ABSTRACT

ON

Interactive MIDI Musical Keyboard: Simplified Music Creation using Python

Submitted to

DEPARTMENT

of

COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

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INTRODUCTION:

The project aims to develop a user-friendly musical keyboard mobile application for Android, where each key corresponds to a specific musical note. The upgraded system uses Android Studio, with Java as the backend and React Native for the front end. This application allows users to easily create music with an intuitive piano interface and features to switch between 128 instrument sounds.

Existing System:

Current systems include DAWs, online virtual pianos, educational software, and gaming keyboards with music modes. They face limitations such as:

1. Limited customizability: Many existing music systems don't allow users to tailor sounds or settings to their personal preferences, restricting creative freedom.
2. Complexity for beginners: Current tools often have complex interfaces and steep learning curves, making it challenging for newcomers to start creating music.
3. Lack of seamless error handling: Errors can disrupt the user experience, with some systems lacking smooth error management to help users quickly recover from issues.
4. Dependency on specific software: Many tools require specific software or platforms to run, limiting user access and flexibility across devices.
5. Limited integration potential: Existing systems often lack the capability to easily connect or integrate with other music production tools, reducing their versatility.
6. High Cost of Advanced Tools: Many professional music production tools require costly licenses, making them inaccessible for hobbyists or beginners.
7. Steep Hardware Requirements: Advanced software often requires high-performance hardware, making it challenging for users with standard devices to run them smoothly.
8. Limited Offline Functionality: Some systems depend heavily on internet access, limiting usability in offline settings or low-connectivity areas.

Proposed System:

The Android application uses a combination of Java for backend processes and React Native for front-end development, offering an interactive GUI with piano keys and a feature to select from 128 instrument sounds. Python MIDI libraries (e.g., mido or python-rtmidi) handle instrument mapping, while Java enhances backend efficiency. The mobile interface includes error handling and receives regular user feedback for a refined experience.

Advantages Over Existing Systems:

1. Portable and Accessible: The app is available on Android, making it easy for users to access and use anywhere, anytime.
2. User-Friendly Interface: With a simple and intuitive layout, even beginners can start making music without a steep learning curve.
3. Wide Instrument Variety: The app offers 128 different instruments, allowing users to experiment with a broad range of sounds.
4. Enhanced Stability and Performance: Using Java for the backend ensures smooth performance and stability, even with complex operations.
5. Error Handling for Smooth Experience: Built-in error handling minimizes interruptions, offering a seamless music creation experience.
6. Cross-Platform Potential: React Native allows for easier expansion to other platforms in the future, like iOS.
7. Open-Source Community: The project is open-source, encouraging community input and collaboration for continuous improvements.
8. Cost-Effective: Being free and open-source, it provides a budget-friendly alternative to expensive music creation tools.

Applications of Proposed System:

1. Learning to Play Piano: Beginners can use the app to learn basic piano notes, chords, and scales without needing a physical piano.
2. Experimenting with Different Instruments: Users can explore the sounds of 128 different instruments, helping them find the ones they like or want to learn more about.

3. Quick Song Ideas: Musicians can record simple melodies or ideas instantly whenever inspiration strikes, so they don't lose track of their creative thoughts.
4. Relaxation and Fun: Casual users can enjoy playing around with different sounds and melodies for fun or relaxation, much like a virtual toy piano.
5. Personalized Practice Tool: Users can practice playing music on the go, using the app as a portable instrument for daily practice.
6. Musical Game: The app can be used as a game to challenge friends or oneself to recreate tunes or guess songs, making learning and playing more enjoyable.

This project aims to create a comprehensive music creation tool that’s both accessible and adaptable, catering to users with various skill levels

Signature of Guide **Signature of Project Coordinator**