

# **Understanding GANs**

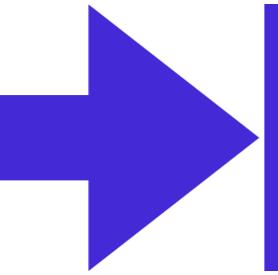
the next leap towards singularity



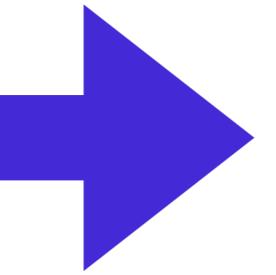
$$D('cat' | X) \approx 1$$



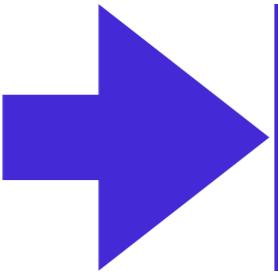
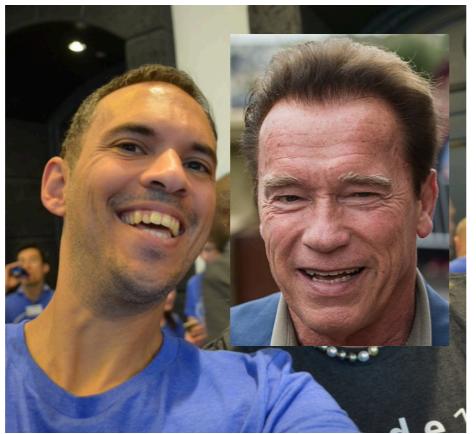
$$D('dog' | X) \approx 1$$



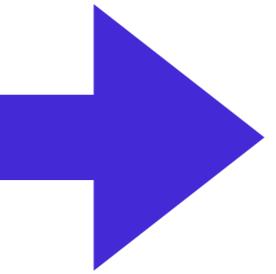
ConvNet



$$D(X) \approx 1$$



ConvNet



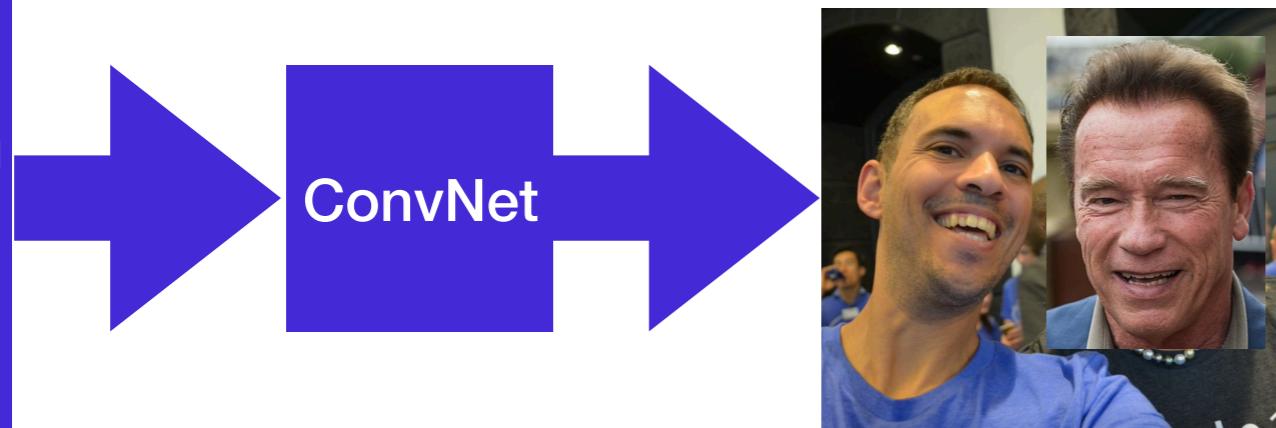
$$D(X) \approx 0$$



ConvNet

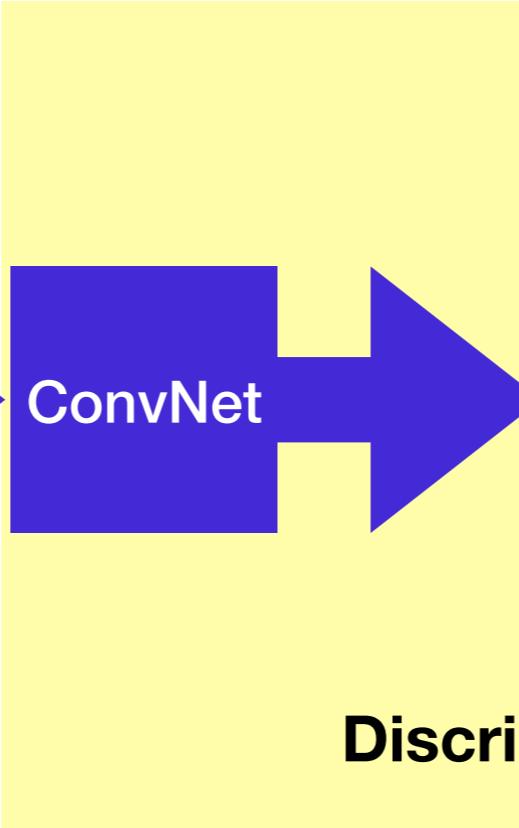
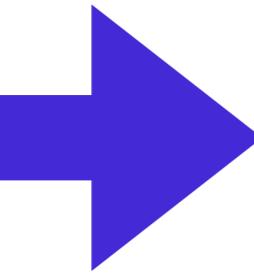
$$D(X) \approx 1$$

R  
A  
N  
D  
O  
M  
  
V  
E  
C  
T  
O  
R



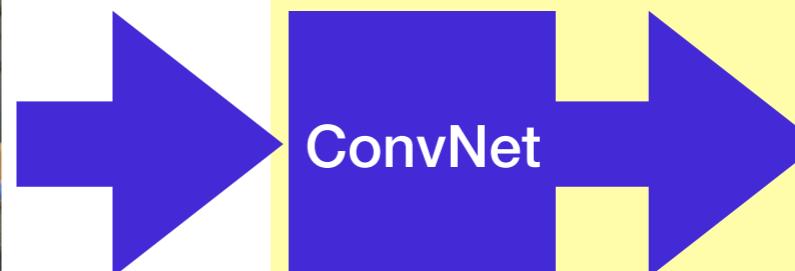
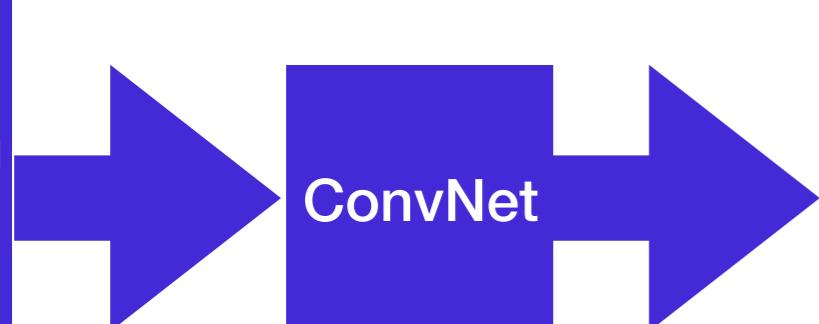
ConvNet

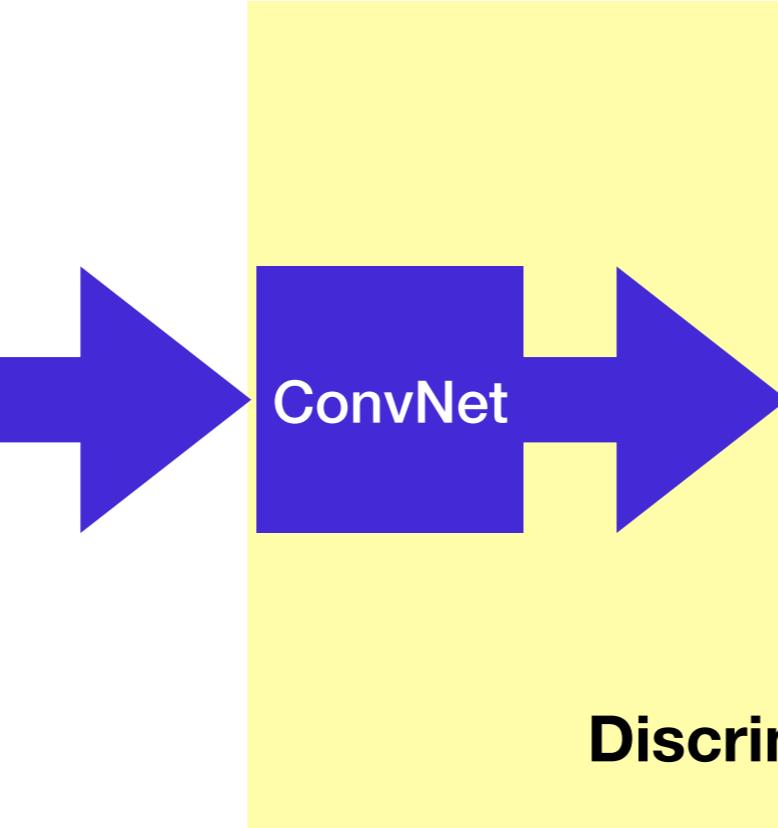
$$D(X) \approx 0$$


$$D(X) \approx 1$$

**Discriminator D**

R  
A  
N  
D  
O  
M  
  
V  
E  
C  
T  
O  
R


$$D(X) \approx 0$$



**Discriminator D**

R  
A  
N  
D  
O  
M  
  
V  
E  
C  
T  
O  
R



**Generator G**

**M = ( G , D )**

$$M = ( G , D )$$

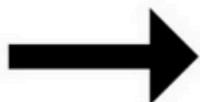
**optimize(M,T)**

# Applications

# Data Augmentation



# Property Transfer



Ground truth



Generated

# Property Transfer

Zebras ↘ Horses



zebra → horse



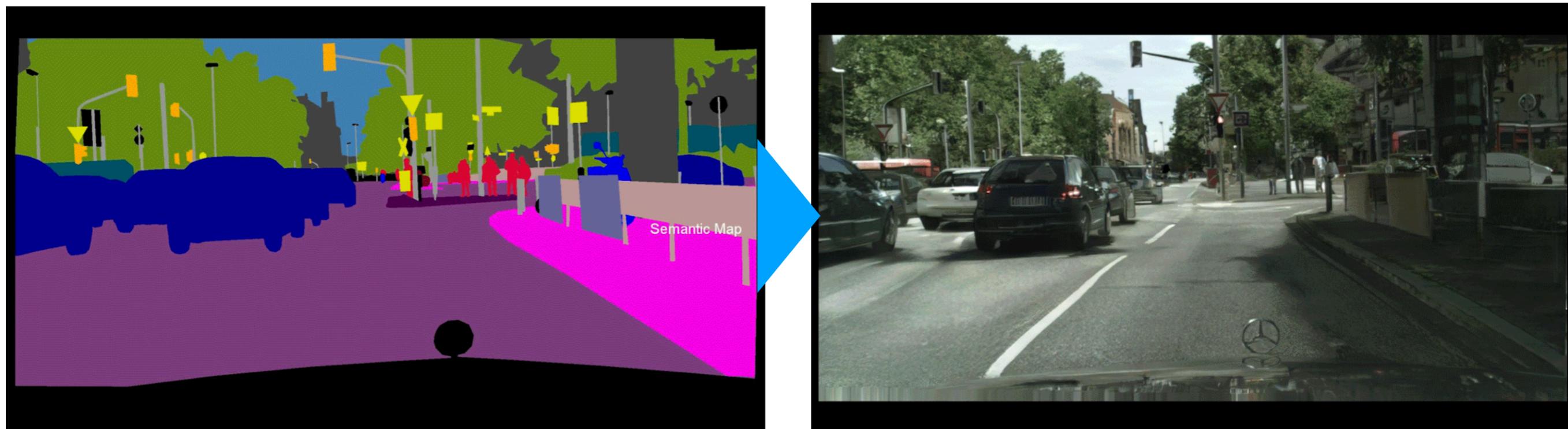
# Object Extraction



# Image Sharpening



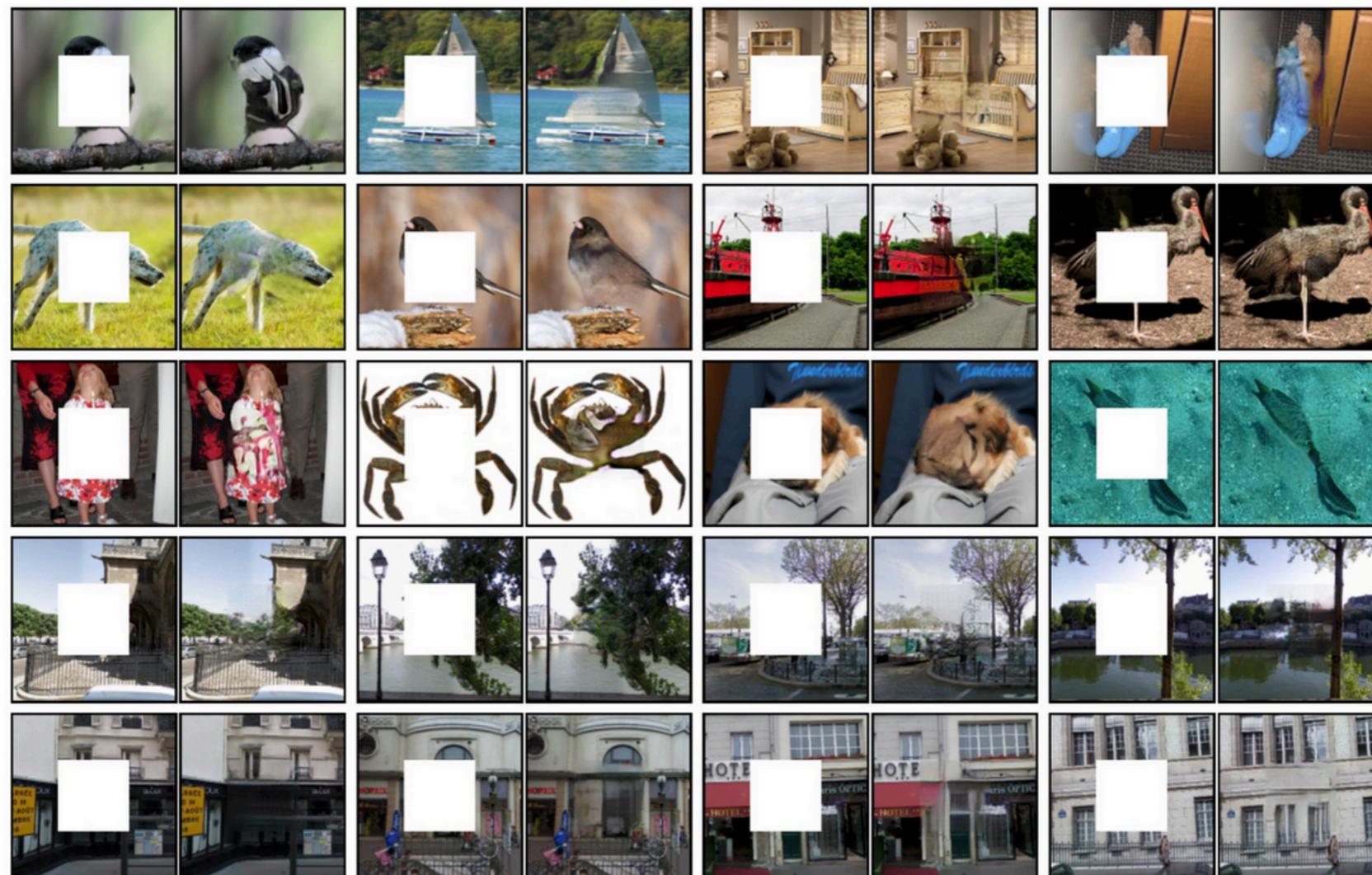
# Image Synthesis



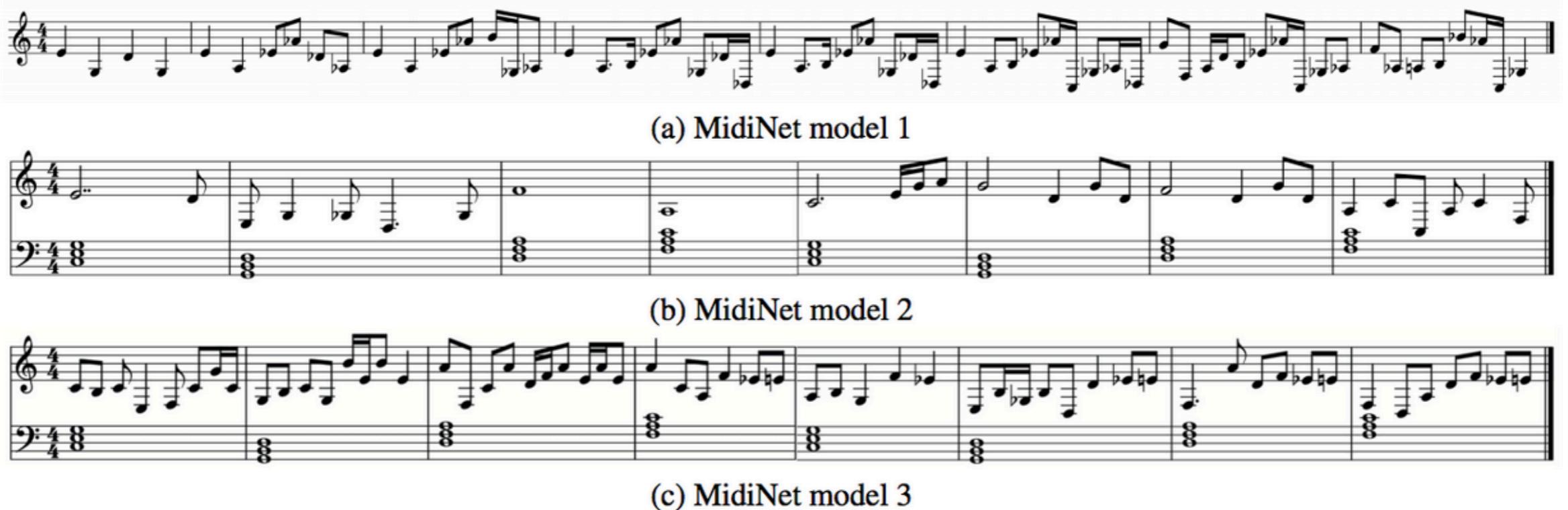
# Image Synthesis



# Image Impainting



# Music Generation



**Figure 3.** Example result of the melodies (of 8 bars) generated by different implementations of MidiNet.



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