: | (None, 64)
Dense | output: | (None, 128)
dropout_6 | input: | (None, 128)
Dropout | output: | (None, 128)
dense_8 | input: | (None, 128)
Dense | output: | (None, 64)
dropout_7 | input: | (None, 64)
Dropout | output: | (None, 64)
dense_9 | input: | (None, 64)
Dense | output: | (None, 64)
dropout_8 | input: | (None, 64)
Dropout | output: | (None, 64)
dense_10 | input: | (None, 64)
Dense | output: | (None, 32)
dropout_9 | input: | (None, 32)
Dropout | output: | (None, 32)
dense_11 | input: | (None, 32)
Dense | output: | (None, 9)

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Results

1. **Accuracy: 96.3%**
2. **Loss: 14.89%**

```
[40]: loss, accuracy = model.evaluate(X_test, y_test)
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 47ms/step - accuracy: 0.9630 - loss: 0.1489
```