

# Generování syntetického otisku prstu pomocí GAN

Lukáš Salvét (xsalve02)

Jan Svoboda (xsvobo0s)

# Shrnutí projektu

- SOCOFing dataset - (103, 96)  $\rightarrow$  (96, 96)
- PyTorch
- Google Colab



# BigGAN

$$z \in \mathbb{R}^{120} \sim \mathcal{N}(0, I)$$
$$\text{Embed}(y) \in \mathbb{R}^{128}$$

$$\text{Linear } (20 + 128) \rightarrow 4 \times 4 \times 16ch$$

$$\text{ResBlock up } 16ch \rightarrow 16ch$$

$$\text{ResBlock up } 16ch \rightarrow 8ch$$

$$\text{ResBlock up } 8ch \rightarrow 4ch$$

$$\text{ResBlock up } 4ch \rightarrow 2ch$$

$$\text{Non-Local Block } (64 \times 64)$$

$$\text{ResBlock up } 2ch \rightarrow ch$$

$$\text{BN, ReLU, } 3 \times 3 \text{ Conv } ch \rightarrow 3$$

$$\text{Tanh}$$

(a) Generator

$$\text{RGB image } x \in \mathbb{R}^{128 \times 128 \times 3}$$

$$\text{ResBlock down } ch \rightarrow 2ch$$

$$\text{Non-Local Block } (64 \times 64)$$

$$\text{ResBlock down } 2ch \rightarrow 4ch$$

$$\text{ResBlock down } 4ch \rightarrow 8ch$$

$$\text{ResBlock down } 8ch \rightarrow 16ch$$

$$\text{ResBlock down } 16ch \rightarrow 16ch$$

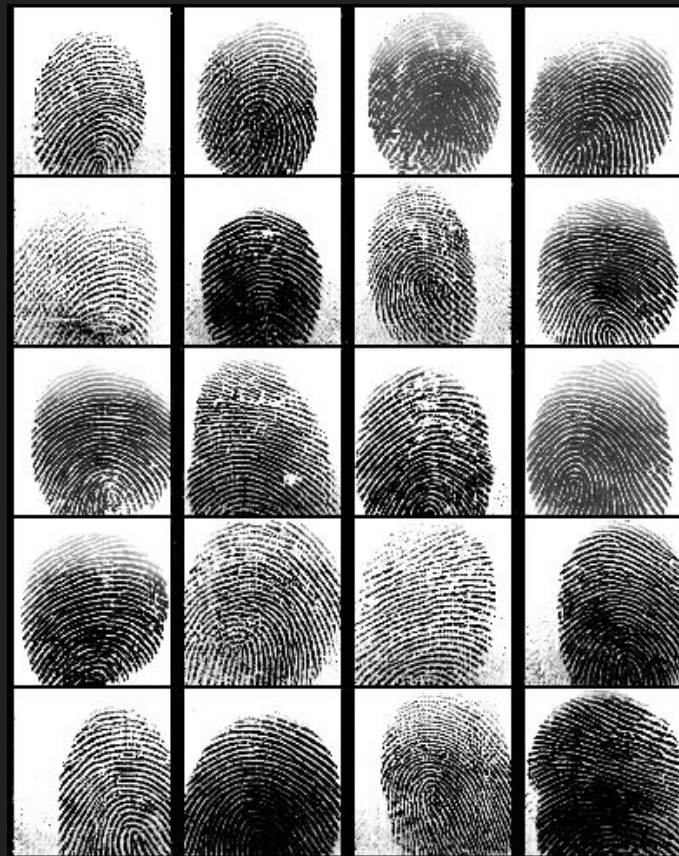
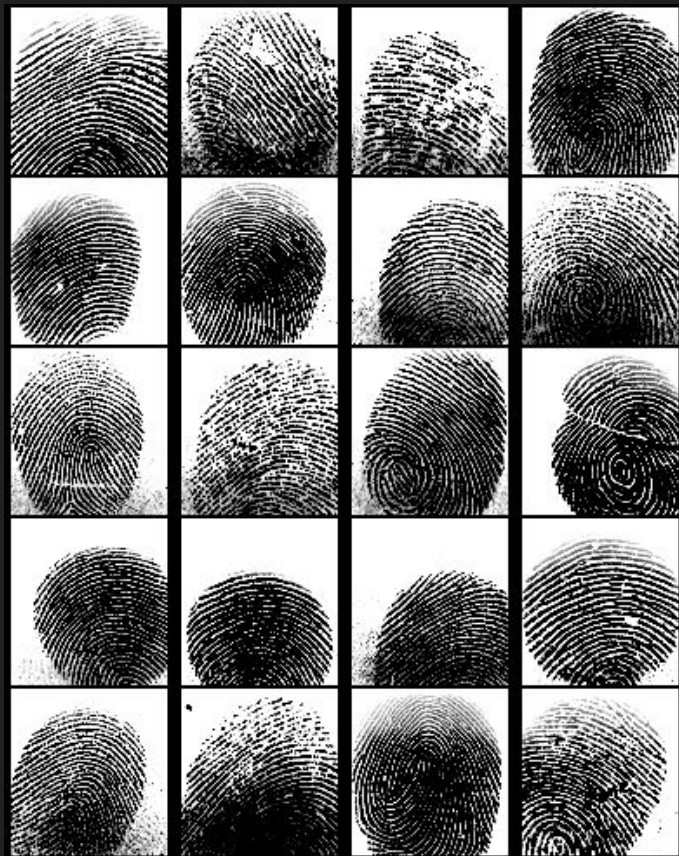
$$\text{ResBlock } 16ch \rightarrow 16ch$$

$$\text{ReLU, Global sum pooling}$$

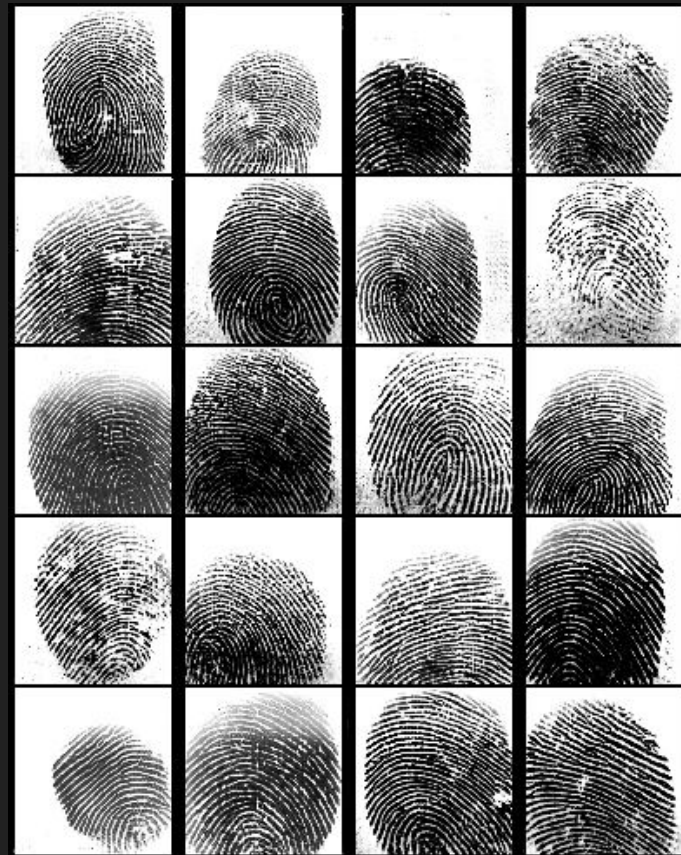
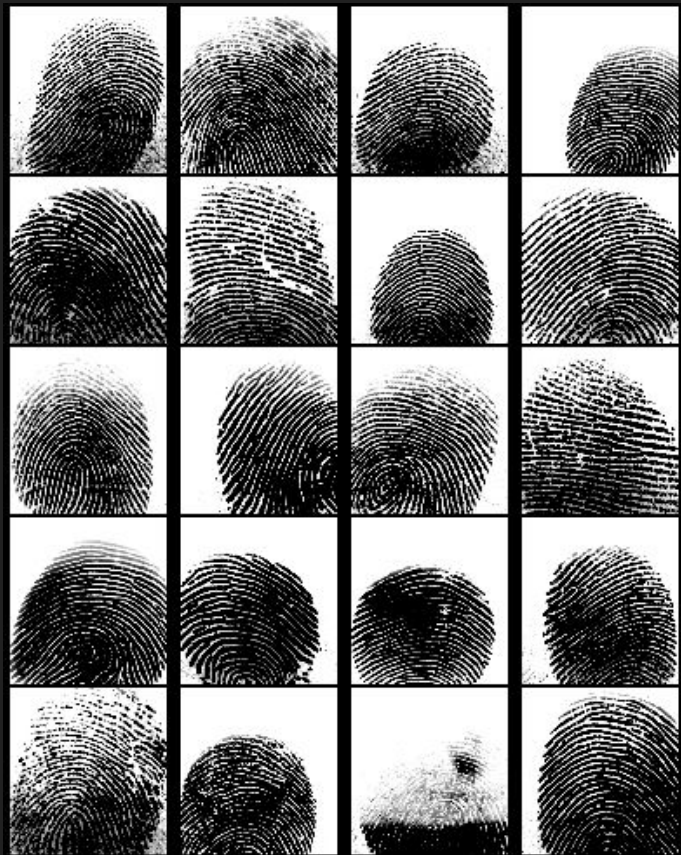
$$\text{Embed}(y) \cdot \mathbf{h} + (\text{linear} \rightarrow 1)$$

(b) Discriminator

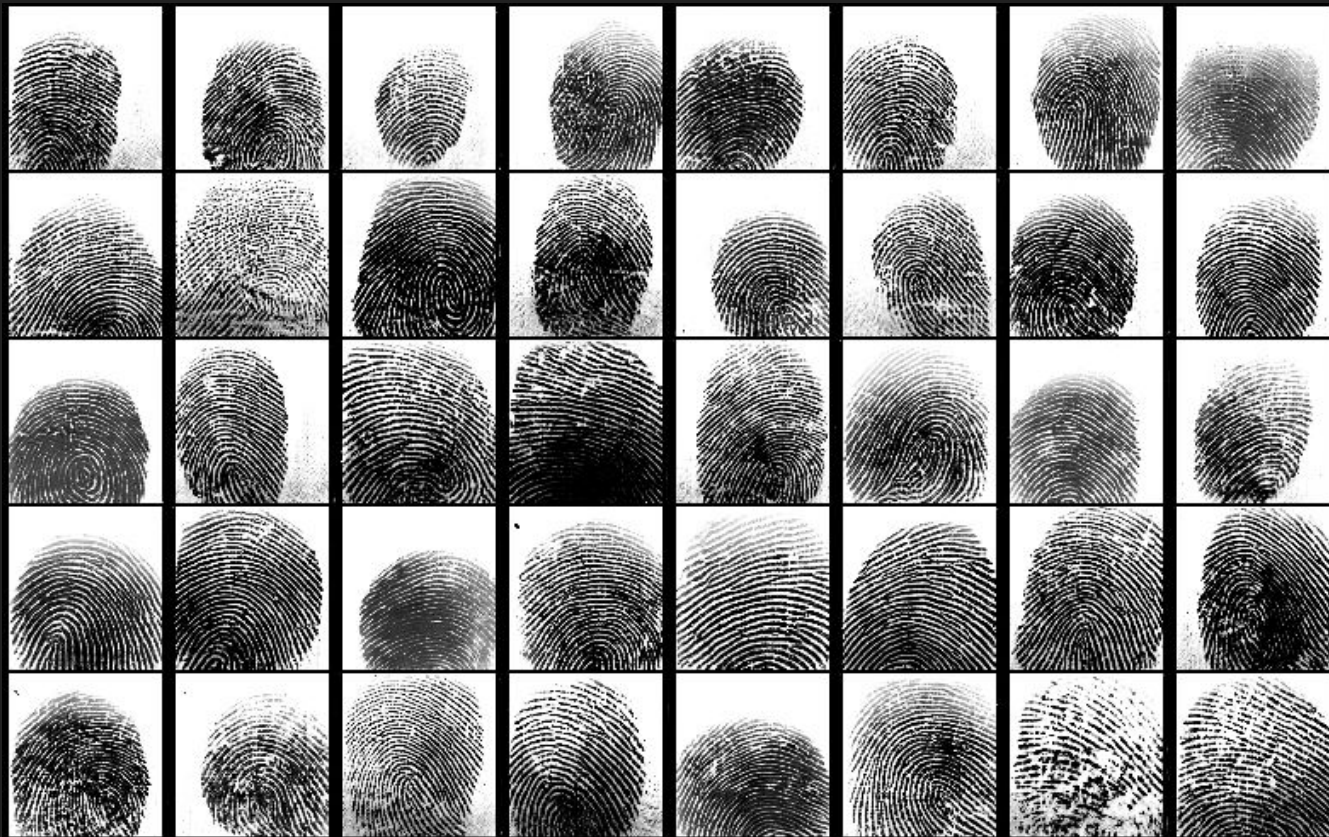
# Které jsou generovány?



# Které jsou generovány?



# Generované otisky



# Trénovací data



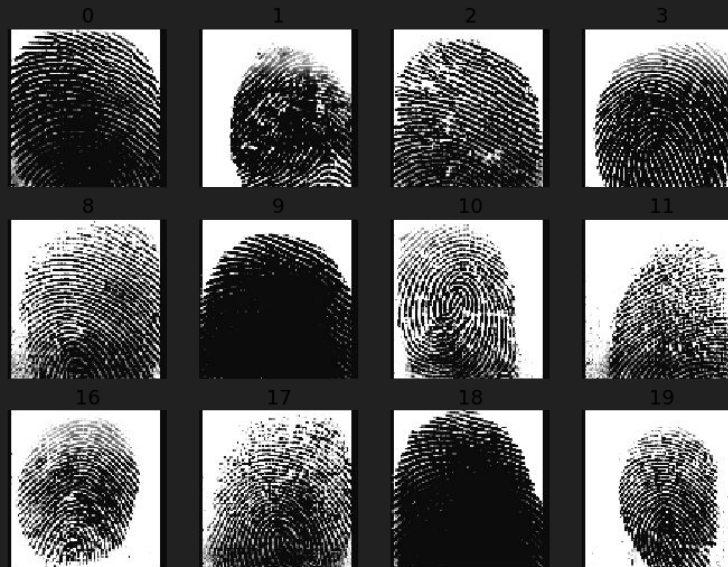
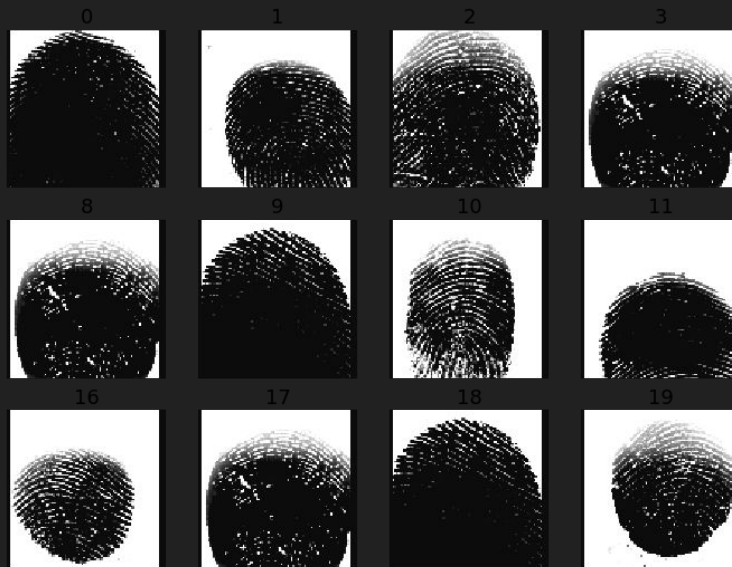
# Vygenerované otisky



SourceAFIS

# Trénovací data

# Vygenerované otisky



nearest neighbor



