Intelligent Chord Progression Assistant

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I. Introduction

Composing effective chord progressions can be challenging for music producers and composers, especially when trying to evoke specific emotions such as happiness, melancholy, or suspense for example. While various music-theory resources exist, they often lack real-time assistance integrated into the creative workflow.

This project aims to bridge this gap by developing an application that automatically recognizes chords in a piece of music, analyzes their harmonic function (is the chord meant for transition or stabilization ? For which kind of emotion ? etc...), and suggests musically coherent alternatives. This tool will help users understand harmony at a deeper level while supporting creative exploration.

II. Goals and challenges

The main goal of this project is to design an application capable of reading and analyzing audio in order to identify its chord progression. Once the chords are extracted, the system should determine the key of the piece and interpret the function and emotional role of each chord within the progression.

Based on this analysis, the application will generate meaningful musical feedback and propose alternative harmonic ideas that align with the user's creative intent, such as adjusting the music to feel happier or more melancholic. All results must be clearly visualized through a simple and intuitive interface, making the tool accessible for users with varying levels of music theory knowledge.

One of the important challenges will be ensuring the reliability and precision of the feedback, which depends on having enough representative data and strong analysis techniques.

III. Technologies

To achieve the above goals, the following technologies will be employed :

- **Python** - core development language
- **Librosa / Essentia** - audio feature extraction and chord recognition
- **Tensorflow** - Machine learning for progression similarity & suggestion engine
- **React or PyQt** - graphical user interface for interaction and visualization

IV. Implementation

The project will be developed in the following phases :

1) Audio/MIDI chord detection
   - Extract chroma features
   - Identify key and chord labels over time
2) Harmonic function analysis
   - Classify chords into standard music-theory roles
   - Map chords to emotional/tension attributes
3) DATA collection
   - Create a Database with chords progression found on Internet (on Looperman for example)
   - Map Data samples with styles
4) Chord suggestion engine
   - Suggest new chords via rule-based harmony and probabilistic models
   - Style presets (e.g., happy, sad, jazzy, cinematic)
5) User interface design
   - Visual representation of progression (timeline, colors per function)
   - Allow users to accept or modify suggested chords

V. Evaluation

The system will be evaluated by measuring the accuracy of chord recognition using annotated reference data, and by assessing the musical relevance of suggested chords. Additionally, user testing will be conducted to verify that the interface is intuitive and that the feedback provided truly supports the creative process.

These combined results will determine whether the tool is both technically reliable and practically useful for composition.