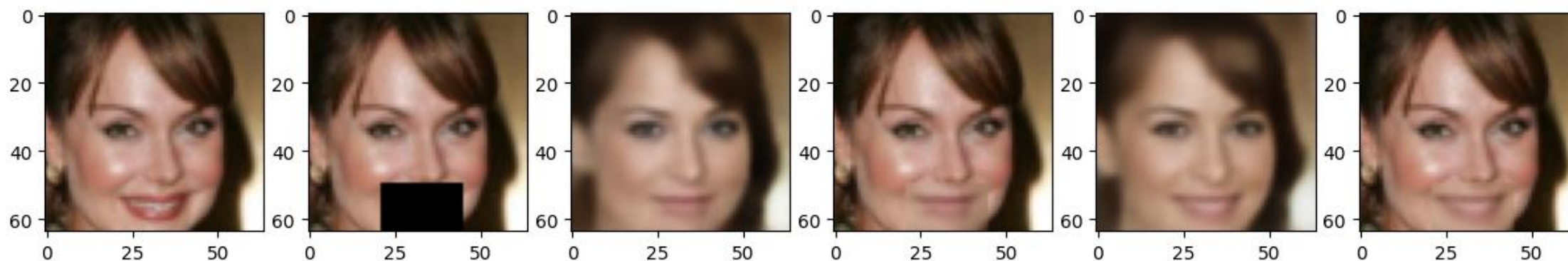


# Upravljivo nadopunjavanje obrisanih regija slika lica

DUBUCE2 2023/24.

Geni Geni GANovi

Tomislav Ćosić, Luka Družijanić, Renato Jurišić, Marko  
Kremer, Anto Matanović, Josip Srzić



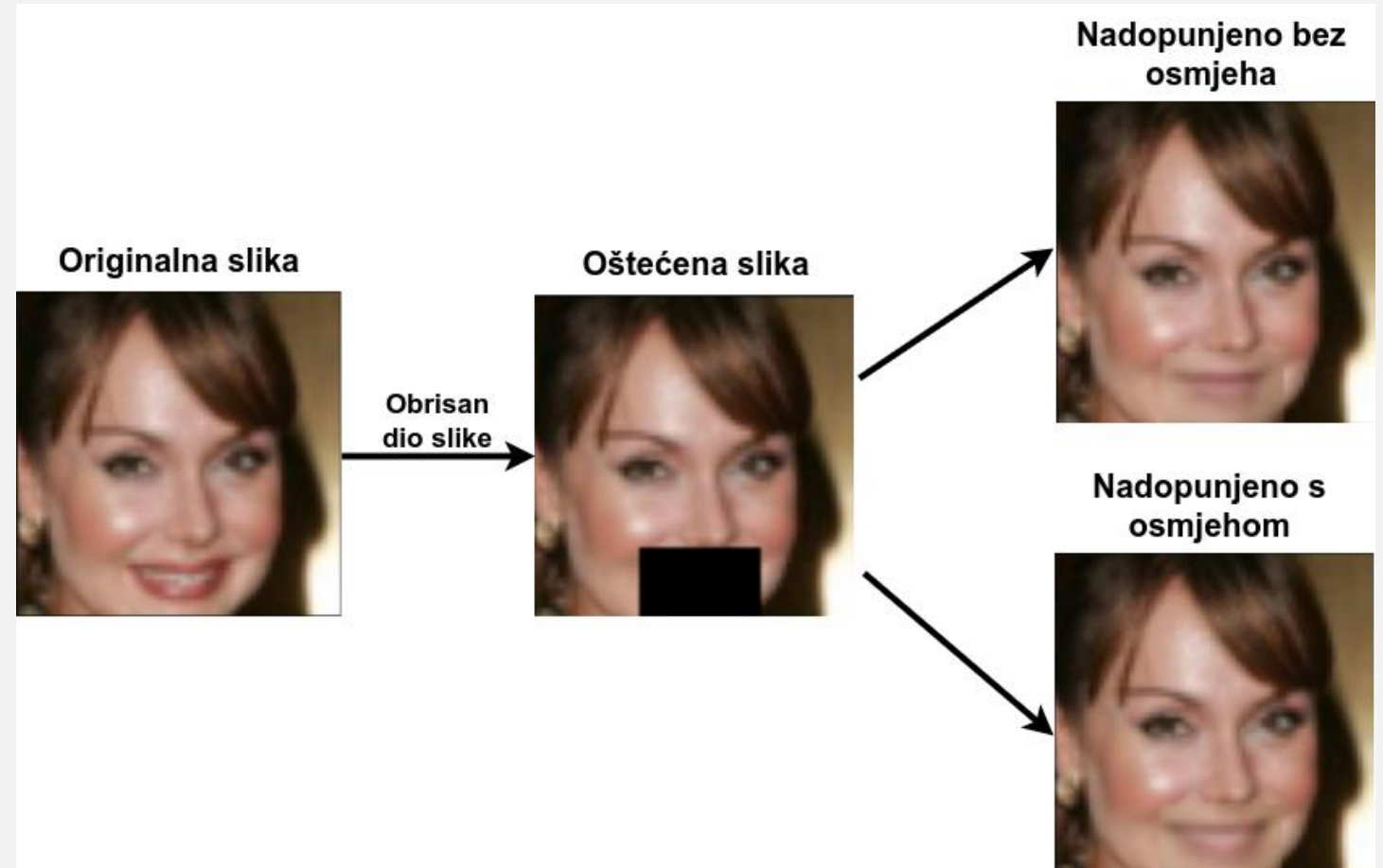
# PROBLEM - nadopunjavanje

- Oštećena slika
- Potrebno je nadopuniti dio koji nedostaje
- Restauracija slike



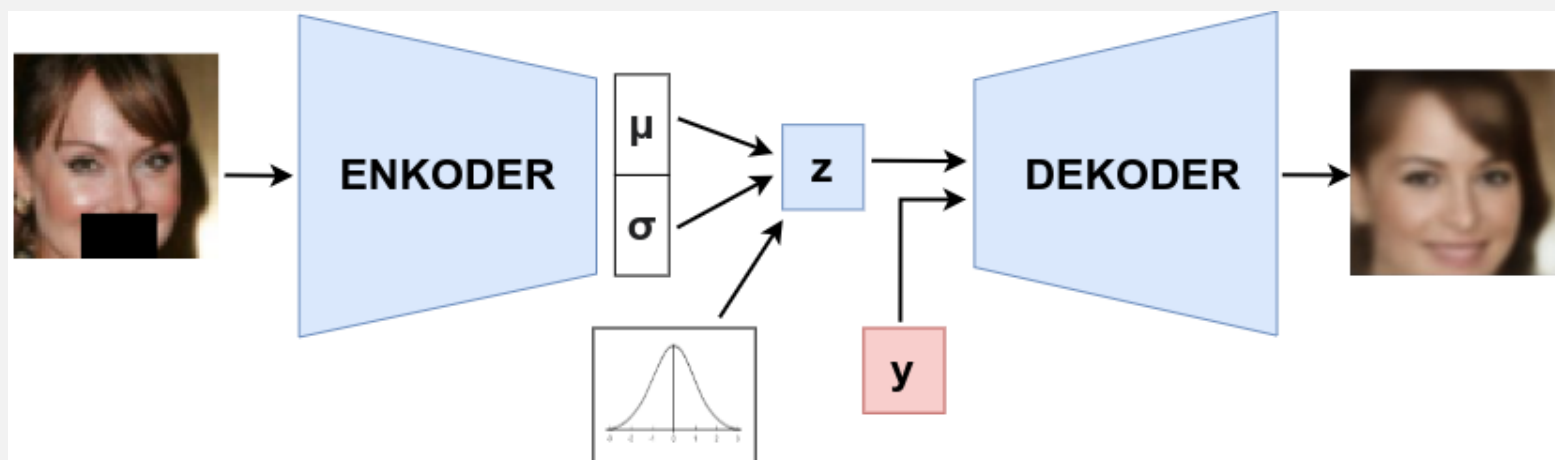
# PROBLEM— usmjereno nadopunjavanje

- Obrisan dio slike
- Potrebno je nadopuniti dio koji nedostaje uz poštivanje uvjeta
- Photoshop



# ARHITEKTURA

- Uvjetovani VAE (cVAE)
- Enkoder mapira sliku u naučeni latentni prostor
- Dekoder rekonstruira sliku
- Uzorkovanje latentnih vektora omogućuje raznolikost nadopunjavanja
- Dekoder je uvjetovan na oznaku



# TRENIRANJE

- Ulaz – slika na kojoj je izbrisan pravokutnih (+oznaka)
- Izlaz – rekonstruirana slika
- Gubitak rekonstrukcije
- Gubitak divergencije distribucije

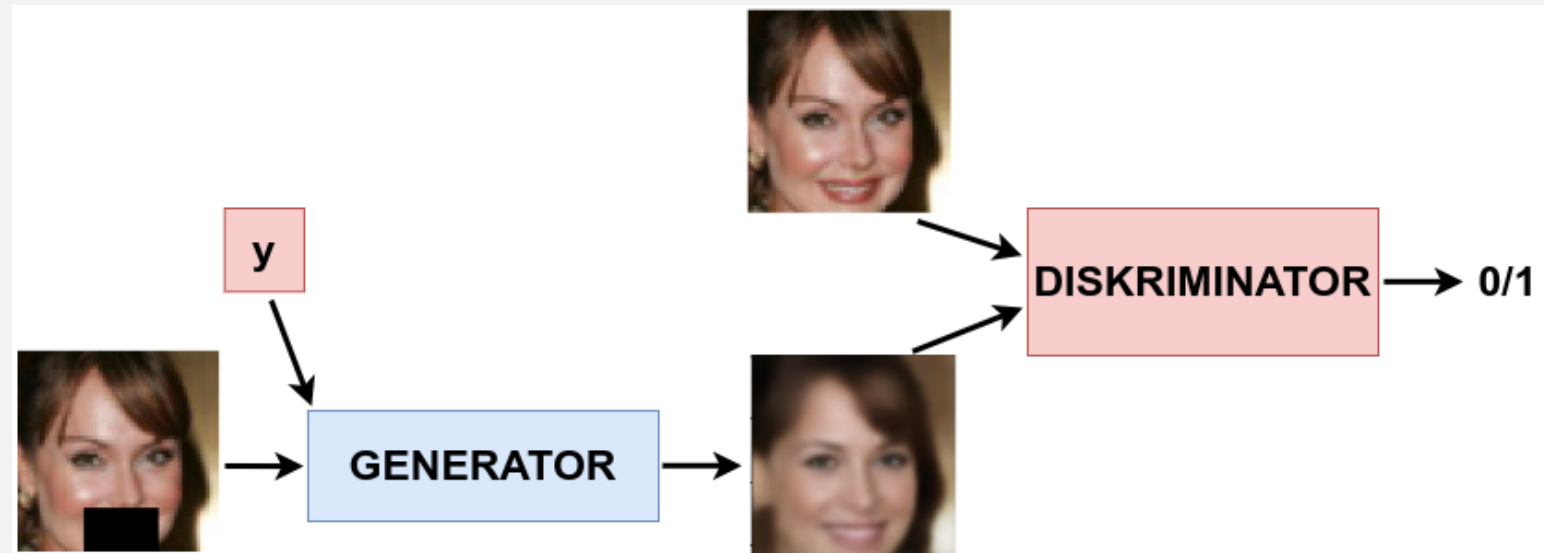
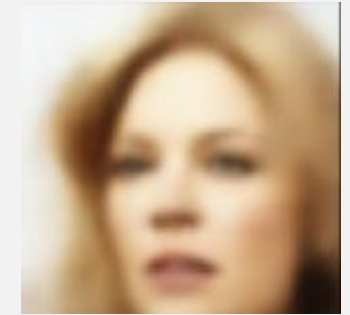
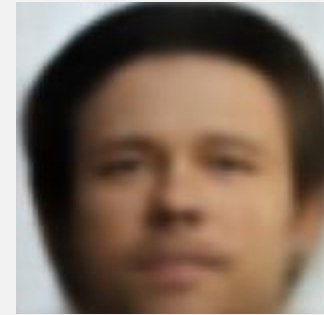
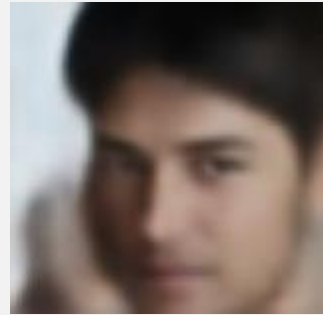
$$L_{BCE} = \sum_{i=1}^N \left[ \mathbf{X} \cdot \ln(\hat{\mathbf{X}}) + (1 - \mathbf{X}) \cdot \ln(1 - \hat{\mathbf{X}}) \right],$$

$$L_{KL} = D_{KL}(\mathcal{N}(\hat{\mu}, \hat{\sigma}^2) \parallel \mathcal{N}(0, 1)) = \\ -1 - \ln \hat{\sigma} + \hat{\sigma} + \hat{\mu}^2,$$

$$L = L_{BCE} + 0.5 \cdot L_{KL}$$

# FINETUNE

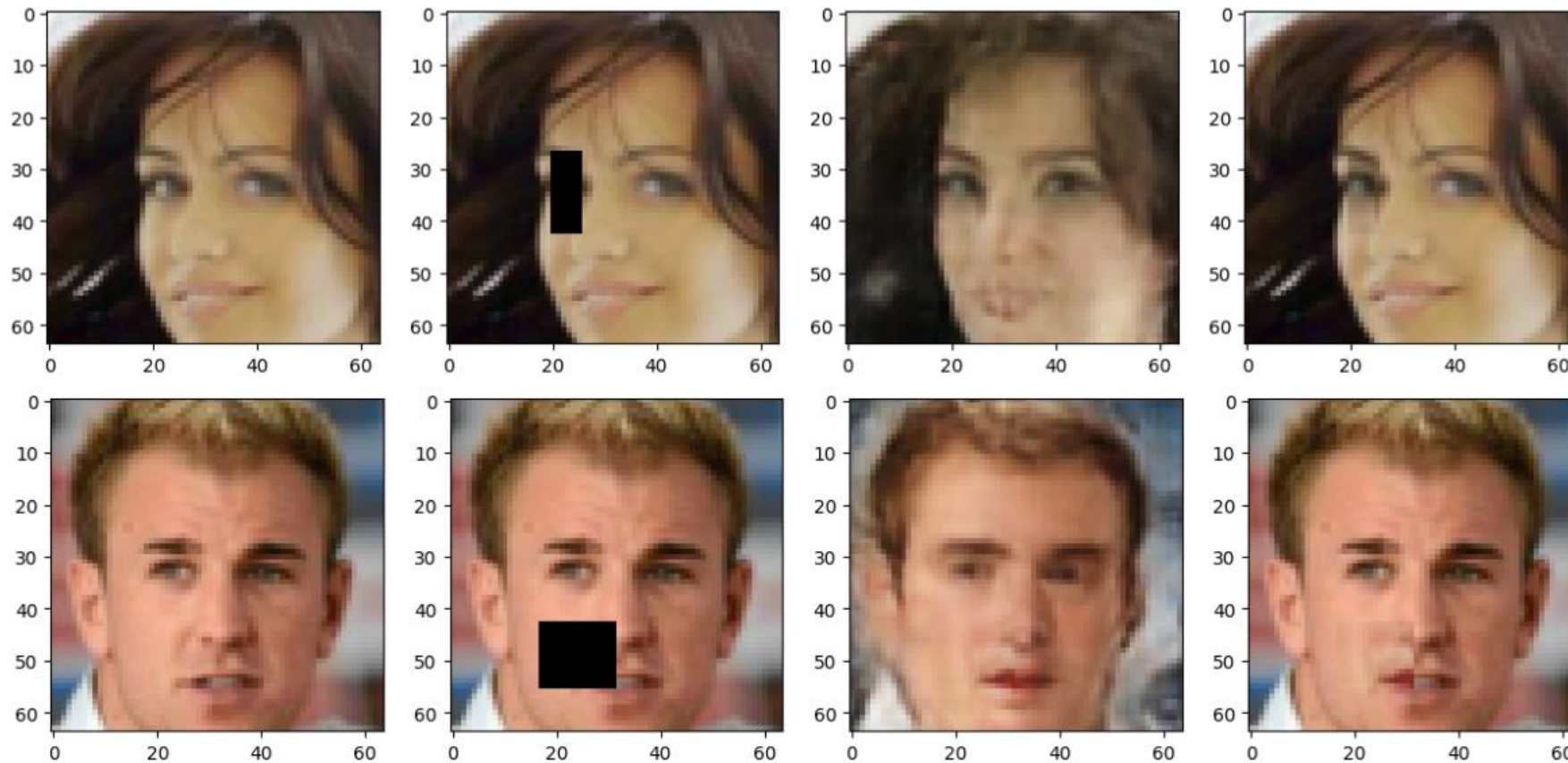
- Osnovni VAE generira mutne slike
- Suparnički gubitak => oštrije slike



# EKSPERIMENTI

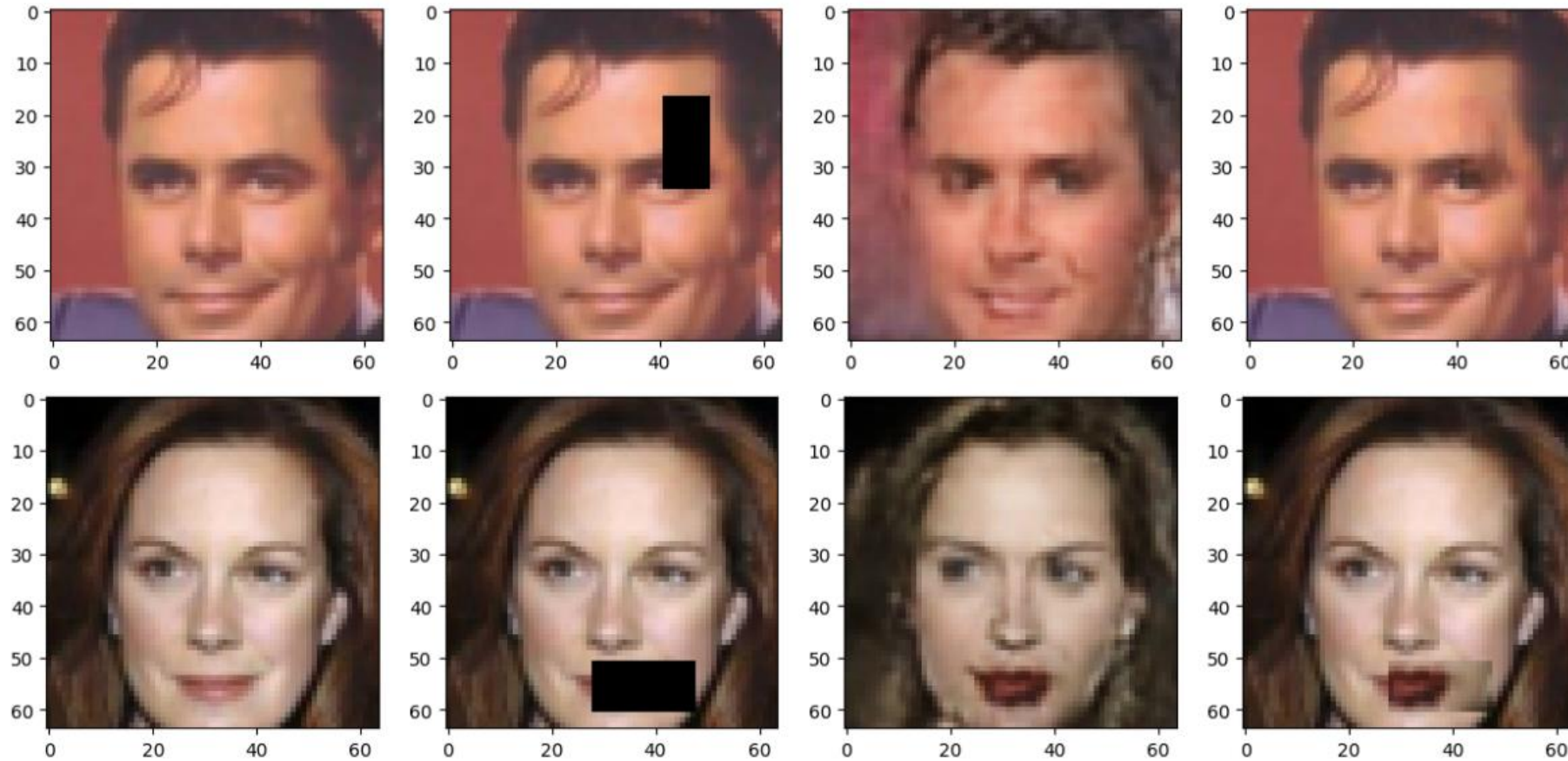
1. Nadopunjavanje
2. Usmjereno nadopunjavanje
3. Usmjerena rekonstrukcija

# General inpainting – SMALL model

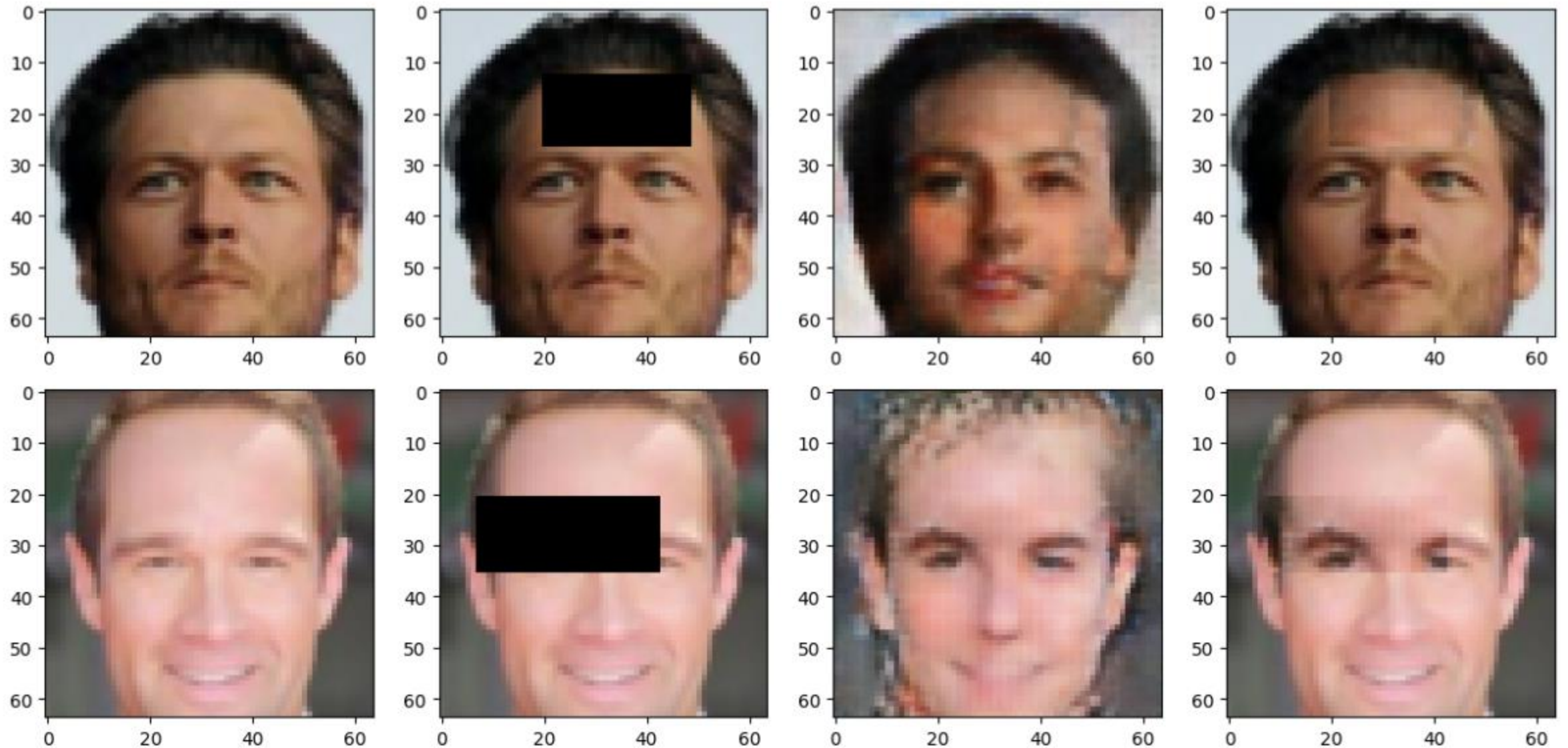




# General inpainting – SMALL model

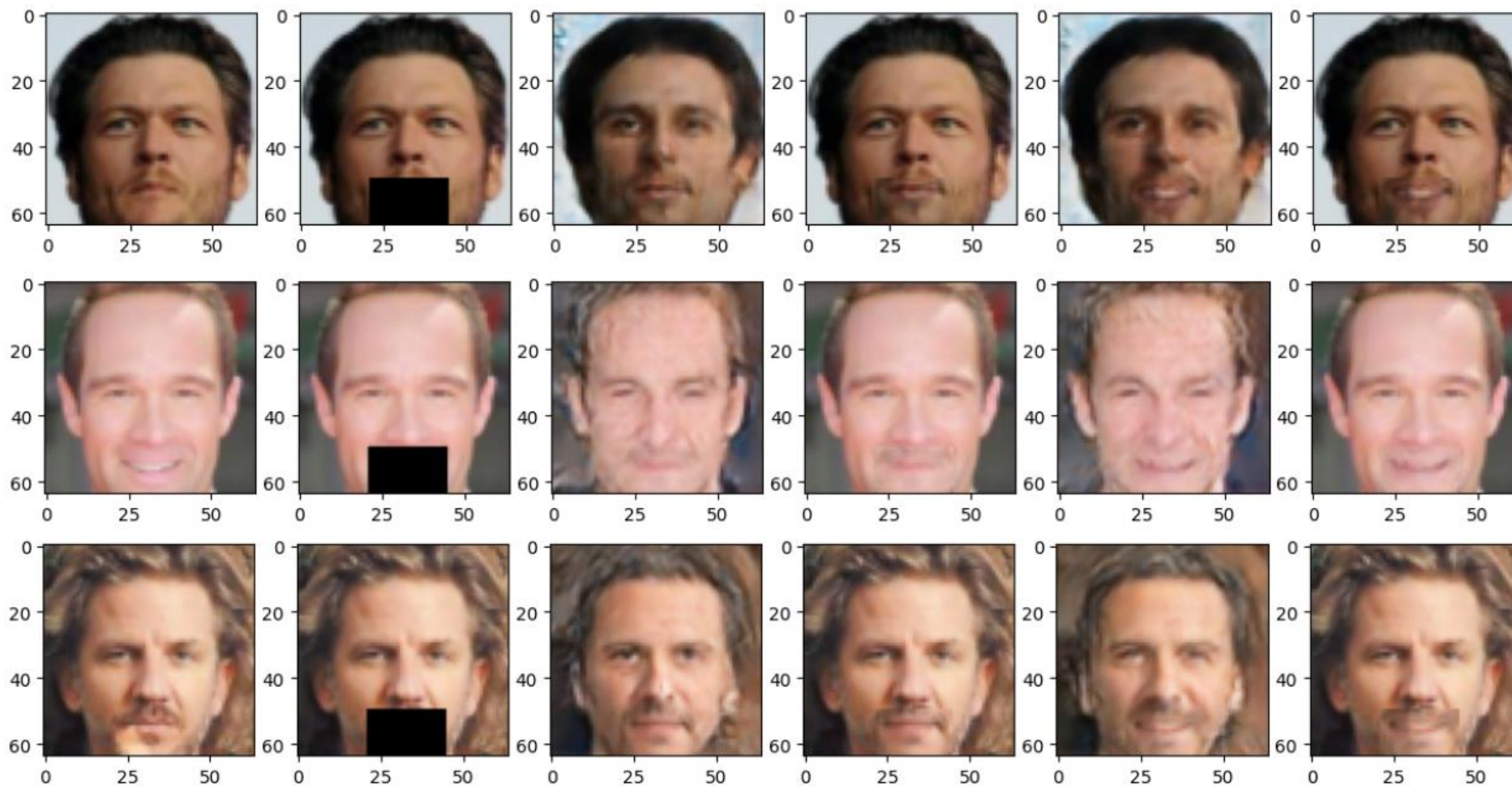


# General inpainting – BIG model

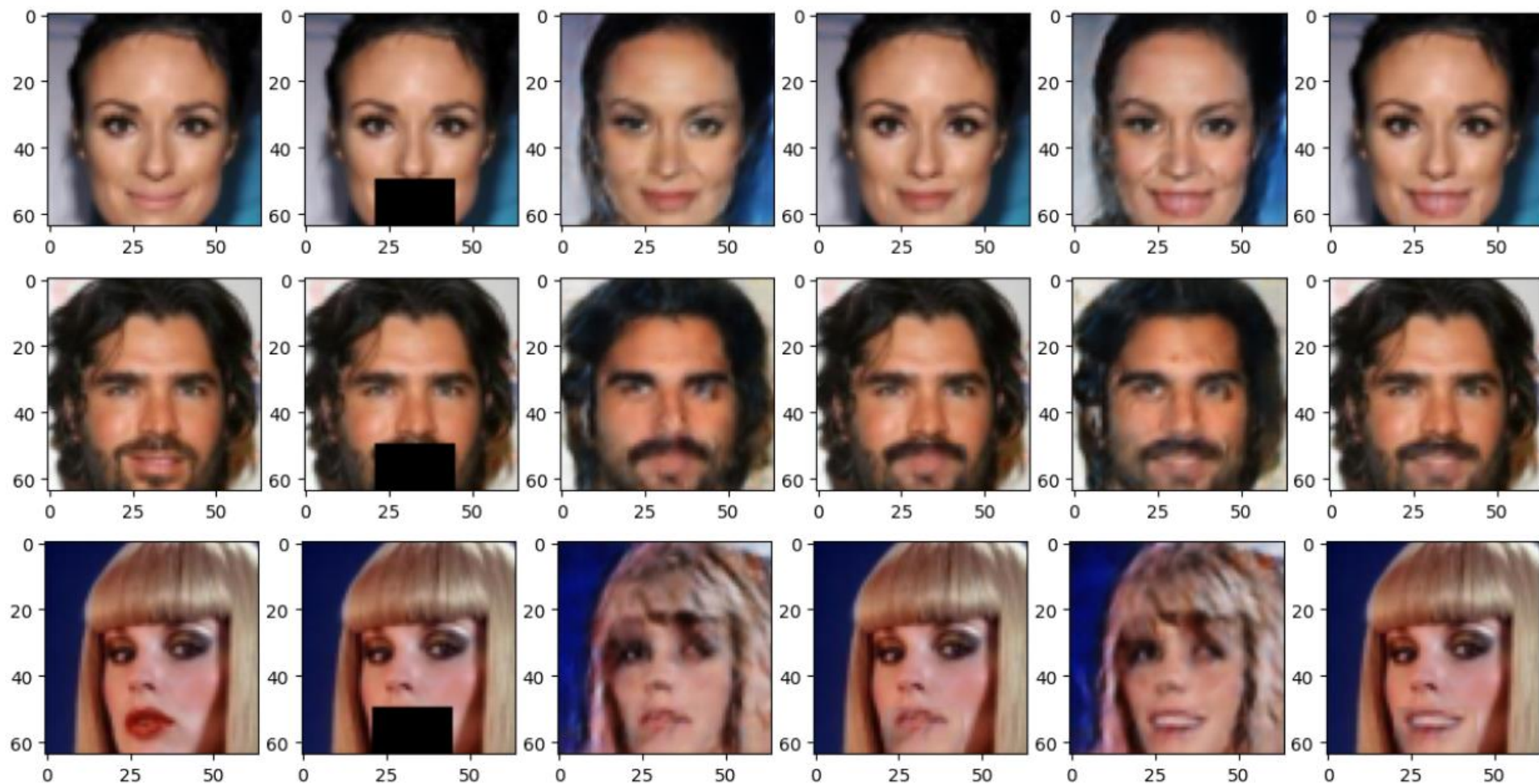




# Smiling-inpainter



# Smiling-inpainter



# Glasses remover





Hvala na pažnji!

