JazzFlow
Generating Inspiring Harmonies from Traditional Counterpoint

Trevor Ritchie and Dr. Bill Manaris, Computing in the Arts, College of Charleston, USA

Introduction

JazzFlow leverages the intergenerational knowledge of composers to transform old compositions into new harmonies.

Starting with a **single input piece**, JazzFlow outputs **32 unique variations**. For the modern composer, this **saves time** for experimentation. Also, the rich, often unexpected harmonies produced may provide **inspiration**.

Background

J.S. Bach's chorales, though masterfully composed, were constrained by the limitations of his era's tuning system and harmonic conventions. Certain intervals were deliberately avoided in his compositions.
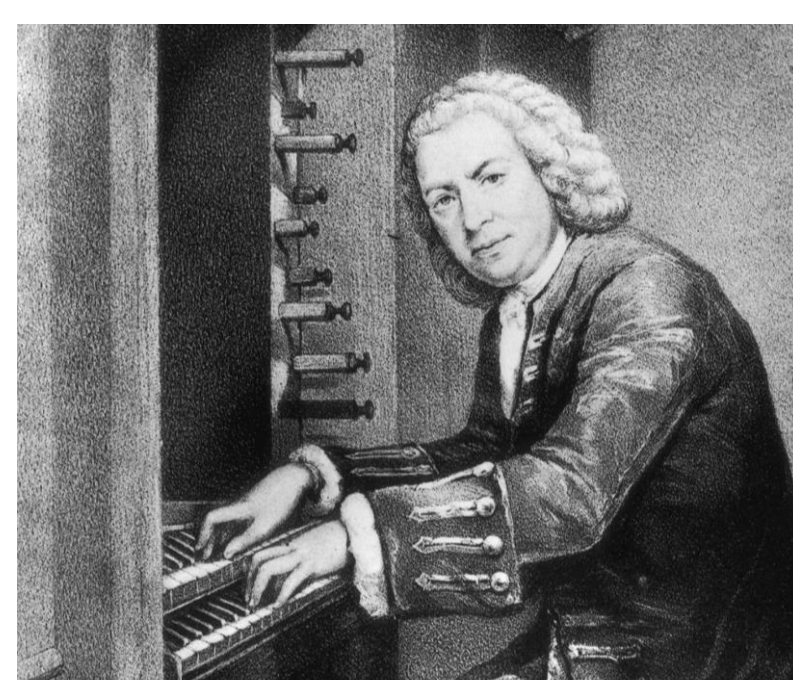
179 years later came **Barry Harris**, a famous Bebop pianist and educator.
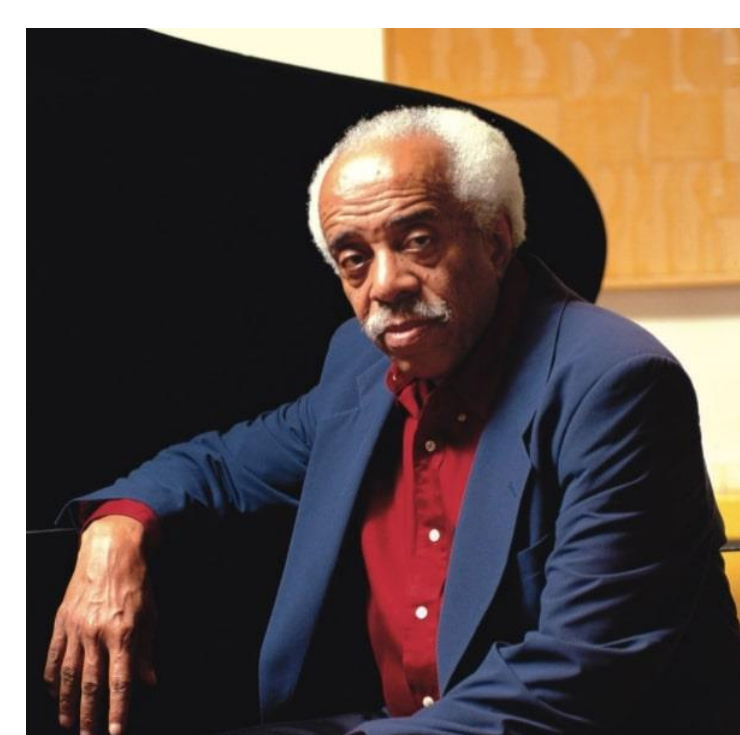
Harris coined four novel, 8-note "scales of chords".

Working in the modern 12 TET tuning system, JazzFlow uses Harris's scales to reimagine traditional counterpoint in a modern context.

Creative Process

1. Select a MIDI file as input - for example, a J.S. Bach chorale.
2. Select one of Barry Harris's scales to generate a diatonic transposition.
3. Repeat step (2) for all scale degrees.
4. Repeat step (3) for all scales.
5. Examine the new MIDI files and manipulate the music as desired.
6. Feed the result of step (5) back into the system for further harmonic exploration.

Music Example

- **All** diatonic transpositions maintain the melodic contour of the original
- **Even** diatonic transpositions maintain the temporal balance of tension and resolution
- **Odd** diatonic transpositions invert the temporal balance of tension and resolution

References

1. B. Manaris, J. Romero, P. Machado, D. Krehbiel, T. Hirzel, W. Pharr, and R.B. Davis, "Zipf's Law, Music Classification and Aesthetics," *Computer Music Journal* 29(1), MIT Press, pp. 55-69, Spring 2005.

2. B. Manaris and A.R. Brown, *Making Music with Computers: Creative Programming in Python*, Chapman & Hall/CRC Textbooks in Computing, pp. 502, May 2014.

Conclusions

JazzFlow, as most successful AI tools, relies on having a "human in the loop". Given the difficulty and subjectivity of music composition, JazzFlow may not always produce perfect results on its own. Great results arise when the composer select parts of the output, and decides how to assemble them. This promotes / maintains / reclaims the personal, intellectual, and emotional process of making music.

Future Work

There are several avenues to explore:

- Extend algorithm to automatically generate interesting islands of harmonic meaning.

- Improve quality of generated material, using other music theories.

- Incorporate earlier work in Zipf's Law and genetic algorithms [1].

Acknowledgments