



Training a machine learning model using a dataset of Bach compositions

AWS DeepComposer uses GANs to create realistic accompaniment tracks. When you provide an input melody, such as *twinkle-twinkle little star*, using the keyboard U-Net will add three additional piano accompaniment tracks to create a new musical composition.

The U-Net architecture uses a publicly available dataset of Bach’s compositions for training the GAN. In AWS DeepComposer, the generator network learns to produce realistic Bach-syle music while the discriminator uses real Bach music to differentiate between real music compositions and newly created ones

The U-Net architecture learns from symphonies to create music

Listen to sample of Bach's music from the training dataset

Bach training sample 1

▶

0:00 / 0:16

🔊

⋮

Bach training sample 2

▶

0:00 / 0:16

🔊

⋮

Symphony-inspired composition created by U-Net architecture

Input melody

▶

0:00 / 0:16

🔊

⋮

Generated composition

▶

0:00 / 0:16

🔊

⋮

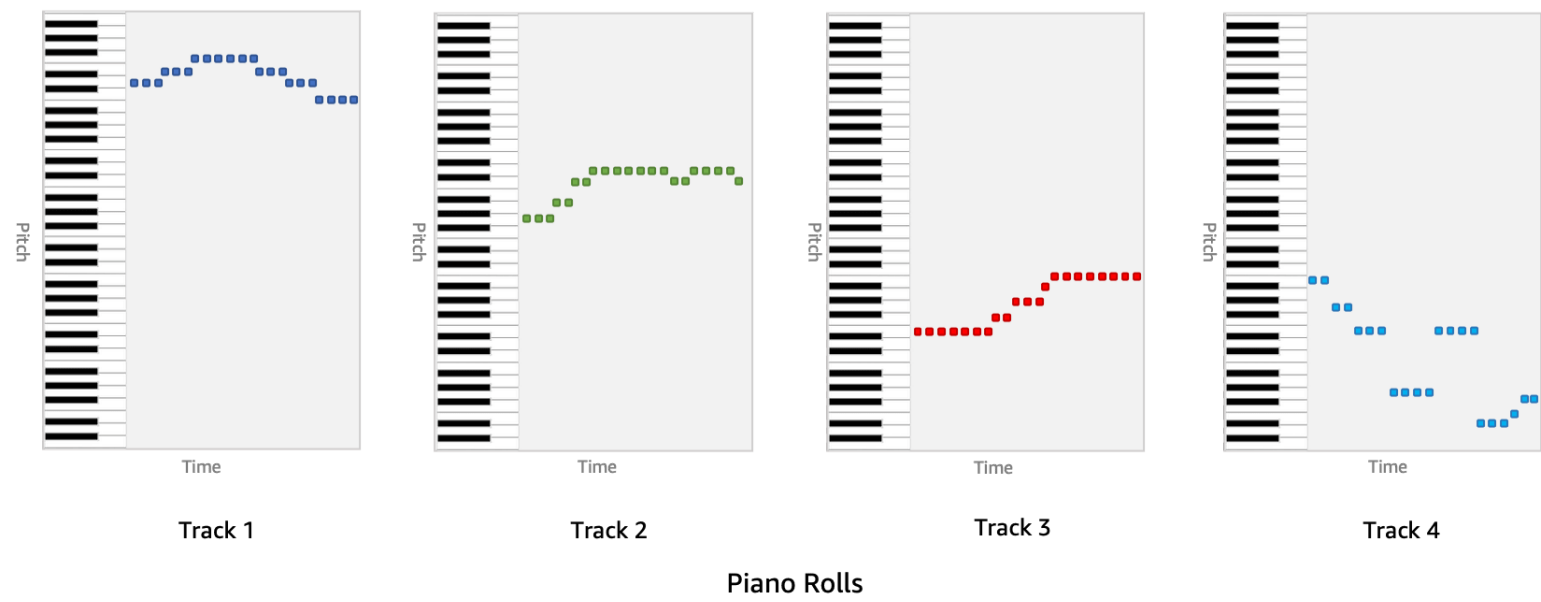
Apply your learning in AWS DeepComposer

[Try generating a musical composition in Music studio](#)

How U-Net based model interprets music

Music is written out as a sequence of human readable notes. Experts have not yet discovered a way to translate the human readable format in such a way that computers can understand it. Modern GAN-based models instead treat music as a series of images, and can therefore leverage existing techniques within the computer vision domain.

In AWS DeepComposer, we represent music as a two-dimensional matrix (also referred to as a piano roll) with “time” on the horizontal axis and “pitch” on the vertical axis. You might notice this representation looks similar to an image. A one or zero in any particular cell in this grid indicates if a note was played or not at that time for that pitch.



The piano roll format discretizes music into small buckets of time and pitch

QUIZ QUESTION

Which of the following statements about the application with Bach-style model is **incorrect**?

- ☐ The discriminator learns from both *real* Bach music and *realistic* Bach music
- ☐ 2D images can be used to represent music pieces
- ☒ The generator is trained on realistic Bach music to output new music piece

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