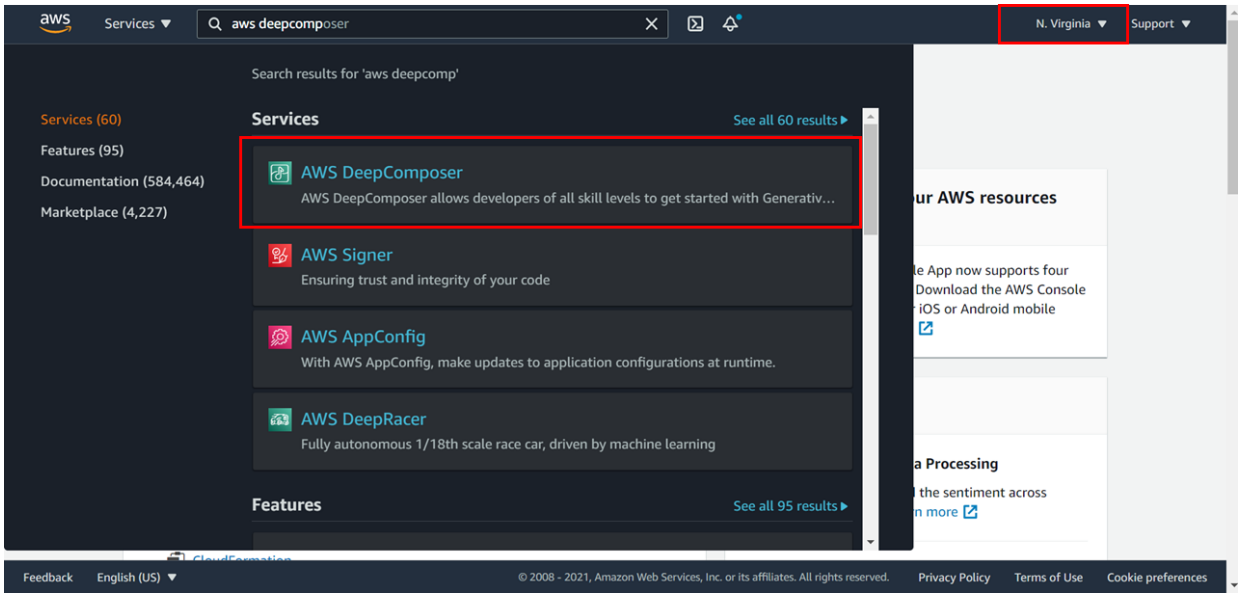
DeepComposer Lab

Last modified: March 2021

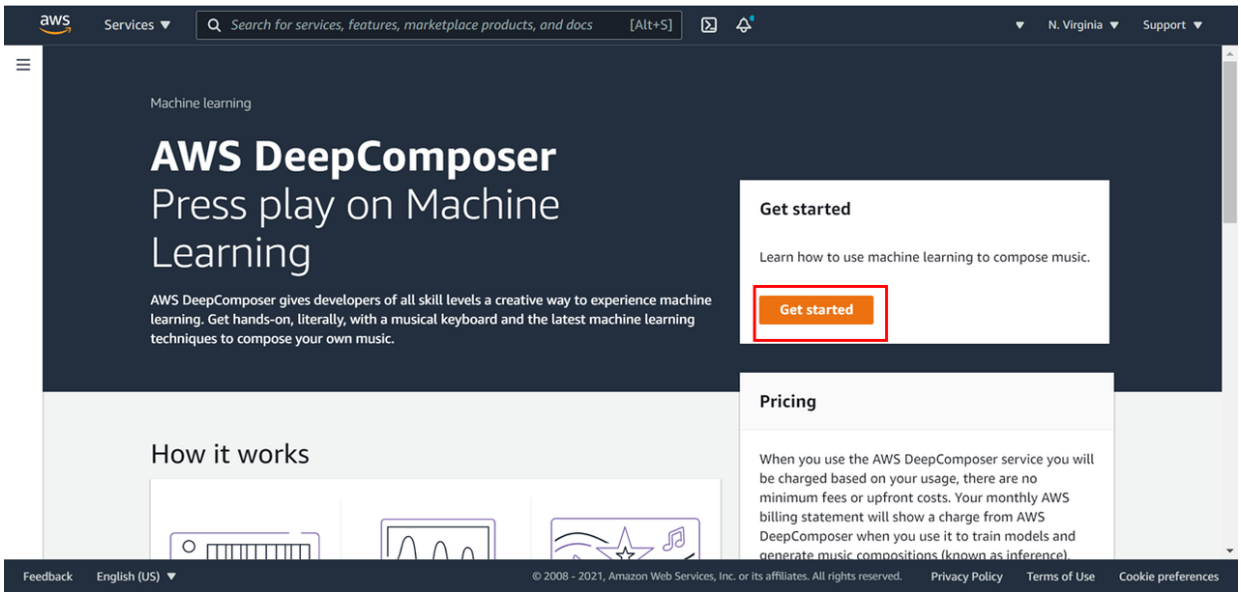
Note: Please use a Chrome or Edge web browser for this exercise for best experience.
This lab assumes that you already have an Amazon Web Services account/have been provided with a lab account. If you don't have either, you can sign up for a free account here. DeepComposer provides a 12-month free tier for first time users, and for more information, you can view the pricing here.

DeepComposer Music Studio

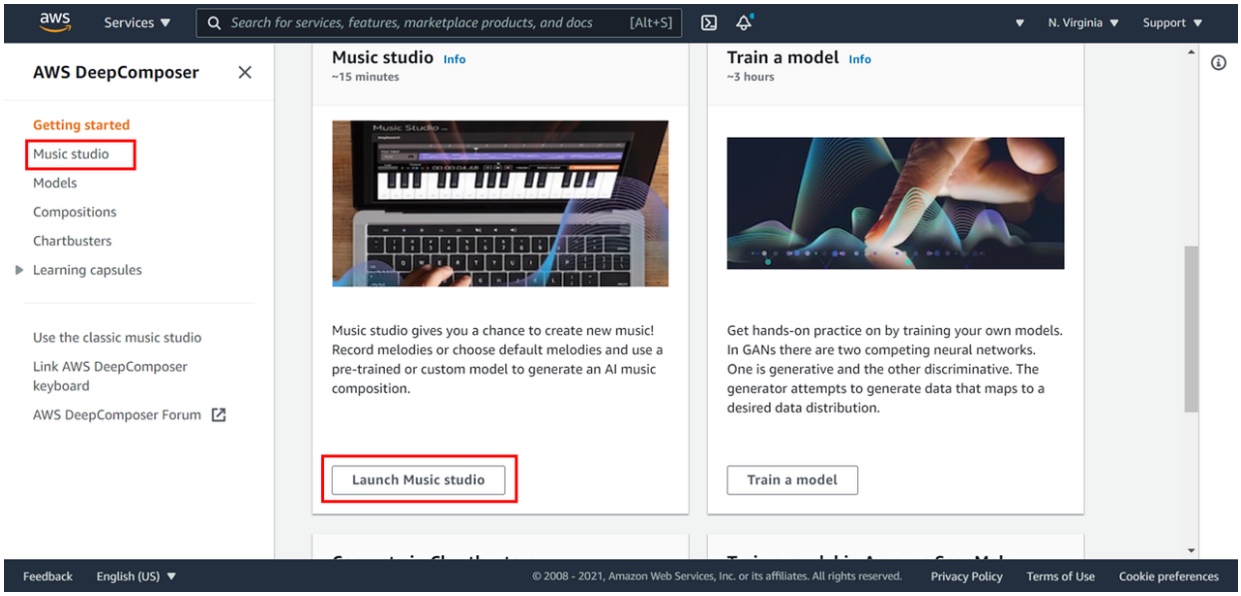
1. To get started, sign-in to your AWS console, and ensure you are on in the us-east-1 (N.Virginia) region. On the search bar at the top, type in 'DeepComposer' to view the service and click on the link to access the DeepComposer console.



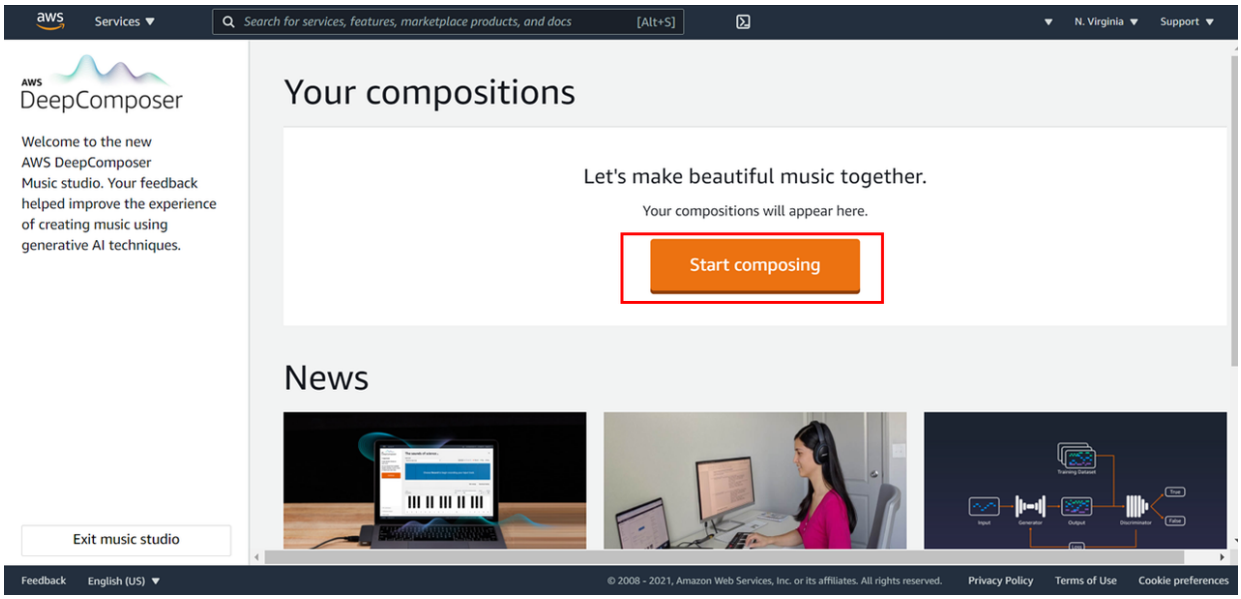
2. Click on 'Get Started'



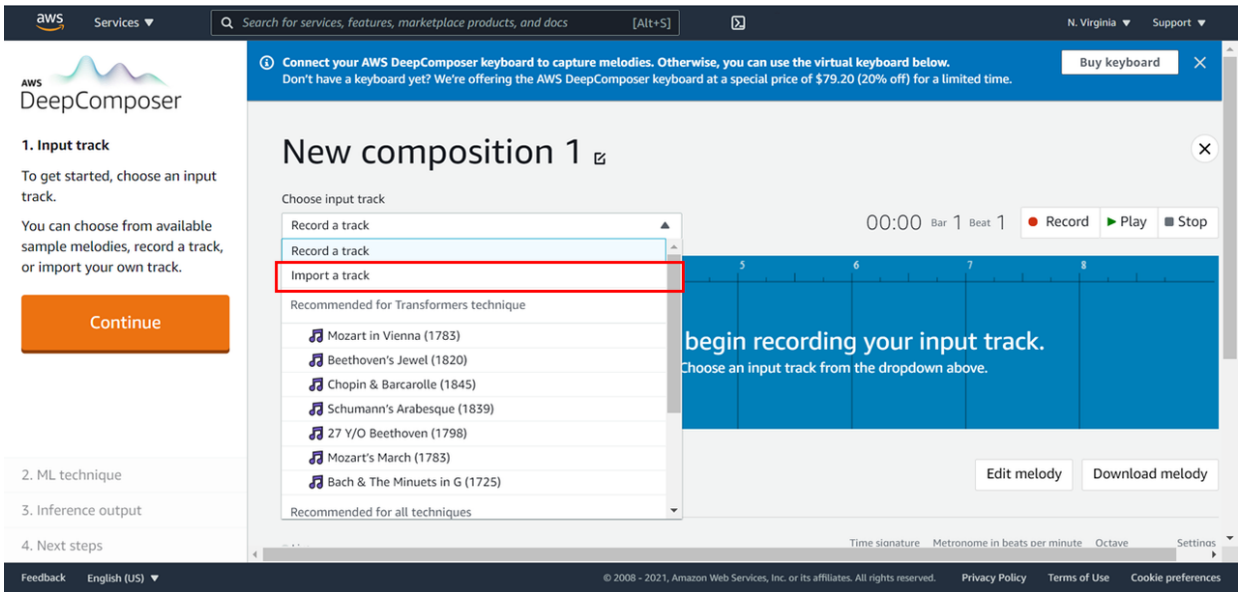
3. Click on ‘Launch Music studio’ from the landing page, or use the menu on the left to access the music studio.



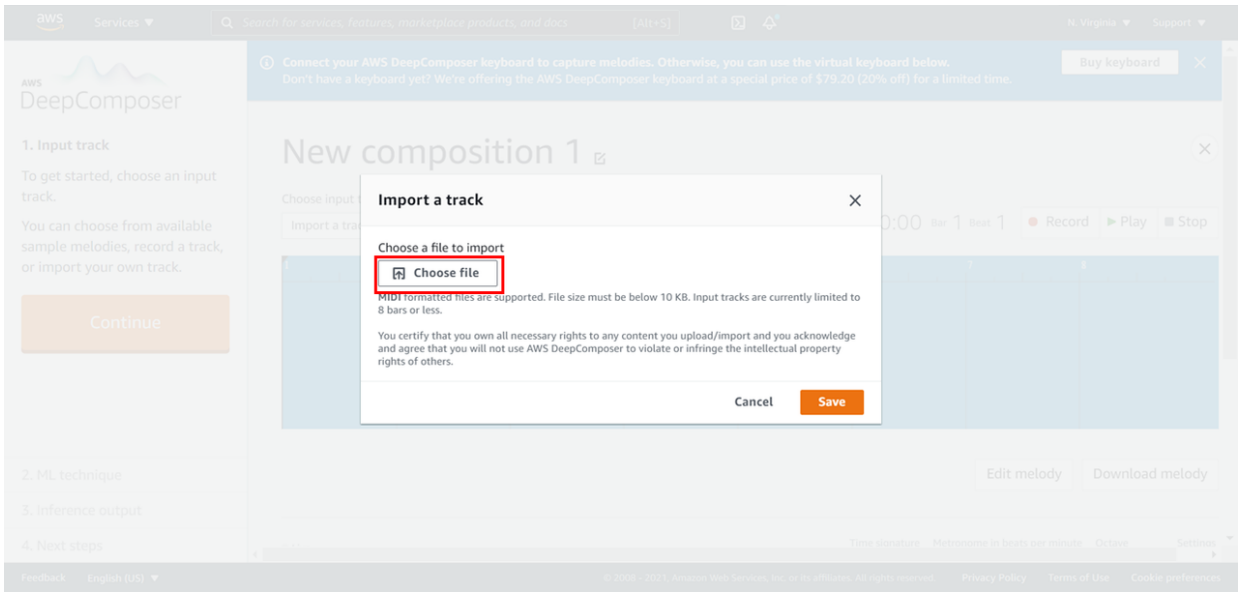
4. Click ‘Start composing’.



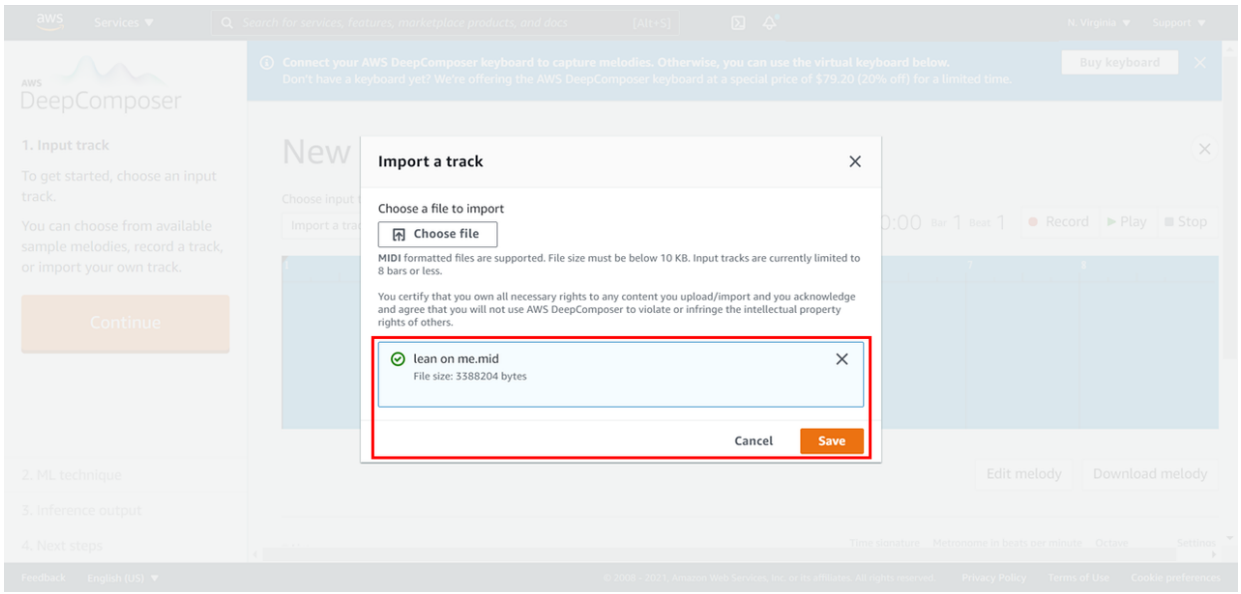
5. You have the options to Record a track (on the virtual keyboard or the DeepComposer keyboard), import the track, or use a pre-recorded track. For this lab, we will import a track. *Note: For the event, if specific input tracks are provided to you, please upload them at this step.*



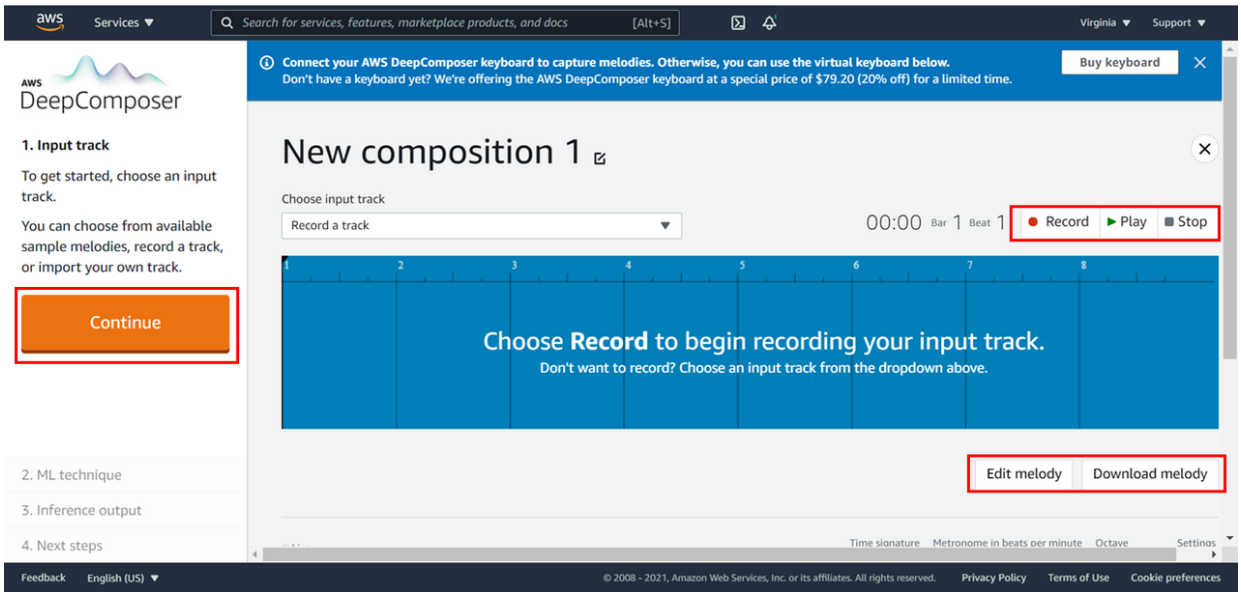
6. Click on ‘Choose File’



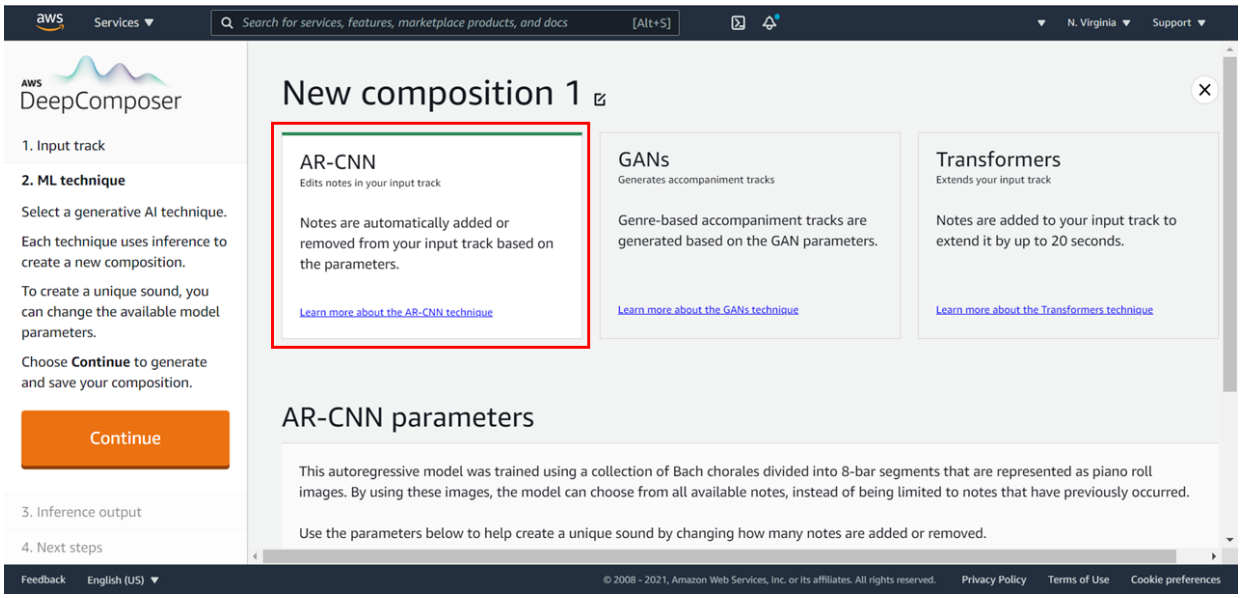
7. Upload a midi file. Note that if your input is longer than the 8 bars, DeepComposer will automatically trim the input file. Click ‘Save’ to import the file.



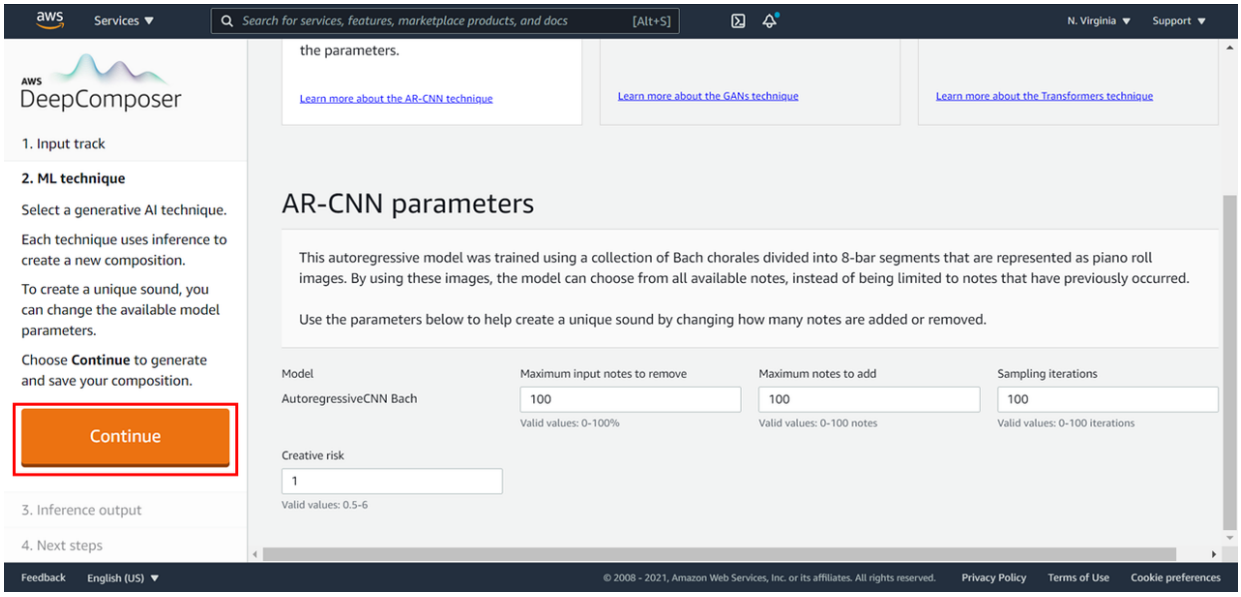
7. Once the file is uploaded, you can listen to it using the ‘Play’ and ‘Stop’ buttons. You can also use ‘Edit melody’ to add, remove, shorten or extend notes, and use the ‘Download melody’ to download the midi file. Once done, click ‘Continue’.



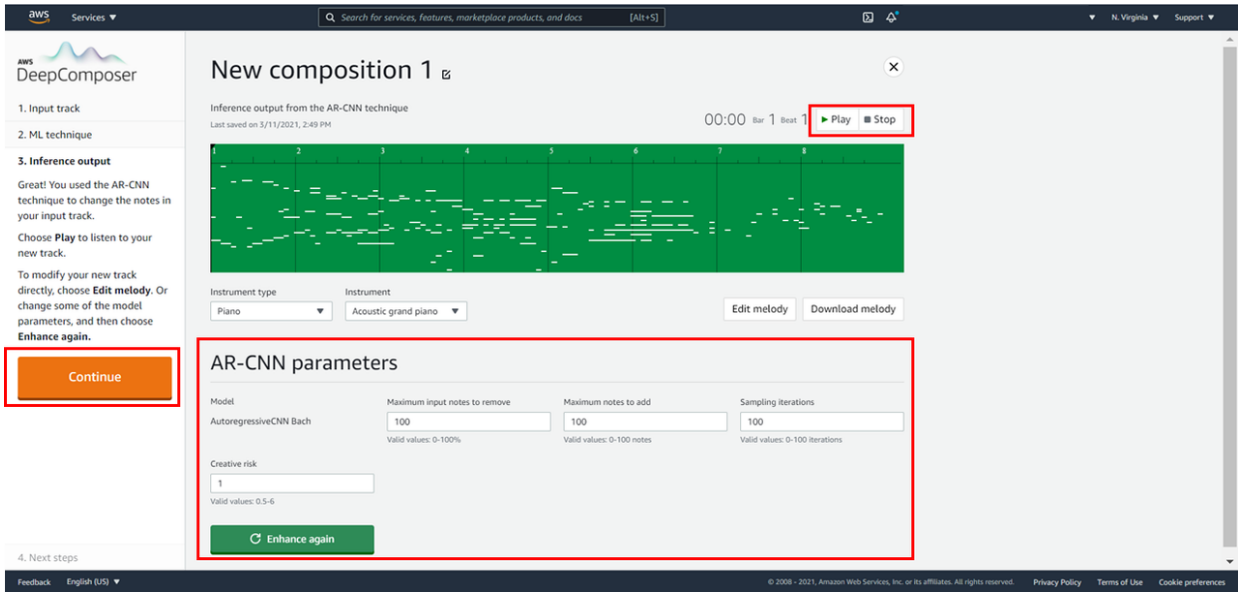
8. In the 'ML technique' screen, click on AR-CNN. *Note: You can use either the GAN or Transformer model after the AR-CNN technique has been applied. Alternatively, you can choose to use the original input melody (without AR-CNN) with GANs or Transformers.*



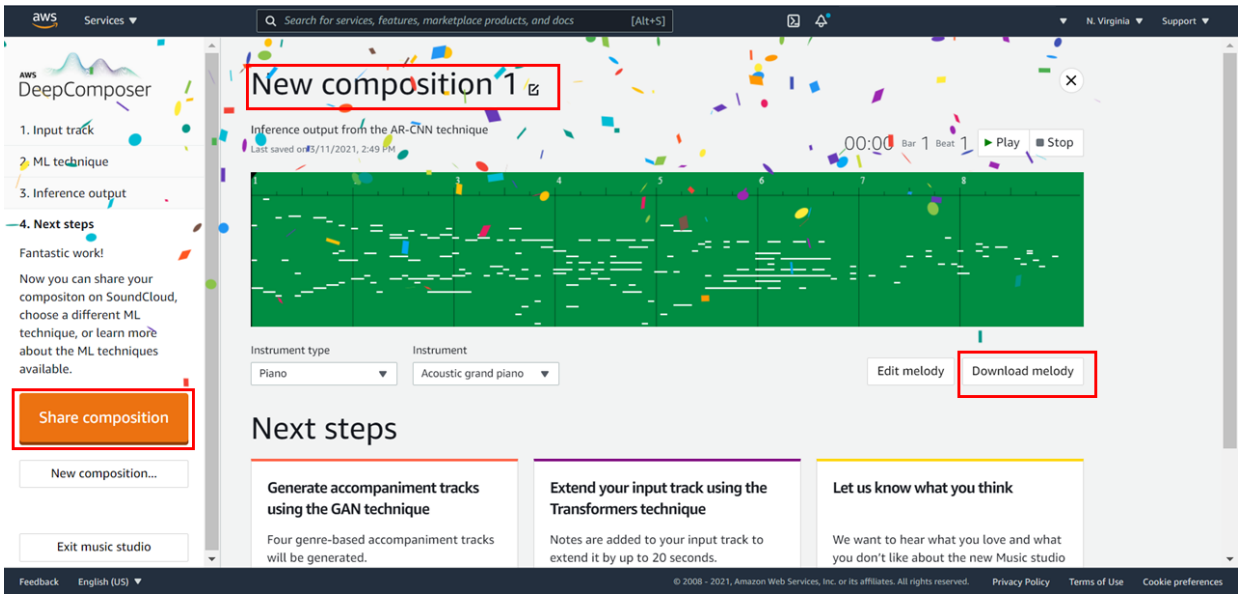
9. Leave the default parameters, and click 'Continue'



10. Your AR-CNN composition is ready!! Click on the ‘Play’ and ‘Stop’ buttons to hear your composition. Play around with the parameters to make the composition unique to you, by changing the number of notes to add/remove. Creative risk is an interesting one to try! You can ‘Enhance again’ until you feel the composition is ready. Once you are satisfied with your composition, click ‘Continue’.

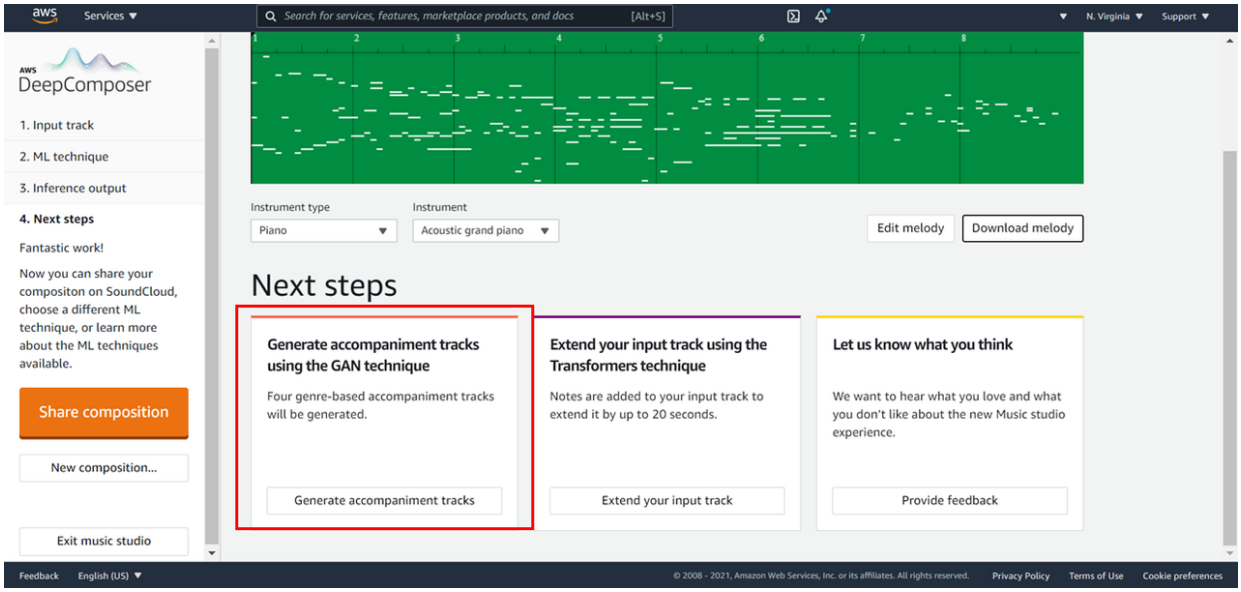


11. Congrats on your first composition using AWS DeepComposer! Use the edit icon next to the name to give a unique name to your composition. You can click the ‘Share composition’ button to share your music on SoundCloud, or use the ‘Download melody’ button to save the midi file to your disk. *Note: If the event includes an AI Judge and you would like to participate, download the final melody to disk for uploading to the pre-signed S3 URL.*

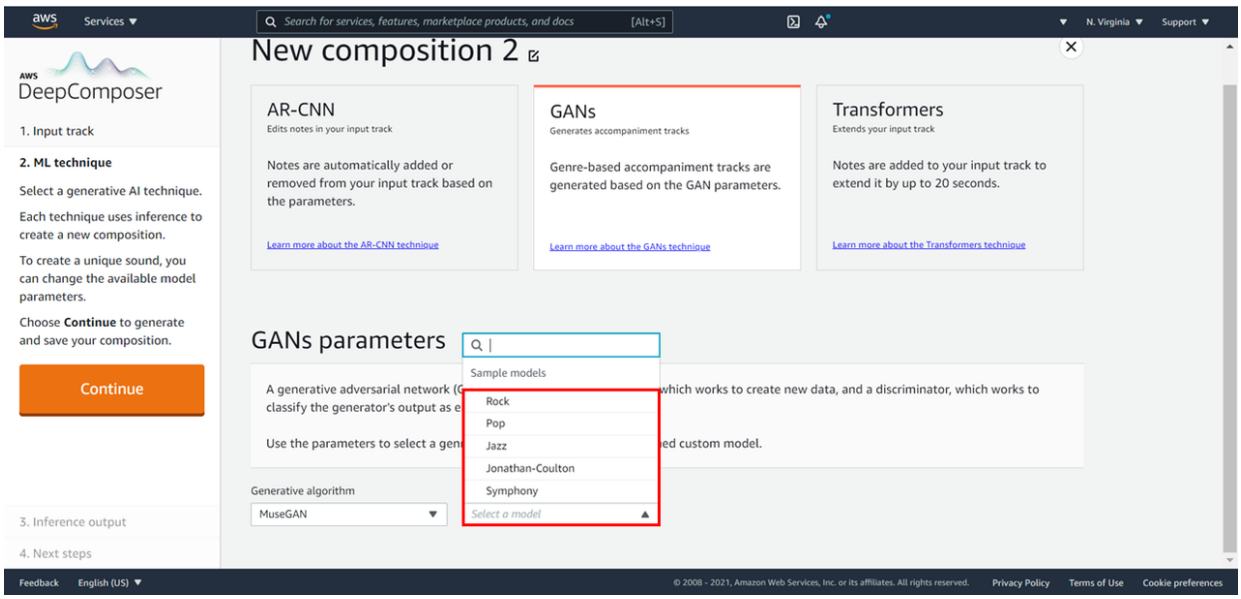


GANs

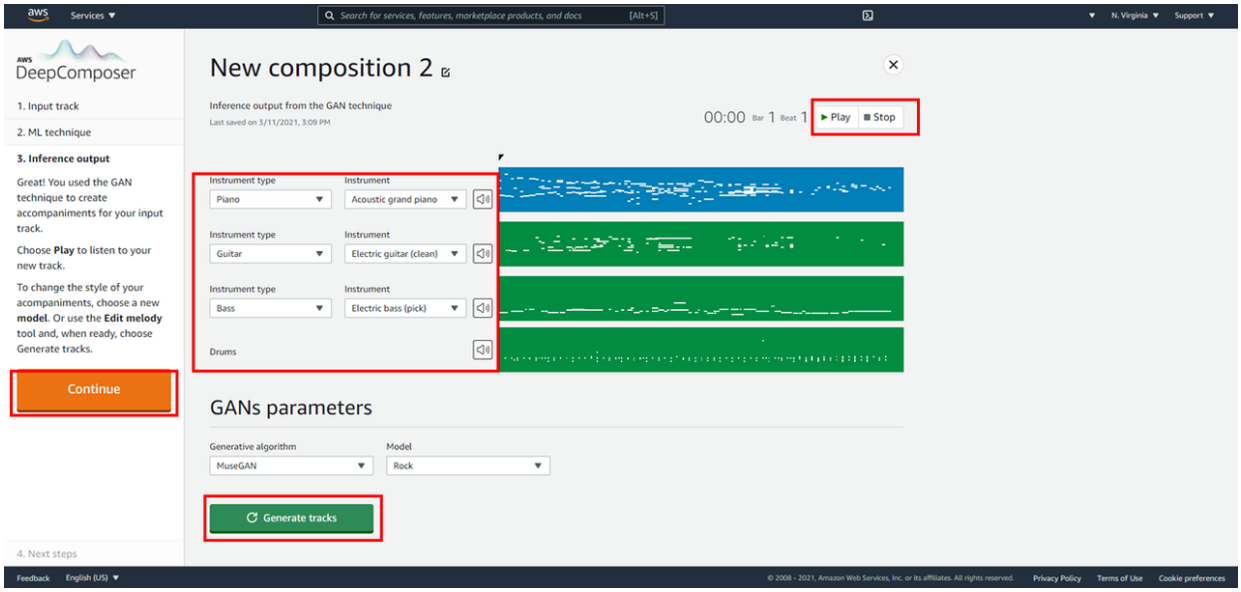
12. Once you have completed the AR-CNN, click on 'Generate accompaniment tracks' to generate four tracks using generative AI based on your composition.



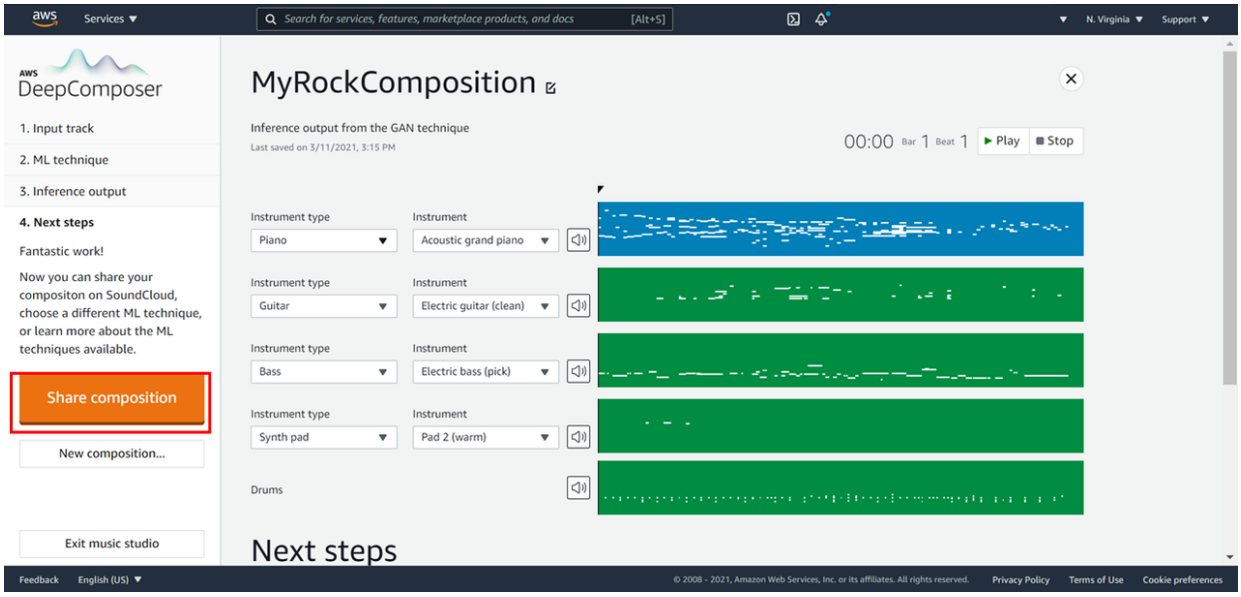
13. Use the MuseGAN generative algorithm, and select a pre-trained model of your choice. Click 'Continue'. *Note: 1. If you selected 'GANs' directly in step 8, you will reach the same screen. 2. To use the U-Net generative algorithm, you need to train your own model. High level steps on training your model is shown in the 'Train your own model' section below.*



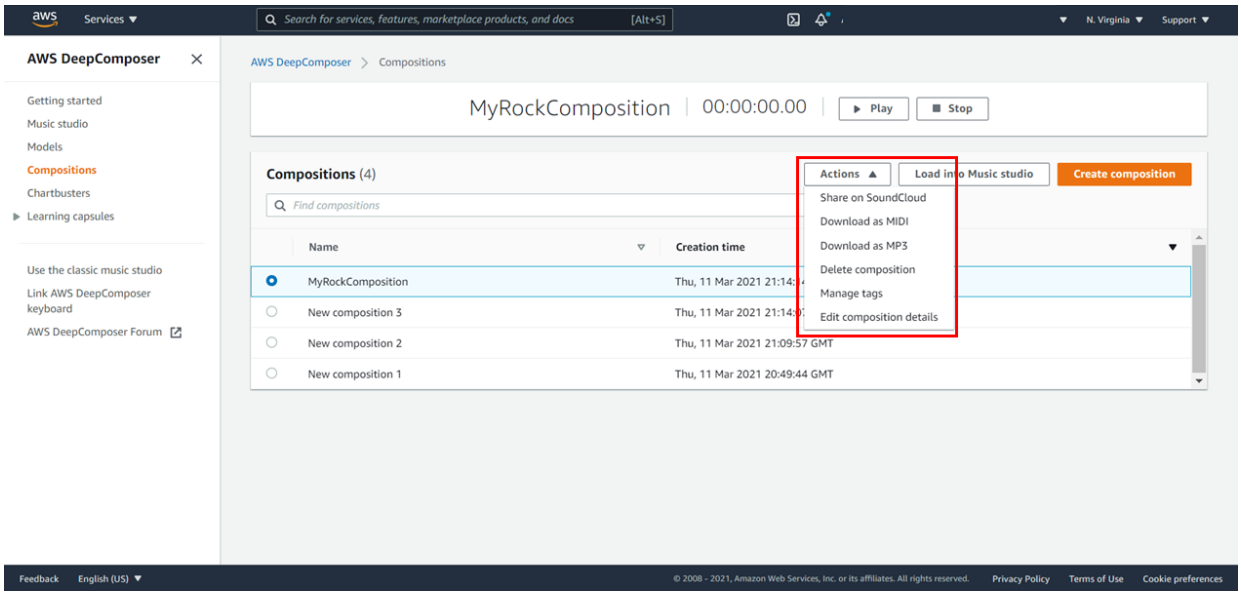
14. Within a few seconds, AWS DeepComposer generates multiple tracks based on the input composition. Click 'Play' to listen to the generated music. You can also change the instrument type and instruments (for example, Additional instruments → Banjo, or Synth effects → goblins!), and mute individual tracks for your final melody. You can also repeat this process multiple times. When you are done, click 'Continue'.



15. Rename your composition and click 'Share composition' to upload it to SoundCloud.

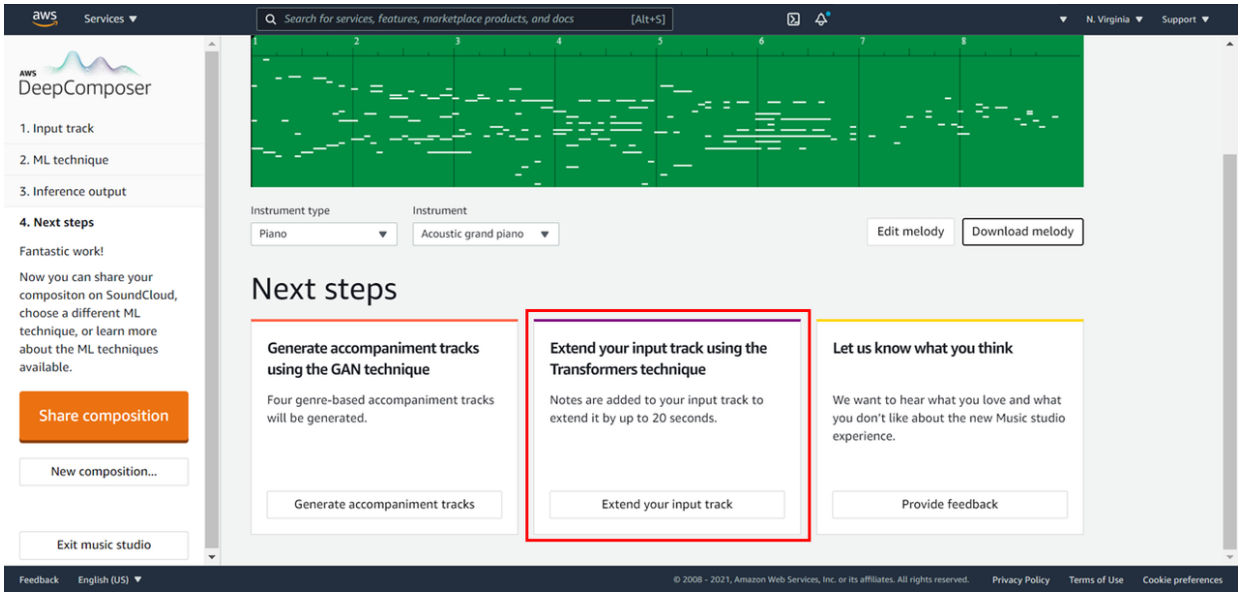


15b (optional): Currently, there is no way to download the GAN melody to disk from the page above. To download to disk, exit music studio, click on 'Compositions' from DeepComposer menu, and download the melody.

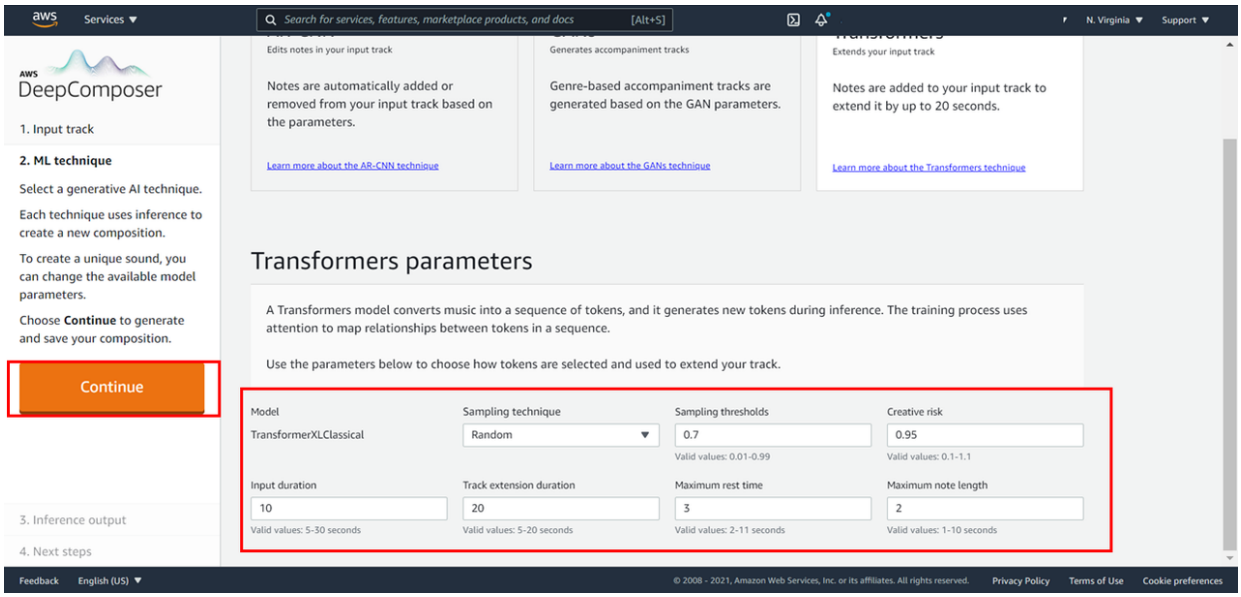


Transformers

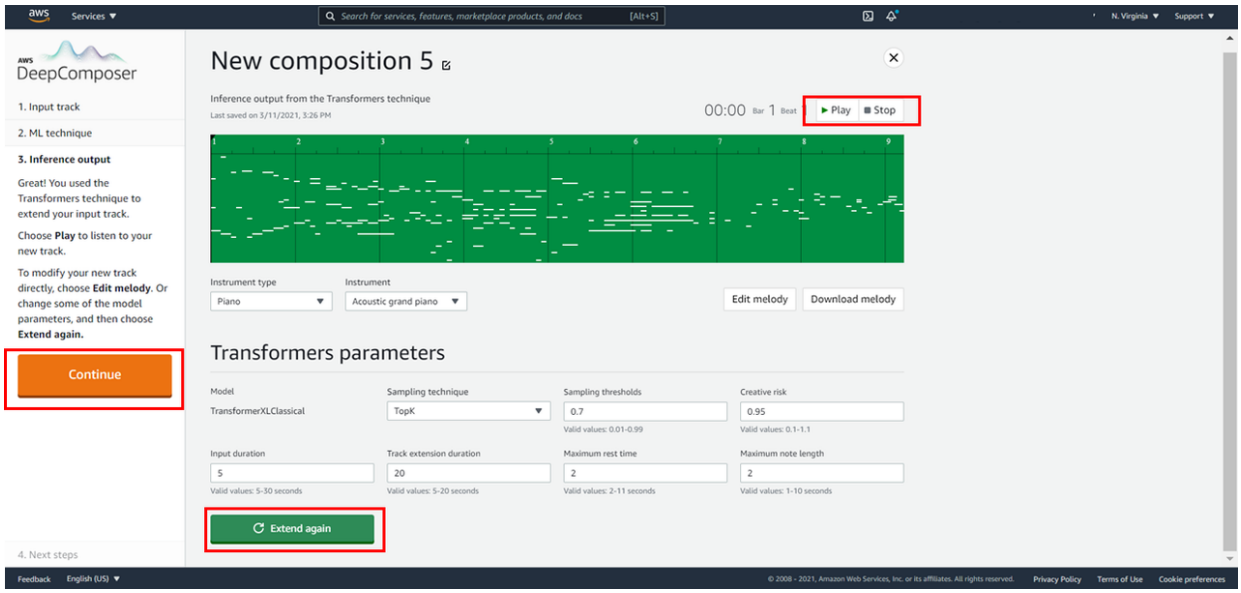
16. Alternative to the GANs at Step 11, you can try the Transformers model to extend your composition by up to 20 seconds. *Note: Instead, you can also choose to try the Transformers model without AR-CNN at Step 8.*



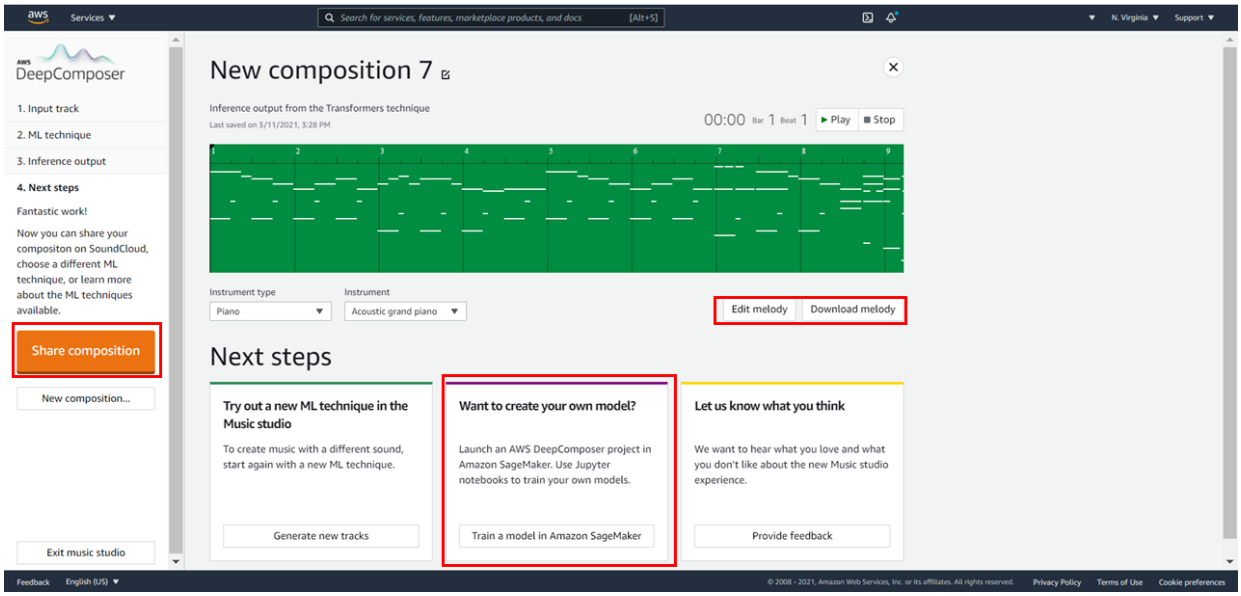
17. Update the parameters, such as sampling technique, creative risk, number of seconds to extend etc. and click 'Continue'



18. The Transformers model takes a few seconds longer than the other two models. Once the music is extended, click 'Play' to listen to the generated melody. You can repeat this process multiple times. Once you are done, click 'Continue'.



19. You've now generated music using all three models! You can share the composition to SoundCloud and/or download the melody to your disk. *Callout: For folks interested in diving deep, the 'Want to create your own model?' option takes you to a GitHub repository with the necessary code to train a new model from scratch on Amazon SageMaker.*



Optional: Training a model on the console

You can also train your own MuseGAN or U-Net model for DeepComposer through the console. To train your own model, click on the 'Models' option from the DeepComposer console, and click on 'Create a model'. Choose the MuseGAN/U-Net architecture, training dataset, hyperparameters and specify a name for your model. *Note:1. AWS DeepComposer allows training 4 models for free. 2. It may take up to 8 hours to train the model, please be aware of that if participating in a challenge.*

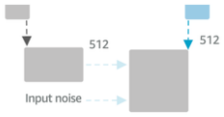
Train a model

Generative algorithm Info

Choose a generative algorithm to train a model

MuseGAN
GAN algorithm often used for complex music structures

U-Net
U-Net is the distinguishing factor for the generator

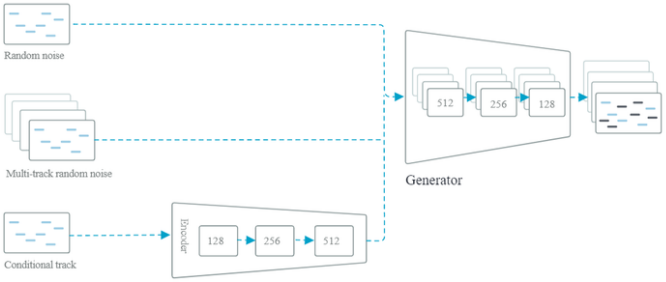


This architecture uses MuseGAN's generator. MuseGAN is an architecture specifically designed for generating music. The generator in MuseGAN is composed of a shared network to learn a high level representation of the song and a series of private networks to learn how to generate individual music tracks.

The main differences between U-Net and MuseGAN are:

- U-Net is a simpler architecture compared to MuseGAN and therefore easier for beginners to understand.
- U-Net has been extremely successful in the image translation domain while MuseGAN has been specifically created for the music domain.

Both architectures use a simple Convolutional Neural Network as the discriminator.



Training dataset

Generative models re-create patterns found in the training dataset.

Choose a genre of music as your dataset.
Choose a supported genre in your dataset.

- (•) symphony
- ( ) jazz
- ( ) pop
- ( ) rock

▼ Hyperparameters

Info

Epochs
For each epoch, the model will be trained over the entire dataset once. Increasing epochs will allow the model to train for longer and may improve performance.

140

Input a value between 70 to 200

Learning rate
The learning rate controls how rapidly the weights and biases are updated during training. A higher learning rate might allow the network to explore a wider set of model weights, but might pass over more optimal weights.

0.001

Input a value between 0.0001 and 0.01

Update ratio
The update ratio controls the number of model weight updates to the discriminator per update to the generator. A stronger discriminator can provide more accurate and useful information to the generator, but increases training time.

5

Input a value between 1 and 5

Model details

Model name

Give your model a name

The model name must be no longer than 100 characters.

Model description - *optional*

Model description