

```
# STEP 1: Install required packages
!pip install music21 tensorflow

# STEP 2: Import required libraries
from music21 import instrument, note, stream, chord
import numpy as np
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Dropout, LSTM

# STEP 3: Generate dummy note sequences for simulation (normally, you'd parse MIDI files)
sequence_length = 100
n_patterns = 500

# Create random sequences simulating music patterns
X = np.random.rand(n_patterns, sequence_length, 1)
y = np.random.rand(n_patterns, 1)

# STEP 4: Build the LSTM model
model = Sequential()
model.add(LSTM(256, input_shape=(X.shape[1], X.shape[2]), return_sequences=True))
model.add(Dropout(0.3))
model.add(LSTM(256))
model.add(Dropout(0.3))
model.add(Dense(1, activation='linear'))

# Compile the model
model.compile(loss='mean_squared_error', optimizer='adam')

# STEP 5: Train the model
model.fit(X, y, epochs=10, batch_size=64)

# STEP 6: Generate a new dummy sequence
generated = model.predict(np.random.rand(1, sequence_length, 1))

# STEP 7: Convert output to music notes (simulation)
output_notes = []

for i in range(10): # Simulate 10 notes
    new_note = note.Note(int(np.random.randint(60, 72))) # MIDI note number
    new_note.offset = i
    new_note.storedInstrument = instrument.Piano()
    output_notes.append(new_note)

# STEP 8: Create a music stream and write to MIDI file
midi_stream = stream.Stream(output_notes)
midi_stream.write('midi', fp='generated_music.mid')

# STEP 9: Download the generated MIDI file
from google.colab import files
files.download('generated_music.mid')
```

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/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to `super().__init__` (**kwargs)
Epoch 1/10
8/8 ━━━━━━━━━━━ 4s 35ms/step - loss: 0.2096
Epoch 2/10
8/8 ━━━━━━━━━━━ 1s 22ms/step - loss: 0.0895
Epoch 3/10
8/8 ━━━━━━━━━━━ 0s 21ms/step - loss: 0.0927
Epoch 4/10
8/8 ━━━━━━━━━━━ 0s 21ms/step - loss: 0.0921
Epoch 5/10
8/8 ━━━━━━━━━━━ 0s 21ms/step - loss: 0.0888
Epoch 6/10
8/8 ━━━━━━━━━━━ 0s 21ms/step - loss: 0.0936
Epoch 7/10
8/8 ━━━━━━━━━━━ 0s 20ms/step - loss: 0.0902
Epoch 8/10
8/8 ━━━━━━━━━━━ 0s 21ms/step - loss: 0.0879
Epoch 9/10
8/8 ━━━━━━━━━━━ 0s 21ms/step - loss: 0.0882

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