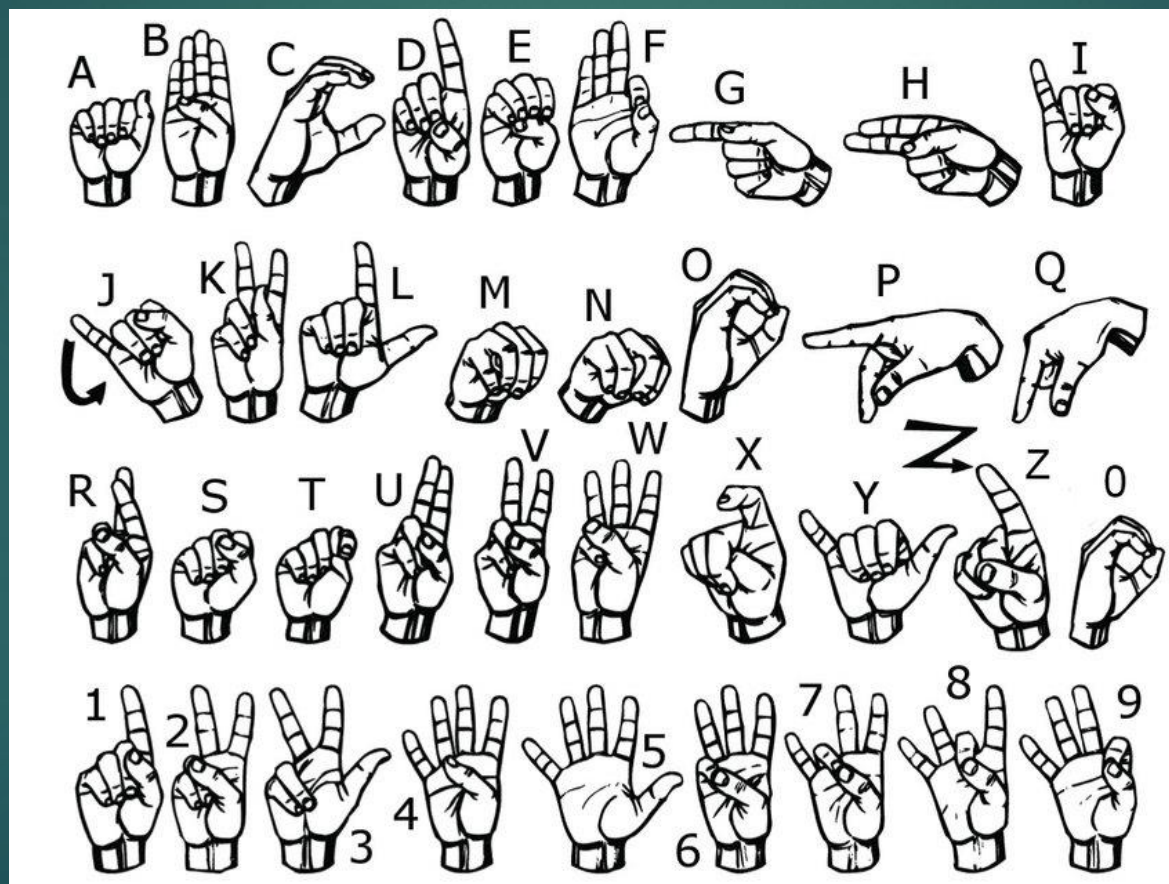




ASL RECOGNITION

AUTHOR: MACIEJ CABAN

American sign language

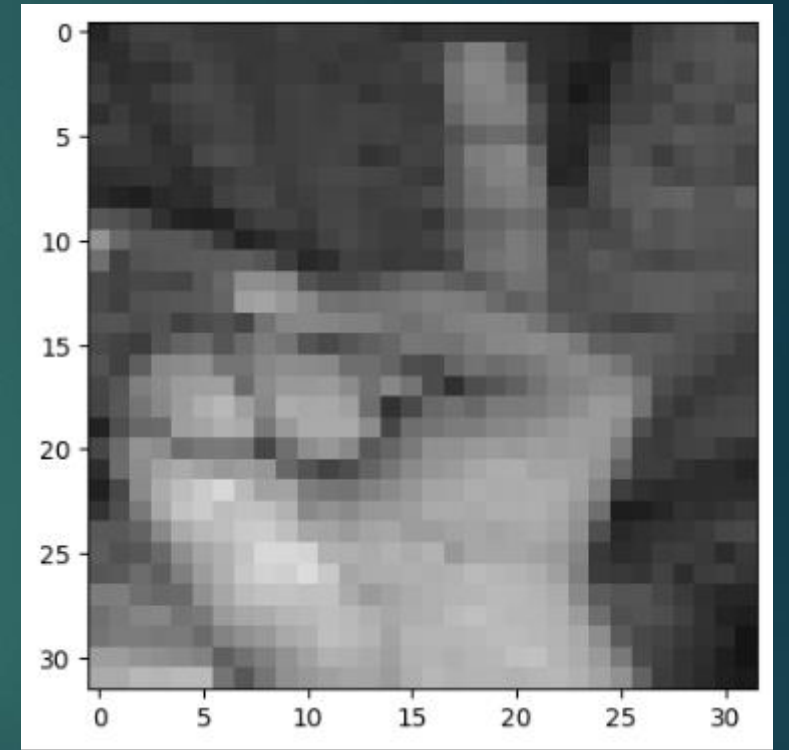
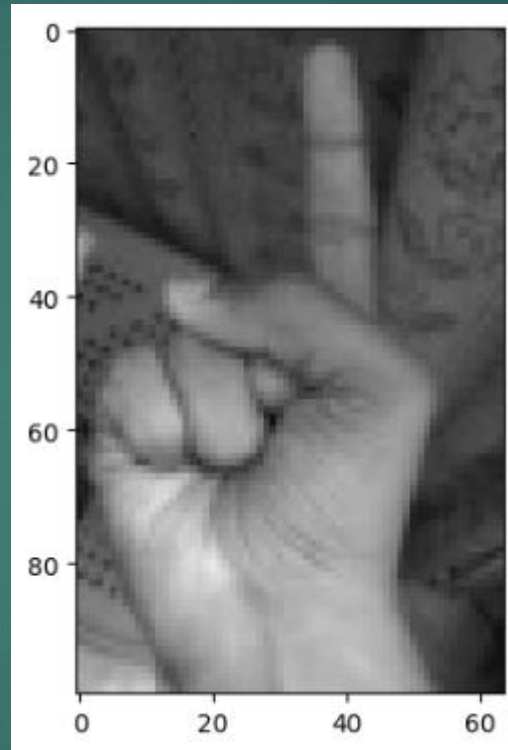


Tools

- ▶ Tensorflow
- ▶ Keras
- ▶ Python
- ▶ Jupyter lab

Dataset

- ▶ 33 classes (without J and Z)
- ▶ 1500 images for class
- ▶ Images scaled to 32x32



Model

- ▶ 2D convolution layer
- ▶ Dropout layer
- ▶ Batch normalization layer
- ▶ Flatten layer
- ▶ Dense layer
- ▶ 20 epochs

Model

```
model.add(Conv2D(64, (3, 3), padding='same', input_shape=(32, 32, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(tf.keras.layers.BatchNormalization())

model.add(Conv2D(128, (3, 3), padding='same', input_shape=(32, 32, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(tf.keras.layers.BatchNormalization())
model.add(Dropout(0.2))

model.add(Conv2D(256, (3, 3), padding='same', input_shape=(32, 32, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(tf.keras.layers.BatchNormalization())

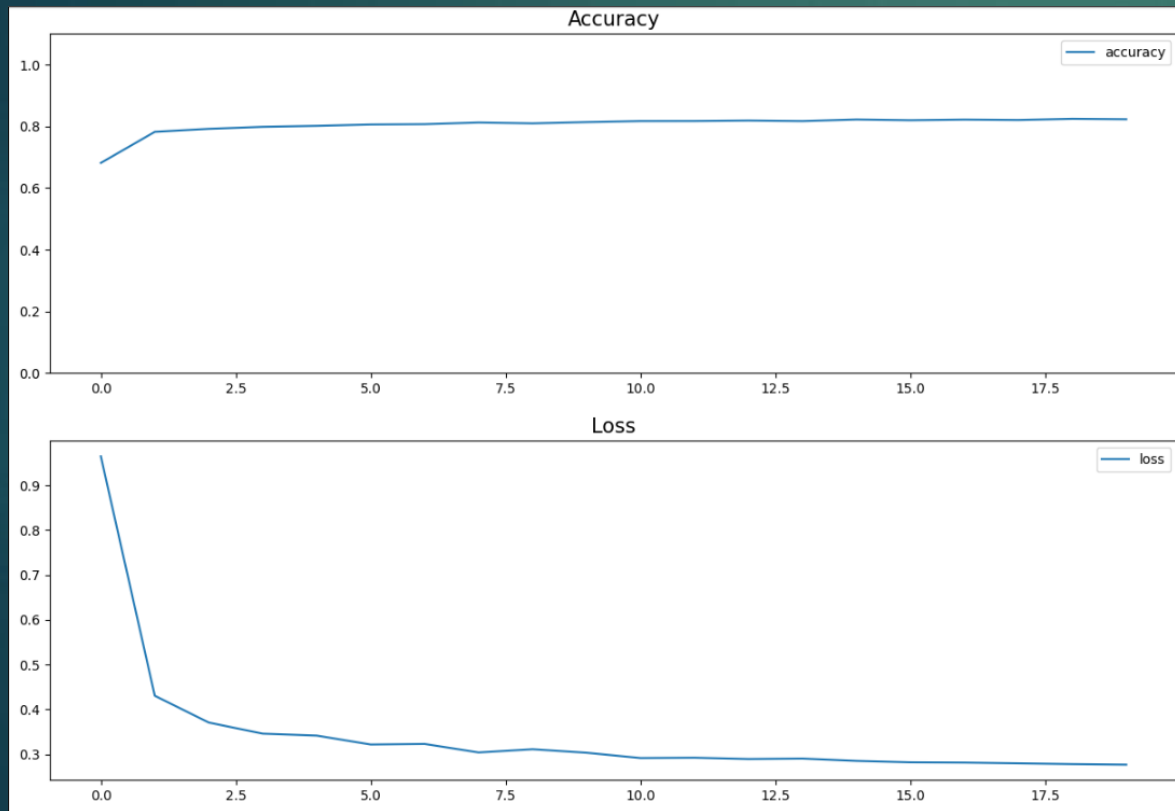
model.add(Flatten())
model.add(Dropout(0.2))
model.add(Dense(1024, activation='relu'))
model.add(Dense(33, activation='softmax'))
```

Training

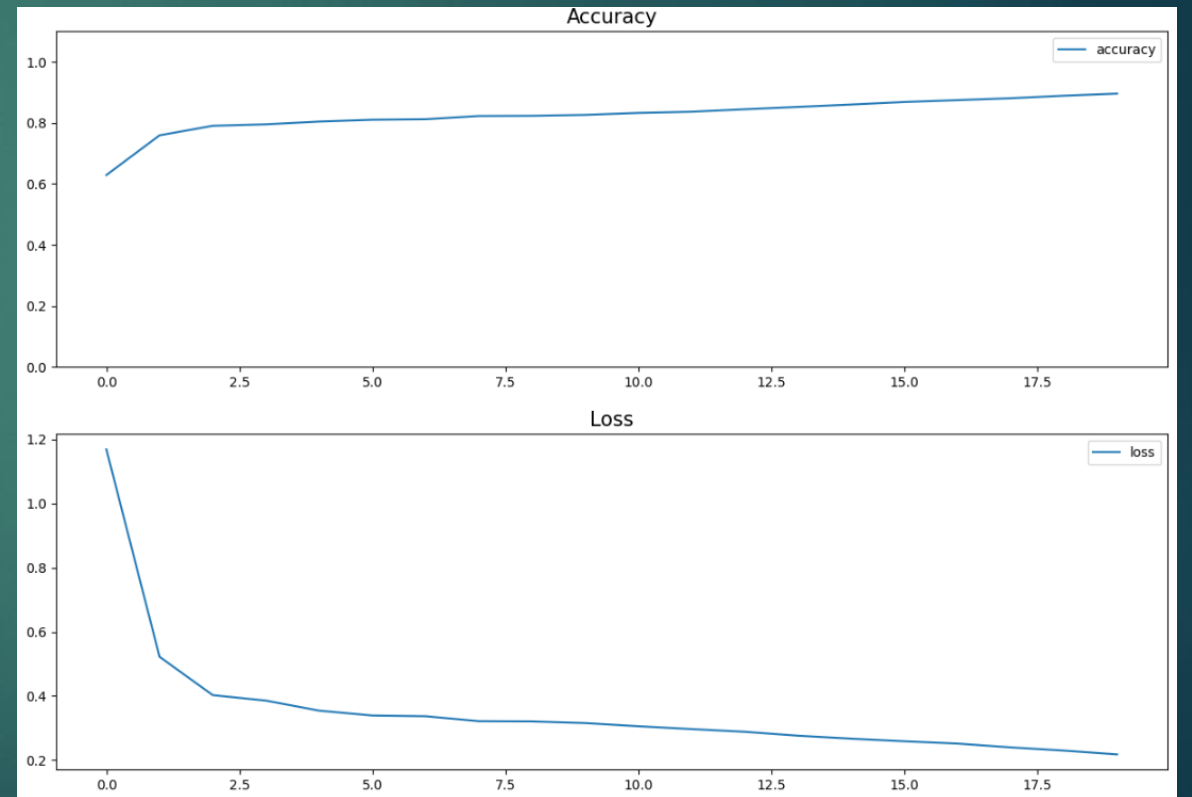
	1	2	3	4	5	6	7
Con2D	3	3	3	3	2	1	3
Dropout	2x0.2	-	1x0.2	2x0.5	2x0.2	1x0.2	2x0.2
Dense	1	1	1	1	1	1	1
Flatten	1	1	1	1	1	1	1
Batch norm	3	3	3	3	2	1	-
Accuracy	0.823	0.84	0.8268	0.8093	0.8391	0.889	0.8552
Loss	0.2766	0.2618	0.2711	0.3035	0.2696	0.2301	0.2537
Time/Epoch	130s	125s	125s	130s	170s	270s	120s

Training

Model 1

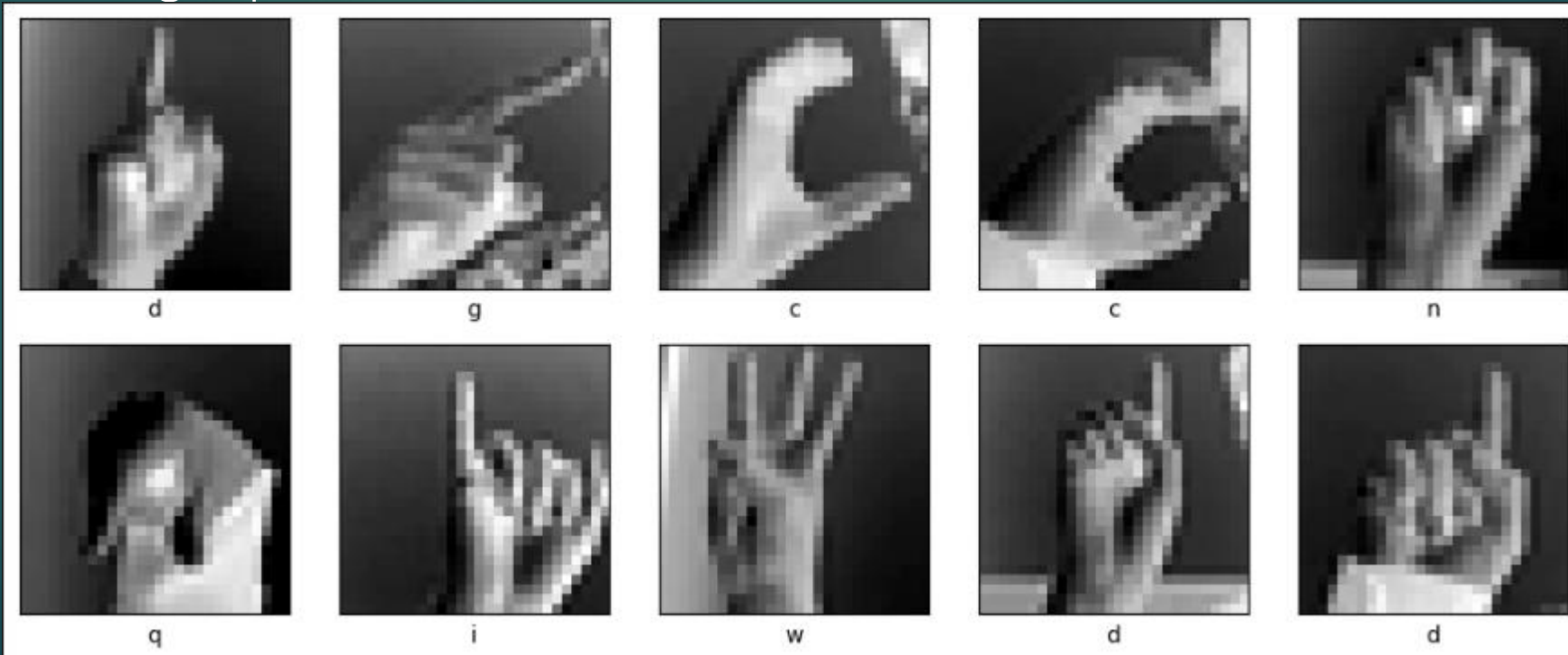


Model 6



Dataset mnist

- ▶ Only letters (without J and Z)
- ▶ 24 classes
- ▶ 1000 images per class



Training mnist

Model 1

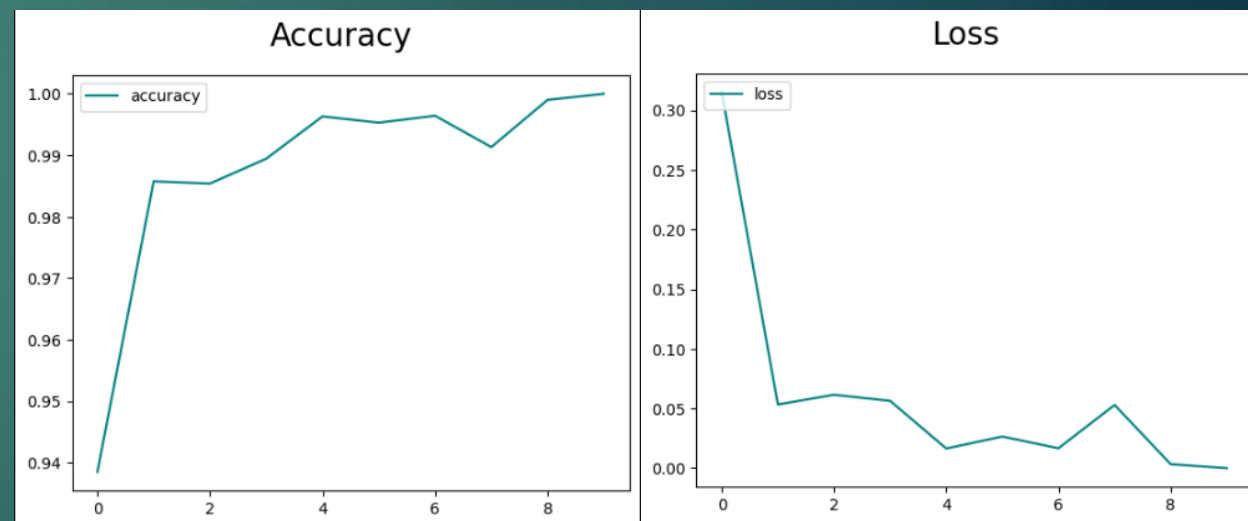
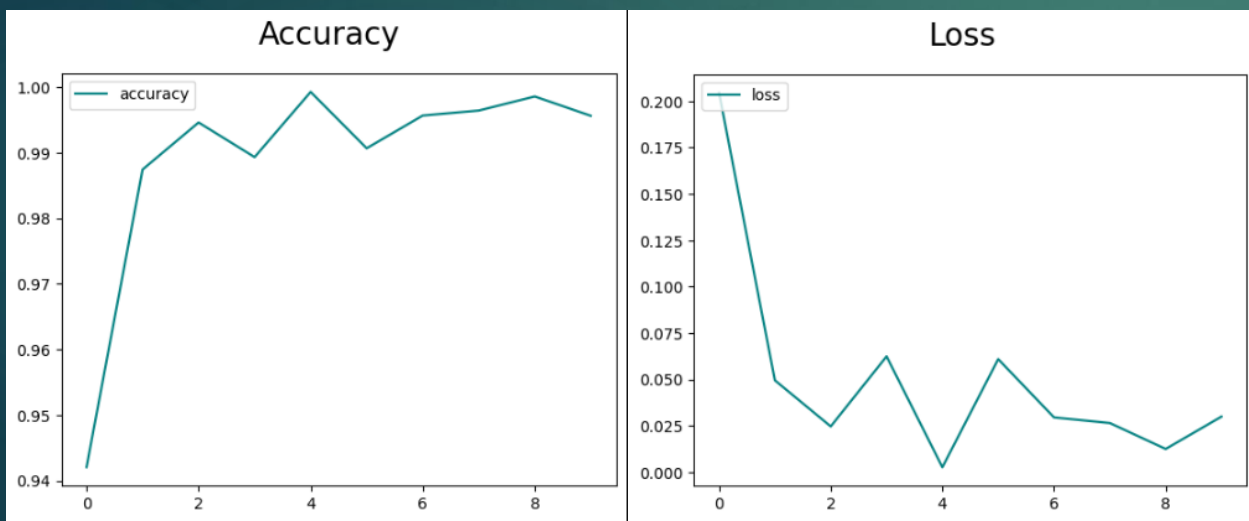
Accuracy: 0.9956 (0.9993)

Loss: 0.03 (0.0027)

Model 6

Accuracy: 1

Loss: 0.000016702



Epoch = 10



Thank you for your attention

Sources:

- ▶ <https://www.kaggle.com/datasets/datamunge/sign-language-mnist>
- ▶ <https://www.kaggle.com/datasets/muhammadrkhalid/sign-language-for-numbers>
- ▶ <https://www.kaggle.com/datasets/muhammadrkhalid/sign-language-for-alphabets>
- ▶ <https://keras.io>
- ▶ https://www.tensorflow.org/?gad=1&gclid=Cj0KCQjwj_ajBhCqARIsAA37s0yg49ORkJ73tXufk3xfpMjLsQGsW2pRRrC96vjwIC3ICIA3KqH8_hYaAgGiEALw_wcB&hl=pl