**Software Requirements Specification**

**Report #2**

**Team Name:**

Mathematical Maestros

**Team Members:**

Jonathan Hasty

Jacob Coomes

Matthew Branstetter

**Breakdown of individual contributions**

*(subject to change over course of project)*

Jonathan Hasty

1. Team lead

2. Documentation

3. Coding

Jacob Coomes

1. Coding

2. Documentation

3. Testing

Matthew Branstetter

1. Coding

2. Documentation

3. Testing

Software Requirements Specification

I.INTRODUCTION

1. Purpose
2. Our product looks to offer computer generated music that has been synthesized to invoke a chosen emotion.

B. Definitions

1. API: Application Processing Interface.

1. Keras: an open source Python interface for artificial intelligence.

C. System Overview

1. It will interact with the music so it can transform it into computer generated music.

D. References

1. Aaron’s Code (Book)
2. <https://axon.cs.byu.edu/papers/Kristine.ICCC10.pdf>
3. <http://computoser.com/>

II.OVERALL DESCRIPTION

A. Product perspective

1. System Interfaces:
2. The application will be implemented in Python and will interface with the Spotify API.
3. We intend to use Keras framework for Machine Learning.

2. User Interfaces

1. The user can download or export songs and classify it to the necessary category.
2. Standard music player features will be included i.e play-pause functionality.

3. Hardware Interfaces

1. We look to offer our product as fully cross platform compatible.
2. Users should be able to access our system from desktop computers and mobile devices.

4. Software Interfaces

1. We are going to utilize Spotify’s API to source and classify the music as well as its other music manipulating features.

5. Communication Interfaces

1. Product will communicate with the internet and Spotify API.

6. Memory Constraints

1. The system will likely need a lot of memory to process all the song files and data.
2. These constraints in memory may scale with project scope.

7. Operations

1. Generate computerized music from other songs via local files and/or over the internet through Spotify.
2. Function to download and store music locally.

8. Site Adaptation Requirements

1. Users must have an Internet connection for the application to be used.

B. Product Functions

1. There will be the basic functions of playing music (Ex: Play and Pause Button/ Fast Forward and Rewind Buttons/ etc.).
2. A text box that allows the user to give the category the music should be in.
3. A download button will be used when the user wants to put the music on their said device or other external devices.

C. User Characteristics

1. Users should have general familiarity with computers and music players.

D. Constraints, Assumptions, and Dependencies

1. Scaling memory in parallel to the project can scale to a substantial size.
2. Access from devices other than computers, like mobile devices could later affect system requirements.
3. Accessing the system offline as compared to online can also be a constraint and a dependency for a preferred online system.

III.SPECIFIC REQUIREMENTS

1. External Interface Requirements
2. The system will require the use of Spotify’s API for music access as well as to the said external system’s API features.

B. Functional Requirements

1. The user selects the mood genres of music they want the computer to generate and the computer outputs the result.

C. Performance Requirements

1. 95% of requests should be processed within 1 second.
2. Results should be generated near instantaneously so the user may have a seamless experience skipping through tracks.

D. Design Constraints

1. Standards Compliance
2. We are limited to our computers when there are over hundreds of people that will want to use this program.
3. When people want to put more music that they want to computerize then we are getting more data on our computers that might have a virus.

E. Logical Database Requirements

1. Database will store songs used as training data.

F. Software System Attributes

1. Reliability
2. Reliability will be improved as our algorithm learns.

2. Availability

1. Our product will be available to anyone who accesses our website/application.

3. Security

1. All data will be sent and received through an HTTPS connection.

4. Maintainability

1. Focus on clearly written code with proper comments and keeping in mind clean code for future developers of the system.

5. Portability

1. The main focus of the system will be to have it preferably available on all machines to run.
2. Android, IPhone, and IOS may be considered at a later point if possible.

G. Other Requirements

1. Unsure whether the product will be offered as a standard application or web app.

**Key Personnel**

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Jonathan Hasty

10303 Judith Ct, Louisville, KY 502-389-3175 jmhasty@iu.edu

OBJECTIVE

To obtain a challenging position in the field of computer science that will allow me to expand my problem-solving and creative ability.

EDUCATION

Indiana University Southeast New Albany, IN

B.S. in Computer Science – Business Information Systems Degree expected: May 2022

Minor: Business GPA: 3.15

Saint Xavier High School Louisville, KY

Graduated: 2016

QUALIFICATIONS

· Strong problem solving and innovative thinking ability

· Effective communication skills – verbal, written, and listening

· Experience with an Agile approach to software development

TECHNICAL EXPERIENCE *(Projects)*

· The Legend of Zordo (2021): A top-down, action-adventure game developed in C++. This project stressed the importance of the ECS architectural pattern for game development.

· Needle in the Haystack (2020): A simple networked guessing game. This project utilized java socket programming for connectivity as well as the Swing framework for GUI design.

PROFICIENCIES

Languages

· Java

· C/C++

· Python

· SQL

Technologies

· VMware

· Git/ GitHub

· Docker

WORK EXPERIENCE

Lucky’s Market Louisville, KY

Deli Associate May 2018 – Jan. 2020

· Provided excellent customer service.

ADDITIONAL EXPERIENCE

· Eagle Scout (Boy Scouts of America)

**Jacob Coomes**

**6012 Heil Rd. Email: coomes.jacob@yahoo.com**

**Henryville, IN 47126 Phone: 812-252-9284**

**Objective:**

Obtain position at SamTech as programmer

**Employment History:**

· Short Order Cook Dairy Queen

Sellersburg, IN

8/16/16-1/31/17

o Duties:

§ Utilize Grill and Deep Fryer to cook various types of food

§ Take the trash out

§ Clean up work area

· Wholesale Employee Walnut Ridge

Jeffersonville, IN 4/18/17-Present

o Duties

§ Water Plants

§ Put Merchandise in Customer’s Cars

§ Take out trash

§ Clean and weeded the Outside area

§ Landscape Assistance

**Education:**

**Henryville High School**

· Address: 213 N Ferguson St, Henryville, IN 47126

· 12th Grade

o Prossor:

o Computer Programming

§ HTML5

§ Visual Basic 6

§ Visual Basic 2010

§ Javascript

**Indiana University Southeast**

· Address: 4201 Grant Line Rd, New Albany, IN 47150

· Major: Bachelor Degree in Computer Science

· Minor: Math

· August 24, 2017 – Present Currently Junior

· Computer Programming

o F#

o C++

o Java

o Assembly Language

· General Education

o Calculus 1 & 2

o Speech

o Art

**Academic Honors:**

· Henryville High School National Honor Society

· Henryville High School Technical Diploma

**Academic Scholarships:**

· Henryville High School Key Club Award

· Orrin E Weber Special Effort Award

· The Terry Hill Higher Education Award

· Willis Drake Helping Hands Award

**Volunteer Work**

· Saint Francis Xavier Church

o Fish Fry

o Cleaning/ Maintenance

o Live Nativity

o Septemberfest

o Usher

o Halloween Trunk or Treat

**Traits**

· Hard-Working

· Focused

· Organized

· Trustworthy

**SIMEON BRANSTETTER**

**Phone:** (812) 406-6814 || **Email:** matbrans@twc.com || **Github:** github.com/SimeonBranstetter

**Objective:** To obtain real world experience in my field of discipline that will enhance my skills in software engineering and application programming as well as computer architecture and data management.

**EDUCATION**

**Indiana University Southeast – New Albany, IN** May 2021

Bachelor of Science in Computer Science – Math & Science Track GPA 3.7/4.0

Minor in Mathematics

**Relevant Coursework:**

**Completed:** Object Oriented Programming, Discrete Mathematics, Computer Structures, Data Structures, Programming Languages, Software Engineering, Computer Networking, Analysis of Algorithms, Calculus 1, Calculus 2, Calculus 3, Linear Algebra, Elements of & Probability

**Additional Coursework:**

**Completed:** Survey of Economic Issues & Problems, Public Speaking, Reading-Writing & Inquiry, Writing in the Arts & Sciences, Principles of Chemistry, Experimental Chemistry

**PROJECTS AND EXPERIENCE**

**IUS Software Engineering Class Group Project** January 2020 – May 2020

* Small development team using RESTful and other architectural styles for application programming in a team to create an application.
* Using Kotlin via android studio a phone application was programmed to read album records from taking a picture of the cover and then sending back pertinent information of the album including songs, writers, producers, etc.
* Google Cloud API was used for the image recognition along with the Discogs API and database for searching up the appropriate album info from the parsed data received from Google Cloud API.

**IUS Computer Networking Class Group Project** August 2020 – December 2020

* Small development team using language, IDE, API/Framework of choice to develop a game that would use networking capabilities for internet communication via 2 or more players.
* Lua via Sublime Text Editor along with a Lua 2d game creation API called LOVE Engine was used to develop a crude version of Battleship using UDP socket connections for internet communication.

**Clark County Indiana 4-H Robotics Club** February 2013 - July 2019

* Physically constructed and programmed with Lego Mindstorms in a group to understand basic robotics, engineering, and programming knowledge.
* Last couple of years spent as a club leader for the robotics group teaching children about basic programming knowledge along with hardware communication.

**SKILLS**

**Languages:** Proficiency in Java, C++ || Comfortable with F#, Lua || Worked with Python, C#, C, Kotlin

**Dev Tools:** Git, IntelliJ IDEA, Netbeans, Visual Studio Code

**AWARDS/HONORS**

**Chancellor’s List - Two Semesters** || **Dean’s List - Two Semesters**