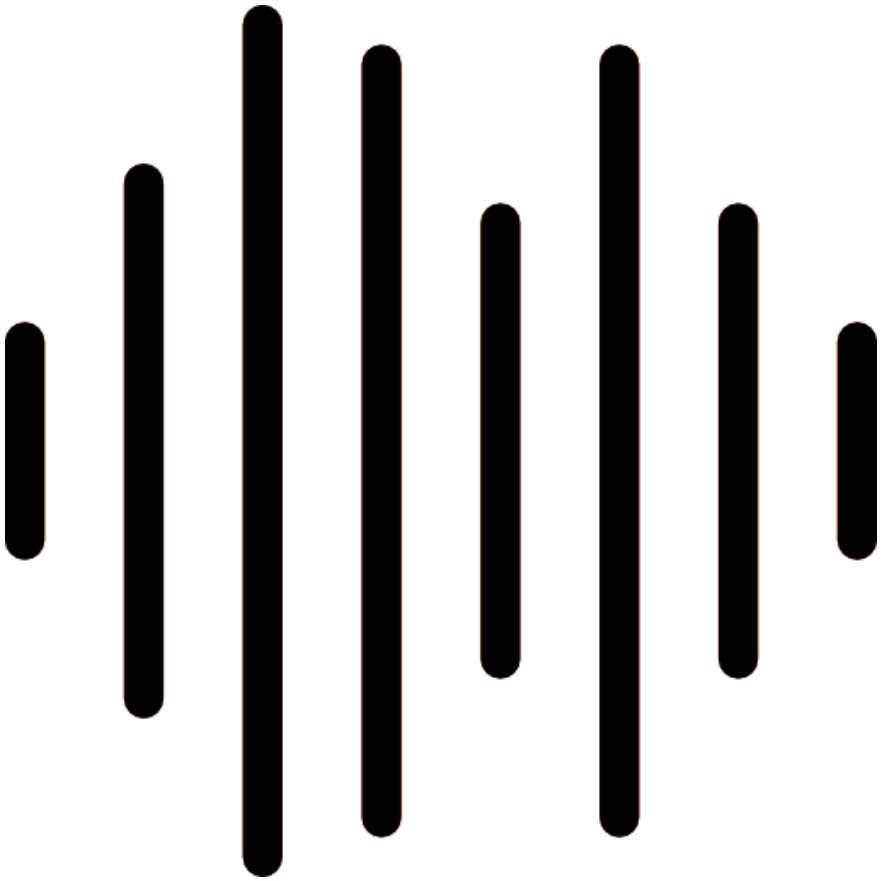
Research Document

Generating music using AI



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VERSION HISTORY

Version	Date	Author(s)	Changes	Status
0.1	01-04-2022	Mickey Krekels	Added the main structure of the document.	In progress

TABLE OF CONTENT

ABSTRACT

(this chapter will be added at a later date)

GLOSSARY

ACRONYMS AND ABBREVIATIONS

Abbreviation	Meaning
MoSCoW	Must have, Should have, Could have, Won't have
VM	Virtual Machine
CNN	Convolutional Neural Network
AI	Artificial Intelligence

INTRODUCTION

I am a third-year student at Fontys university of applied sciences and studying software ICT. During my specialization on Fontys, I studied the subject of AI with the main focus set on neural networks. This project gave me a chance to learn new types of machine learning, this being generating music using AI.

But why is AI or Machine learning so important in this current day? Machine learning is a fast-growing branch within the software and data science sector, it is used in almost all of the top companies that have a big focus on tech, data, and IT.

The document is structured in separate chapters, each containing important parts of research, steps, and problems that occurred during the development of the project. At the end of the report, there will be a conclusion where I will describe the final result.

1 GENERATING MUSIC USING ARTIFICIAL INTELLIGENCE

1.1 CONTEXT

1.2 PROBLEM DESCRIPTION

There are a lot of topics within Artificial Intelligence and Machine Learning that can be researched. From simple classification such as Decision Tree algorithms to more advanced neural network projects.

From my previous specialization semester in Artificial Intelligence, I learned the basics of working with neural networks. For this research, I would like to continue working on this skill. Therefore the main goal is to make a demo project that generates music using a trained neural network.

This technology could provide the music industry with an opportunity with a cheap and fast alternative to writing music.

1.3 DELIVERABLES

The delivery of this research will be a demo project, where the network is able to generate a musical sound file. For documentation purposes, I am going to use Jupyter Notebook (1), which is a python framework for documenting code. This notebook delivery will explain all the training steps, optimization techniques and the end result.

2 Research Questions

In this part of the document, I will describe the most relevant research questions. This will be done by using the Dot Framework research methodology (2).

2.1 Main Research Question

2.1.1 How is it possible to generate music with machine learning and neural networks?

2.2 Sub Questions

To provide an answer to the main question these sub-questions are required.

2.2.1 How to create a training set for the network?

2.2.2 How to create a validation set for the network?

2.2.3 How is the data structured?

2.2.4 What public datasets are available?

2.2.5 What are the common techniques/algorithms used for this type of network?

2.2.6 What is the theory behind music generation with neural networks?

2.2.7 How to create a music generation network demo?

2.2.8 How to test the quality of the generated result?

See the table below for the linked category and methods for each of the sub-questions.

Dot Framework research methodology		
Sub Question	**Method**	**Category**
2.2.1	Data analytics	**Lab**
2.2.2	Data analytics	**Lab**
2.2.3	Available product analysis	**Library**
2.2.4	Available product analysis	**Library**
2.2.5	Literature study	**Library**
2.2.6	Literature study	**Library**
2.2.7	Prototyping	**Workshop**
2.2.8	A/B testing	**Lab**

3 INITIAL PHASE

(this chapter will be added at a later date)

4 CONCLUSION

(this chapter will be added at a later date)

5 BIBLIOGRAPHY

1. **Ingargiola, Antonino.** What is the Jupyter Notebook? *jupyter-notebook-beginner-guide.* [Online] 2015. https://jupyter-notebook-beginner-guide.readthedocs.io/en/latest/what_is_jupyter.html.

2. **The DOT Framework.** ***ictresearchmethods.*** **[Online]**
https://ictresearchmethods.nl/The_DOT_Framework.