

Sign Language Hand Gesture Recognition with CNN

Reads 25 American Sign Language hand gestures from a webcam in real time.

BUILT WITH

Deep Learning

Computer Vision

CNN

TensorFlow

Flask

Image Classification

Accessibility

98.65% to 99.78%

test accuracy after regularisation

25

hand gestures recognised

28 x 28

grayscale input per frame

How it works



WHAT EACH PART DOES

Camera capture (OpenCV)	Reads frames from the webcam on the server.
Preprocessing	Grayscale, resize to 28 x 28, normalise.
CNN classifier	Predicts the letter; two saved versions (.h5) allow a before/after comparison.
Flask stream	Draws the letter on the frame and streams video to the browser (MJPEG).



Key decisions

01

Keep both model versions

The plain CNN reached 98.65%. Adding dropout and data augmentation reached 99.78%. Both files stay in the repo so the gain can be checked.

02

Stop on validation loss

Early stopping watches validation loss with 3 epochs of patience and restores the best weights, instead of a metric that keeps rising as the model memorises.

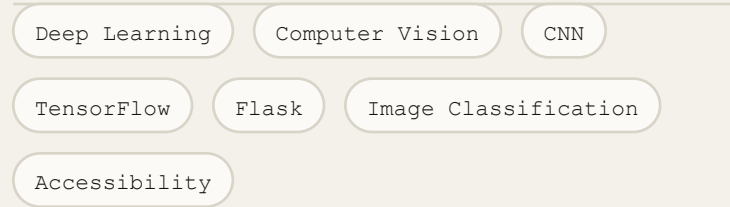
03

Admit the local-only limit

The demo opens the server's own camera, so it cannot serve public visitors. A browser-capture design was started to fix that.

Stack, status and what is next

BUILT WITH



KNOWN LIMITS

- Works as a local demo only; a public visitor's camera cannot reach a remote Python process this way.

NEXT STEPS

- Finish the browser version: capture frames with `getUserMedia` and POST them to a `/predict` endpoint.

SOURCE

<https://github.com/wailethewave/Sign-Language-Hand-Gesture-Recognition-Using--CNN>

