Musical Assistant Mixer:
A Composer's Guide to Music Theory

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INTRODUCTION

Music composition is an art of it's own. Creativity is at it's foundation. Writing an original piece is not always so easy to execute. It sometimes requires to know a little about music theory to make your next move in the composition. Music composition assist softwares can be a significant tool to the improvement of a composition. With the assistance of software, it allows users to develop their ideas as they see the actual theory behind their music. Such software has been experimented with. In one software, music is input by a user so the software can analyzes the style of pitch durations and transitions to make recommendations to the next bar. (Kikuchi, Yanagi, Mima). Another software was able to fit together separate motifs of music, that was randomly generated, to combine to a fuller piece (Khalifa and Al-Mourad). These projects have set up a promising foundation to build upon and we aim to contribute to the composing of musical rhythms and harmonies.

CONCEPTUAL BASIS

The goal of this project is to afford users an environment which is both functional and educational for musical composition. The UI design will be as intuitive as possible so that nothing gets in the way of the creative process, and still having all the tools that are needed for the user. Some improvements expected through our design will include part writing suggestions. This will be aimed not only for melodies, but also rhythm sections, bass, and harmonies.

The desired effect targets improving the overall productivity of experienced composers while making music composition more accessible to new users.

Our hypothesis is if users are exposed to music theory and proper music notation, music composer of all experience levels will then have a significant improvement in their writing skills and productivity. To identify whether or not the realized system has satisfied its goals, we will have users compose their music on our system and other software such as Guitar Pro (without tablature mode), and compare their experiences between the software. The goal is get as much productivity done. This sort of evaluation is set in a controlled environment , then we will test in natural environment where the user can have any experience level with prior experience using other music composition software.

RESEARCH COMPONENTS

The main components of our project will consist of answering three questions. The first question relates to the ability of gauging the individual human's familiarity with music theory. The second will attempt to measure what our users learned, if anything, about music theory. Lastly, we plan on testing if our software made learning about music theory appealing and natural.

In attempting to determine how much an individual understands about music theory, we realized that achieving this information will involve well-devised probing questions. We considered different methods of gathering data and ultimately decided to use a questionnaire to collect our information. We will be delivering how comfortable people feel about their knowledge of music theory based on their own sense of theory and experience with instruments and music creation.

Throughout the project we plan on making use of the prototypes to infer users' knowledge of music theory. We will need to understand the user's knowledge before and after using our prototype. We will be administering a questionnaire before and after the user has tested our prototype. We will be weighing the responses from each

questionnaire against each other to conclude the results about their learning process.

Next, we will focus on building prototypes of our music editing system and test it against other music editors, such as FL Studios and GarageBand. This will help us analyze how well our music editor compares to others in helping the user understand music theory. By using these comparisons, we will be able to adjust our music editor until we believe it's able that it able to competes with these other music editors.

We'll also apply to our final project what we have learned from the journals we researched and discussed. In one journal, the authors developed an AI that was able to teach the user hot to construct chord sequences (Malgaonkar, Nag, Devadiga, Hirave). We can use this journal to help create a function that helps the user learn the basic fundamentals of music theory and even chord progression within our music editor. Another journal explains how the authors use genetic algorithms to produce new melodies (Sheikholharam, Teshnehlab). This journal provides much use with different algorithms we could learn from to create our own unique melodies to help the user learn how different melodies, instruments, and rhythms sound in comparison to one another.

Our last objective is to determine if we've made progress in making our music composition teaching and human-computer interface focused software appealing and natural. This task will also be handled through actual user testing. These users that will be testing our system will range from people who have used other music editors and feel confident with how much knowledge they have on music theory, to people who have no experience with music editors or music theory. After testing our product, we will have the user fill out a questionnaire that's similar to our first one, but with more open-ended questions. This will give us a great look at how people feel about our product, how much they learned about music theory from using our product, and how our product could improve. Getting input from users who use our product will give us the best result on bettering our music editor, until we feel like it's fully complete.

Research benefits

The system will ultimately serve as a music composition service which will help our users realize what music mechanics are happening in the back end. Users that have not been exposed to music theory before will understand the musical components that are involved in their own creations. This system will let the user be free in their creation as well as support the user's creations in a musically accurate manner. Although music is an art, it does have some structure. No other music software has this type of support. This system will allow musicians of all experience levels to expand on their own knowledge and understanding of their craft by looking at it from a different perspective. An example of this is a musician coming from composing on a pure sequencing software to compose their music. This musician has little to no understanding of what musical components are involved in their piece, but by using our system, this user will gain a better understanding of their composition. This is why our system is important to its own field.

With the system helping the musician to develop a better understanding of music theory, the expected end result will be better music composition. To the artist's listeners, this means a greater listening experience. This is the benefit to society. The system directly promotes teaching and learning to the user. They will learn music theory and from there, their creativity is endless with all the tools our system will provide. Music is a universal language. No matter where you are, who you are or what you are, the theory is the same. Anyone with the desire and passion can learn it. Thus, our system suites the educational infrastructure. Which can potentially be used in classroom settings for interactive learning of music composition.

Team

We are an undergraduate team of Bachelor of Computer Science students. We are all passionate about creating music and learning and creating code to help improve human-computer interaction.

Matthew O'Toole is a musician, composer, and songwriter. He has worked with different recording studios, such as GarageBand and FL Studios, and has written and recorded over eighty songs. His experience with other music editors will be a great asset in determining what works and how we can make our music editor different from the rest.

Jose Ortiz is a musician, composer, and audio recording enthusiast. He's very familiar with many music creation software such as sequencers, digital audio workstations and other composing software. His experience with previous software will push us forward on this project by enhancing features and creating new ones to improve human experience.

Arturo is an ambitious DJ and producer who has worked on team projects that relied on human-computer interaction. His experience with previous music production software

has pushed him to learn more about music theory, but he feels the software itself should incorporate some type of learning in the process. He has experience with creating software for Android mobile devices and is excited to put his skills to test in a new environment and topic. Our drive to improve our knowledge of good human-computer interaction systems and our passion in music will pave a path to successfully creating our final product.

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