**SoC Summer 2022 Final Documentation**

***\* This will be considered as your final documentation and will be made available for online usage.***

**Musify**

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**Keywords** (Include 7 or more keywords that will help others find your documentation easily)

*RNN, LSTM, Machine learning, Music, AI generated Music, Machine Learning*

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**Brief Description**

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| In this project we built a model to generate melody using RNN LSTM machine learning models. Implemented LSTM neural network architecture for training model And Performed data pre-processing, feature engineering, deliberate hyperparameter tuning and finally documentation. The data set was taken from Kaggle in midi file format.  Link [Classical Music MIDI | Kaggle](https://www.kaggle.com/datasets/soumikrakshit/classical-music-midi) |

**Progress**

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| * Week 1 Brushing up basic python concepts * Week 2 Started with reading relevant articles on music generation * Week 3 Neural network and relevant concepts of deep learning * Week 4 Started Learning Tensor flow * Week 5 Tinkering with tensor flow and RNN LSTM   *Difficulty faced: regarding understanding the fundamentals behind RNN LSTM, resolved by team interaction*   * Week 6 Implementation part started   *Some implementation issue came which were overcome by collaboration*   * Week 7 model training and building * Week 8 Submission documentation and repository |

**Results**

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| *The result of our model was AI generated music*  *,*  *Use this link to listen to model generated music,* [*https://drive.google.com/file/d/1r8HC8NuBoAbHdno1WmK0OJ1n-H5uz66e/view?usp=sharing*](https://drive.google.com/file/d/1r8HC8NuBoAbHdno1WmK0OJ1n-H5uz66e/view?usp=sharing)  *And check out this link for GitHub repository* [*https://github.com/MohitPunasiya/Musify-Project*](https://github.com/MohitPunasiya/Musify-Project)  *To get a quick idea refer to this video* [*https://drive.google.com/file/d/10sgGoqz7Ced\_y3cYVdzM2oJpvVaZQNzb/view?usp=sharing*](https://drive.google.com/file/d/10sgGoqz7Ced_y3cYVdzM2oJpvVaZQNzb/view?usp=sharing)  *And here is attached the presentation*  [*https://docs.google.com/presentation/d/1ctJLTUTkbVcZ4JWN\_aMYbKqTUvD2kLhL/edit?usp=sharing&ouid=100009593486541140632&rtpof=true&sd=true*](https://docs.google.com/presentation/d/1ctJLTUTkbVcZ4JWN_aMYbKqTUvD2kLhL/edit?usp=sharing&ouid=100009593486541140632&rtpof=true&sd=true) |

**Learning Value**

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| Music Theory  Tensor flow  Neural networks particularly RNN LSTM  Data preprocessing  Hyper parameter tuning |

**Software used**

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| Python, music21, Keras, TensorFlow  [Zamzar](https://www.zamzar.com/uploadComplete.php?session=a6a7d6f0c47a2c41793d168e495c9f&tcs=Z80&from=mid&to=mp3) : midi to mp3 converter |

**Suggestions for others**

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| Recently, Convolutional Neural Networks (CNNs) have been used to generate music with great success, with DeepMind in 2016 showing the effectiveness of WaveNet, which uses dilated convolutions to generate raw audio.  Check out this article to know more  https://towardsdatascience.com/generating-music-using-deep-learning-cb5843a9d55e |

**References and Citations**

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| *[1] https://towardsdatascience.com/how-to-generate-music-using-a-lstm-neural-network-in-keras-68786834d4c5*  *[2] https://github.com/musikalkemist/generating-melodies-with-rnn-lstm*  *[3] https://towardsdatascience.com/generating-music-using-deep-learning-cb5843a9d55e*  *[4]* *https://github.com/abhijit-kr/MUSIFY---Music-Composition-using-AI* |

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