

VIVYNet: A New Approach to Creating AI-Generated Music

Benjamin Joseph L. Herrera, Computer Science

Mentor: 'YZ' Yezhou Yang, Ph.D.

School of Computing and Augmented Intelligence

Motivations & Introduction:

The introduction of General Adversarial Networks (GANs) allowed researchers to artificially generate many forms of media. Notable works that have been involved in music content generation have been OpenAI's JukeBox and TensorFlow's Magenta. However, none have explored the possibility of using poems/lyrics to generate music.

Abstract:

This research project aims to translate/transform poems of any length into classical music in the form of music sheets. To achieve this behavior, we explore the use of start-of-the-art models for transfer learning and the latest machine learning techniques for model design. For this semester, we focus on data collection and analysis of collected data.

Methodology:

Data collection for this project involved two different operations: **1)** surveying and **2)** web-scraping. Once the data has been collected, a t-SNE plot can be formed to conduct data analysis.

Surveying:

This operation utilizes Discord to ask users to listen to a given musical piece and interpret the given song into a poem. Users may also verify others' interpretations. The incentive for user activity is a chance at a raffle draw for a \$400 stipend payment.

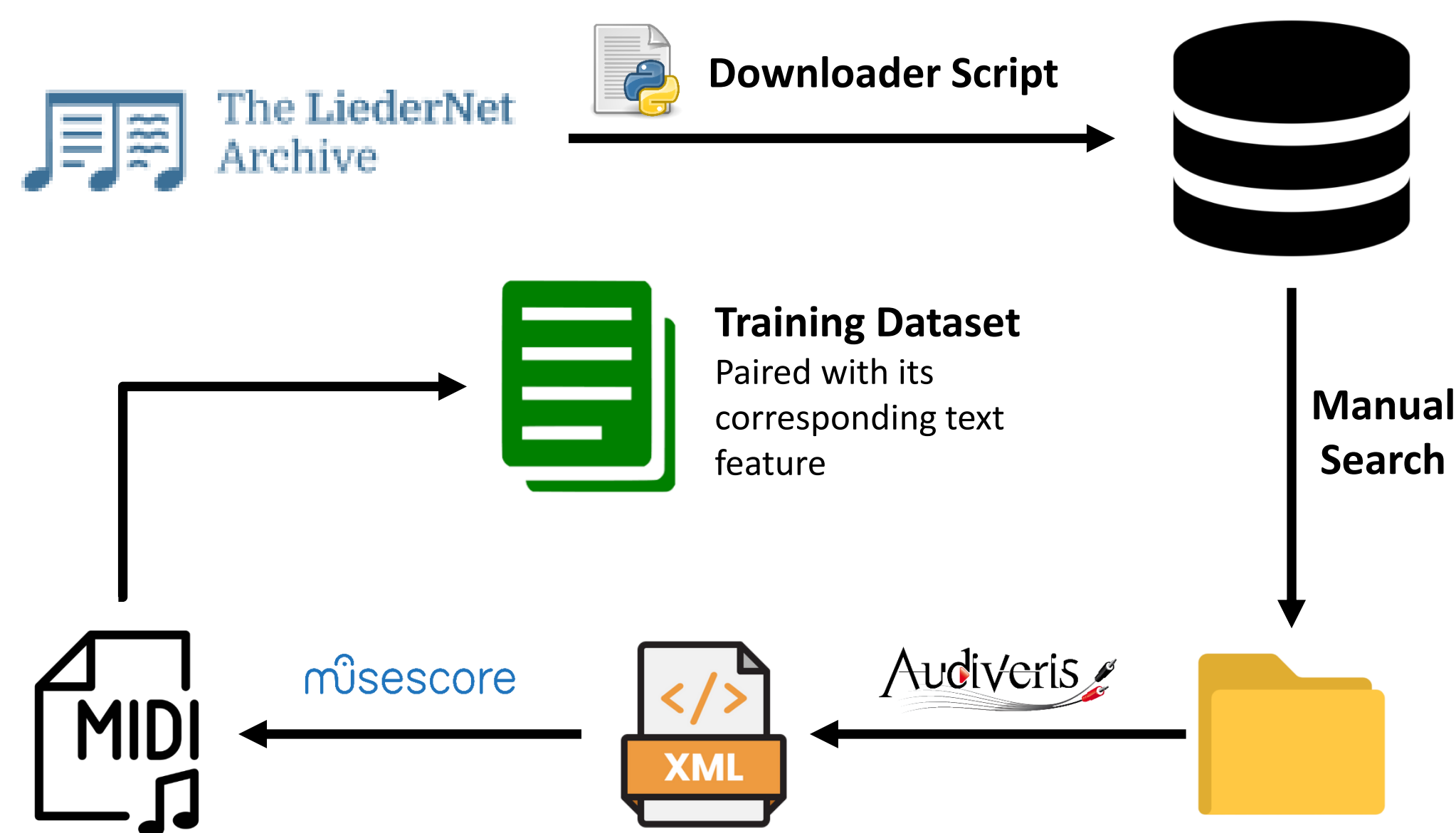


Web Scrapping:

This second form of data collection involved utilizing web scrappers on a music database, **lieder.net**. This website contained all lieder made since the 13th century. A lied (plural form is lieder) is a song that contains lyrical components or was created from a poem.

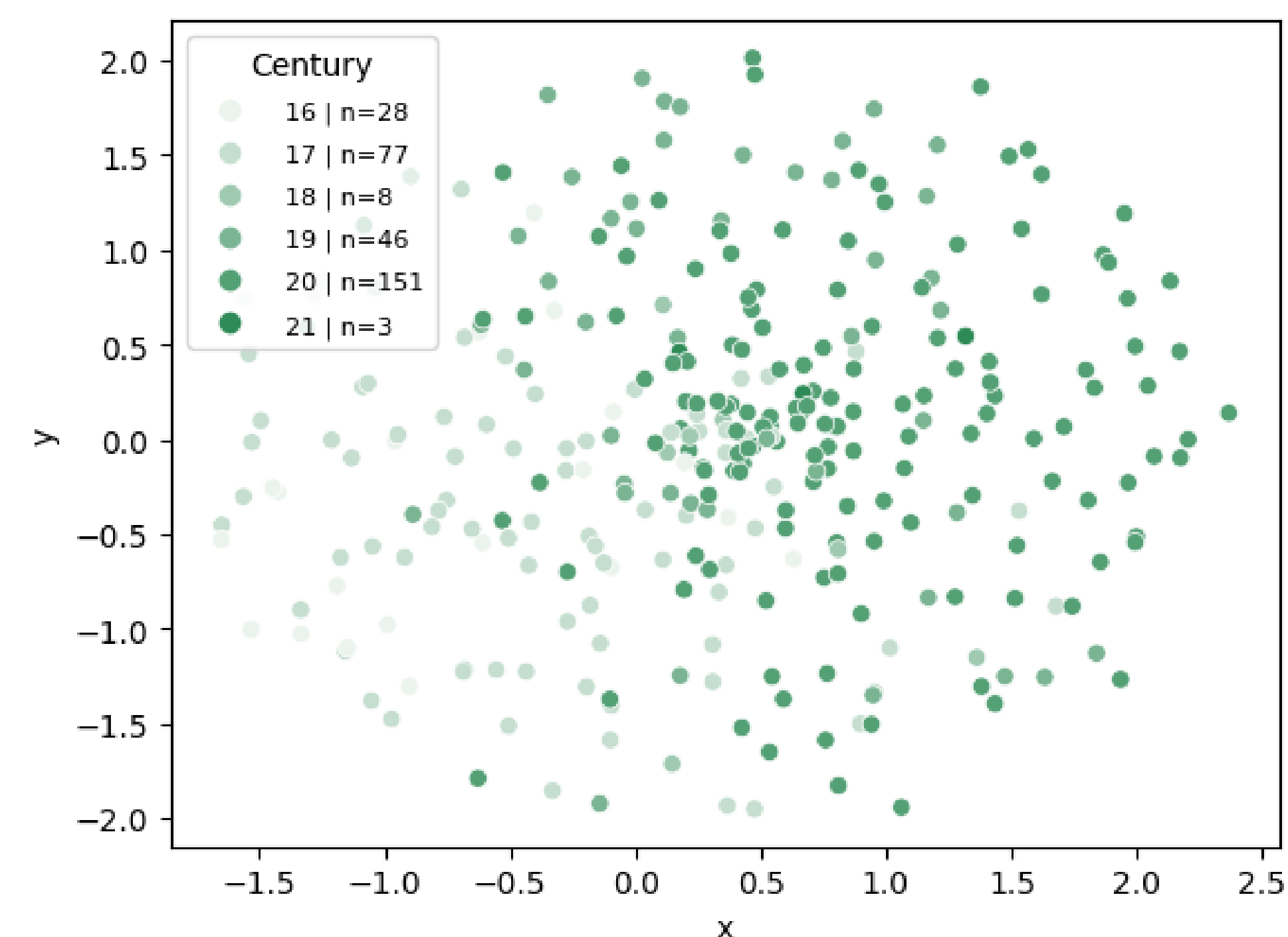
Once the entire website was scrapped, another web-scraping operation had to be conducted to pair the lyrical text to its respective music sheets. These music sheets are readily available online on various websites hosting repositories of music sheets.

As music sheets are collected, they are passed through an Optical Music Recognition (OMR) software. Our OMR of choice was Audiveris. This software translated music sheet images into **MusicXML** files which can be transformed into MIDI files using **MuseScore**.



Results and Analysis:

From all two data collecting operations, a total of 400+ samples were collected (80+ from surveying operations and 320+ from web-scraping operations). The image below is a t-SNE plot of the poem vectors to show similarities across different centuries.



Future Work:

Creating a machine learning model to compose classical music based on inputted poems is no easy task and cannot be done overnight. This 2022 Spring FURI season serves as a prelude to what is ahead. Over the following months, we will develop better ways to efficiently collect PDF files from across multiple different resources. We will also research methods to build the models needed to transform poems into classical musical pieces.