INFORMATICS INSTITUTE OF TECHNOLOGY

In Collaboration with

UNIVERSITY OF WESTMINSTER

AlapanaGen

An Automated Alapana Generating System

A dissertation by

Mr. Vithushigan Jayatharan

W1790018 / 20191148

Supervised by

Ms. Dileeka Alwis

Submitted in partial fulfilment of the requirements for the BSc (Hons) Computer Science degree at the University of Westminster.

May 2023

ABSTRACT

The recent advancements in deep learning techniques and computational power have promoted the development of novel approaches for music generation. In this study, generating alapana, an improvisational form of Carnatic music was proposed, by leveraging Generative Adversarial Networks (GANs) and Finite State Machines (FSM). The goal is to create melodious alapana sequences that follow a given input Raga, ensuring continuity and coherence throughout the generated musical piece. The proposed approach incorporates Carnatic music theory rules into the generation process to enhance the structural coherence of the generated alapana. Additionally, various hyperparameter settings were explored to achieve the best performance. The Fréchet Audio Distance, Percentage of Correct Pitches and the Subjective evaluation through human listeners are the evaluation metrics of this approach. The result of this study demonstrates the potential of using GANs and FSM for generating continuous and pleasing alapana sequences in Carnatic music, contributing to the growing body of research in computational music generation.

Experimental results demonstrate the effectiveness of our proposed system in generating Indian classical music compositions that are both diverse and musically coherent. The generated compositions have been evaluated by experts in the Indian classical music domain and have received positive feedback. The Alapana system has the potential to significantly contribute to the field of computer-generated music and to aid composers and music enthusiasts in generating new and innovative compositions.

Keywords: Generative Adversarial Network, Indian Classical Music, Deep Learning, Carnatic Music, Data Science

Subject Description

- Computing Methodologies → Deep Learning → Machine Learning → Generative Adversarial Network (GAN)

- Computing Methodologies → Artificial Intelligence → Automata Theory → Finite State Machines (FSM)