

THE SOUND OF SPACE



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OUTLINE

DESCRIPTION

PARAMETERS COMPUTATION

SOUND IMPLEMENTATION

GRAPHICAL IMPLEMENTATION

CONCLUSIONS

DESCRIPTION

- › Generative computer music system that develops Aleksandr Nikolaevič Skrjabin's idea of association between colors and musical tonalities
- › Contrary to Skrjabin, this project uses image processing algorithms to extract qualitative visual data from pictures and convert them to musical features
- › Themed tri-dimensional rhythmic wheel to visualize generated music

PARAMETERS COMPUTATION

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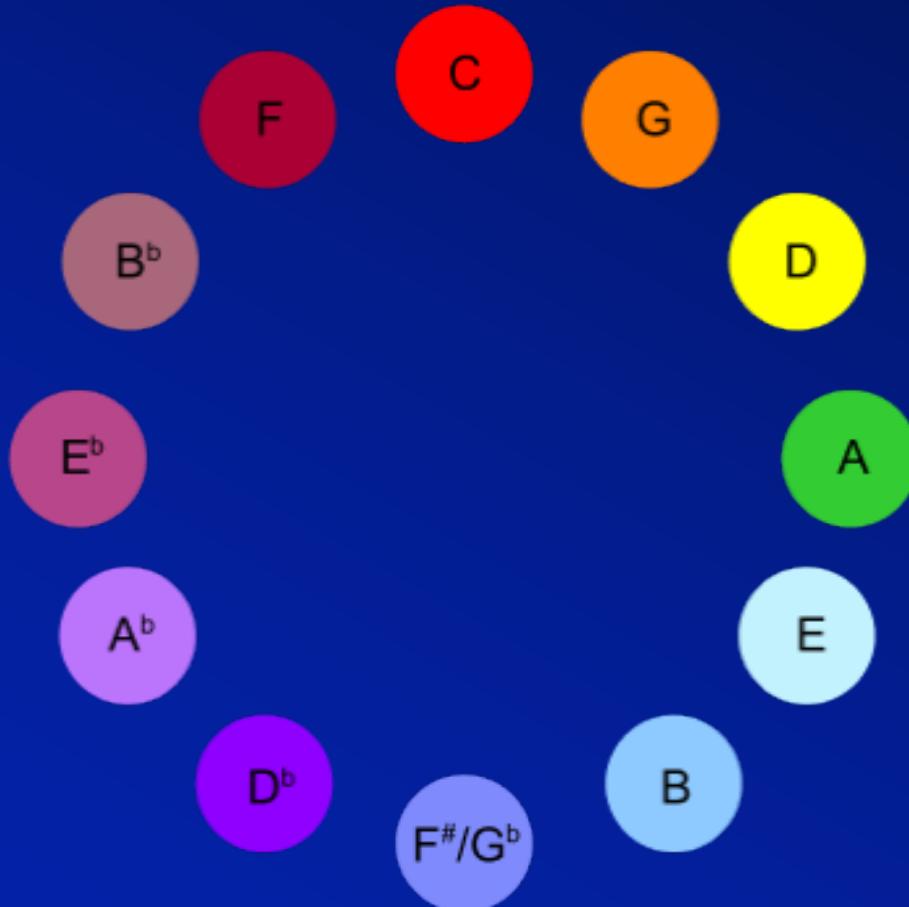
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KEY

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Average color

- › Retrieved from image
- › Calculation of perceptive distance from *Skryabin's key-to-color mapping*
- › Computed key corresponding to closest reference color

MODE

Brightness

- › Average of RGB from pixels to obtain the total grey value of the image
- › Label based on empirical thresholds
- › Mapping onto musical modes



- Lydian
- Ionian
- Mixolydian
- Dorian
- Aeolian
- Phrygian
- Locrian

CHORD TYPE

Lightness

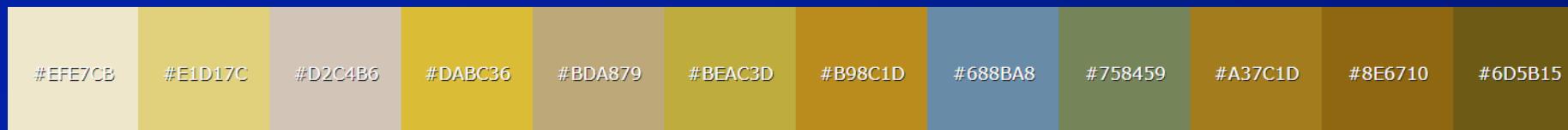
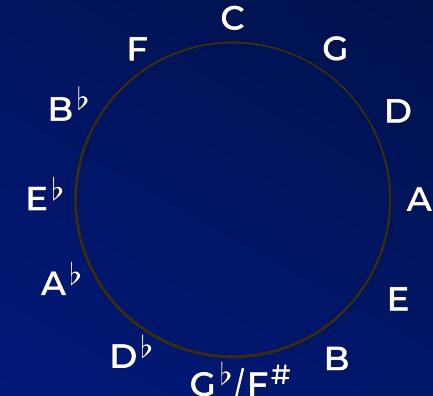
- › Algorithm to determine the "lightness" of the image
- › Two possible chord types based on the number of bright spots: a simple *triad* or a *seventh tetrad*

CHORD PROGRESSION

Colour Palette

- › The greater the size of the palette, the more complex the progression:
- › Linking the chromatic complexity of the image to the harmonic complexity of the generated piece

I - V
I - IV - II - V
I - VI - IV
I - IV - VI - V
I - V - VI - IV



SOUND IMPLEMENTATION

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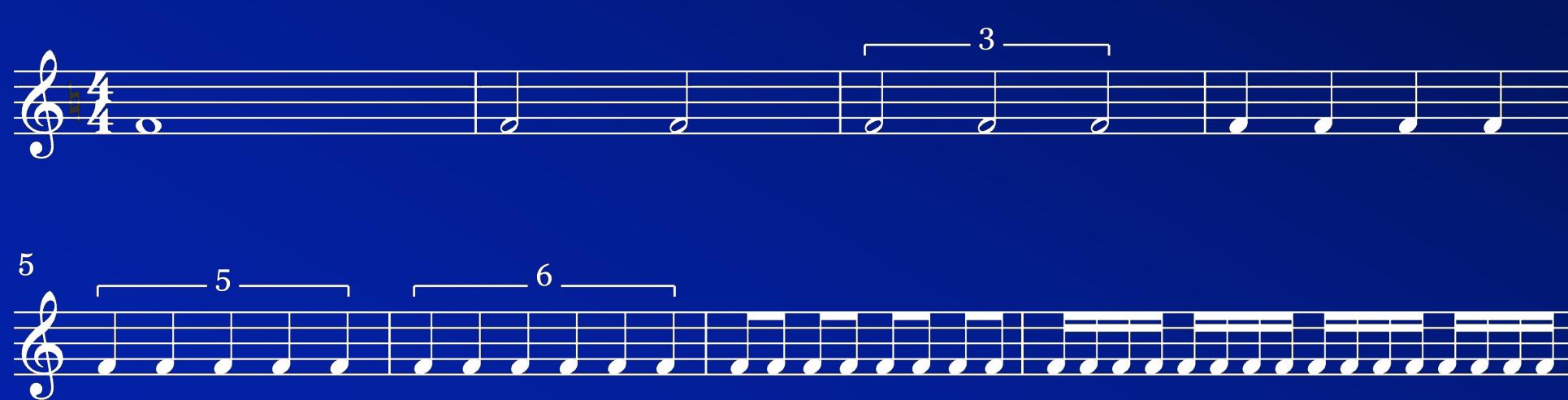
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MUSICAL STYLE

- › Ambient inspired musical style
- › Stochastic component, semi-generative music
- › Influence of Brian Eno and Vangelis works

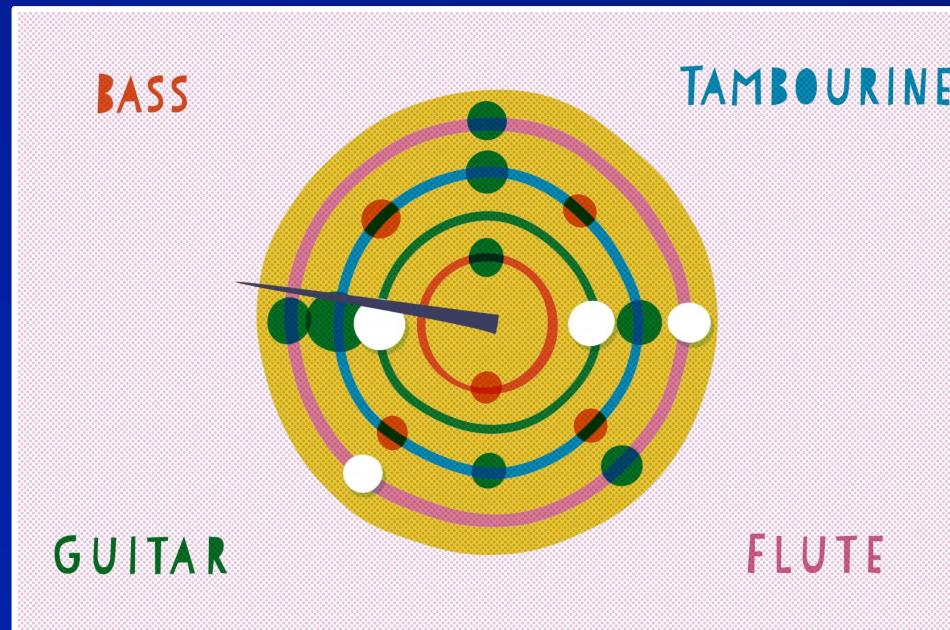
RHYTHMIC STRUCTURE

- › Each planet represents an instrument and is played periodically
- › Playing ratios are fractions of a fundamental one (bass)



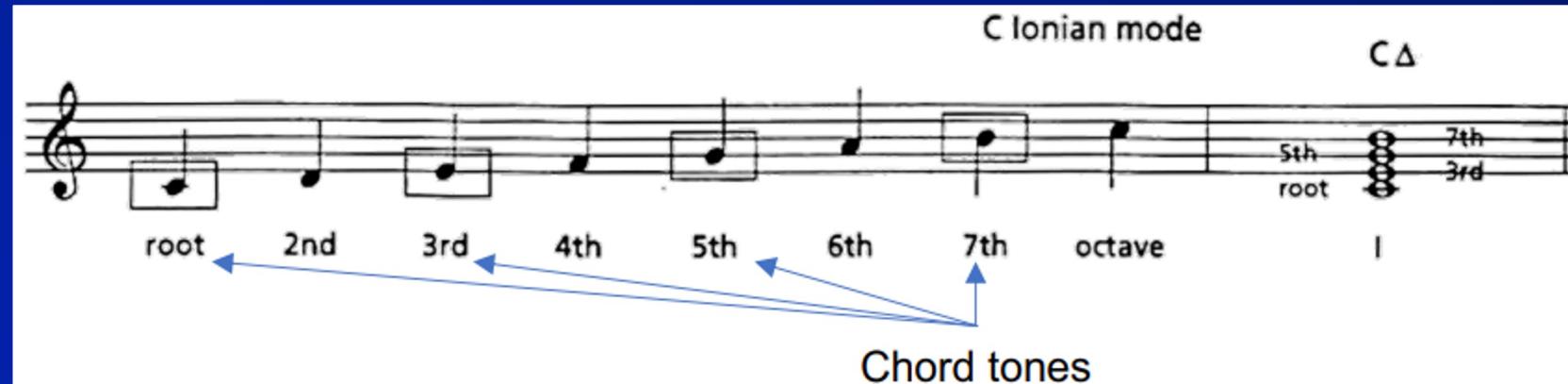
RHYTHMIC STRUCTURE

- › Rhythmic wheel representation allows polyrhythms visualization



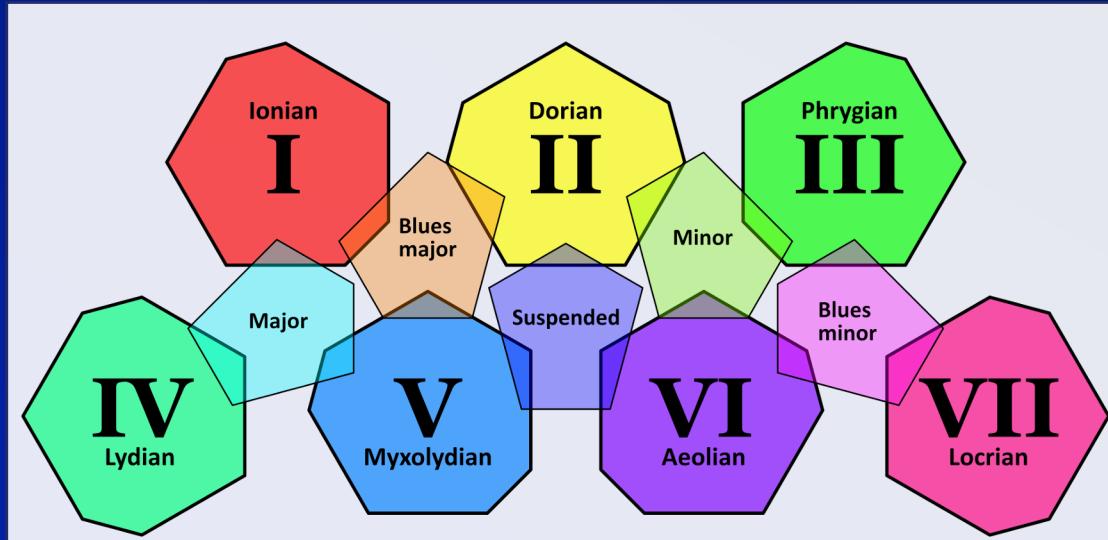
NOTES COMPUTATION

- › The chord notes are selected via a 2:1 subsampling from the selected key (starting from the tonic of the chord)
- › Chord notes are randomly played between two octaves and this allows for interesting inversions and generativeness



NOTES COMPUTATION

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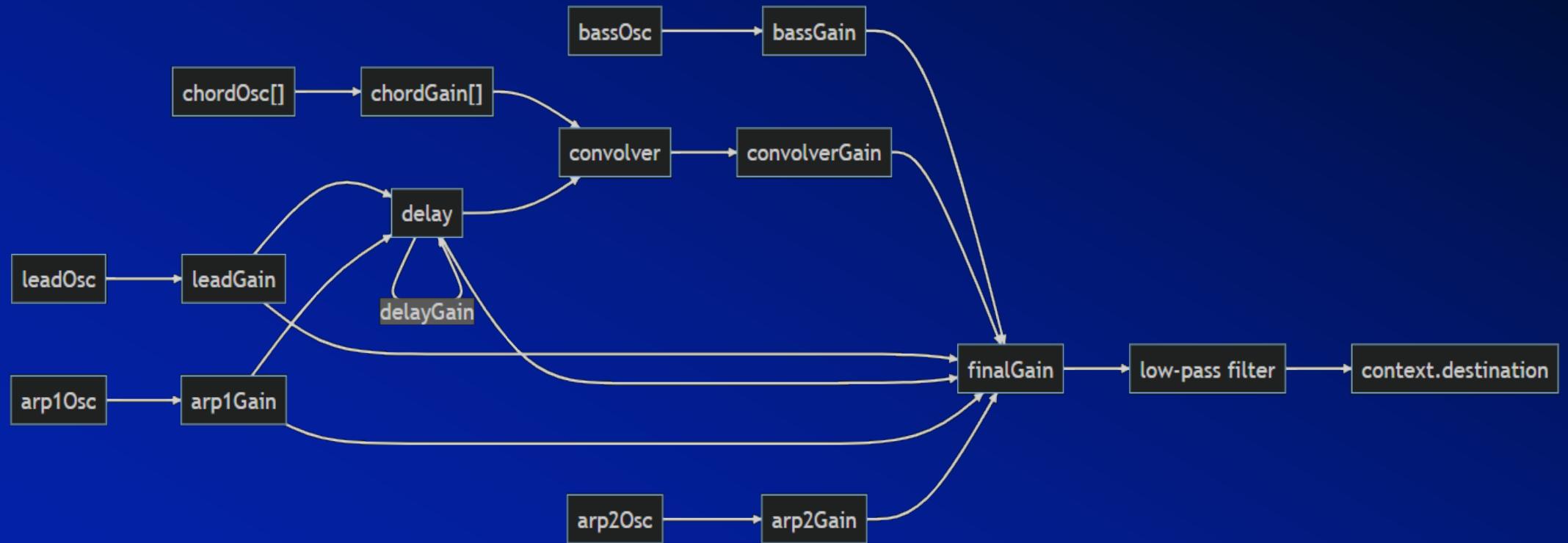


PENTATONIC	MODES
Major	Lydian, Ionian
Suspended	Mixolydian, Dorian, Aeolian
Blues Minor	Phrygian, Locrian

- › The bass always plays the tonic of the chord
- › The lead (Earth) plays random notes from the pentatonic scale (generative feature)
- › Arpeggiators cycle through chord and scale notes

SYNTHESIS CHAIN

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GRAPHICAL IMPLEMENTATION

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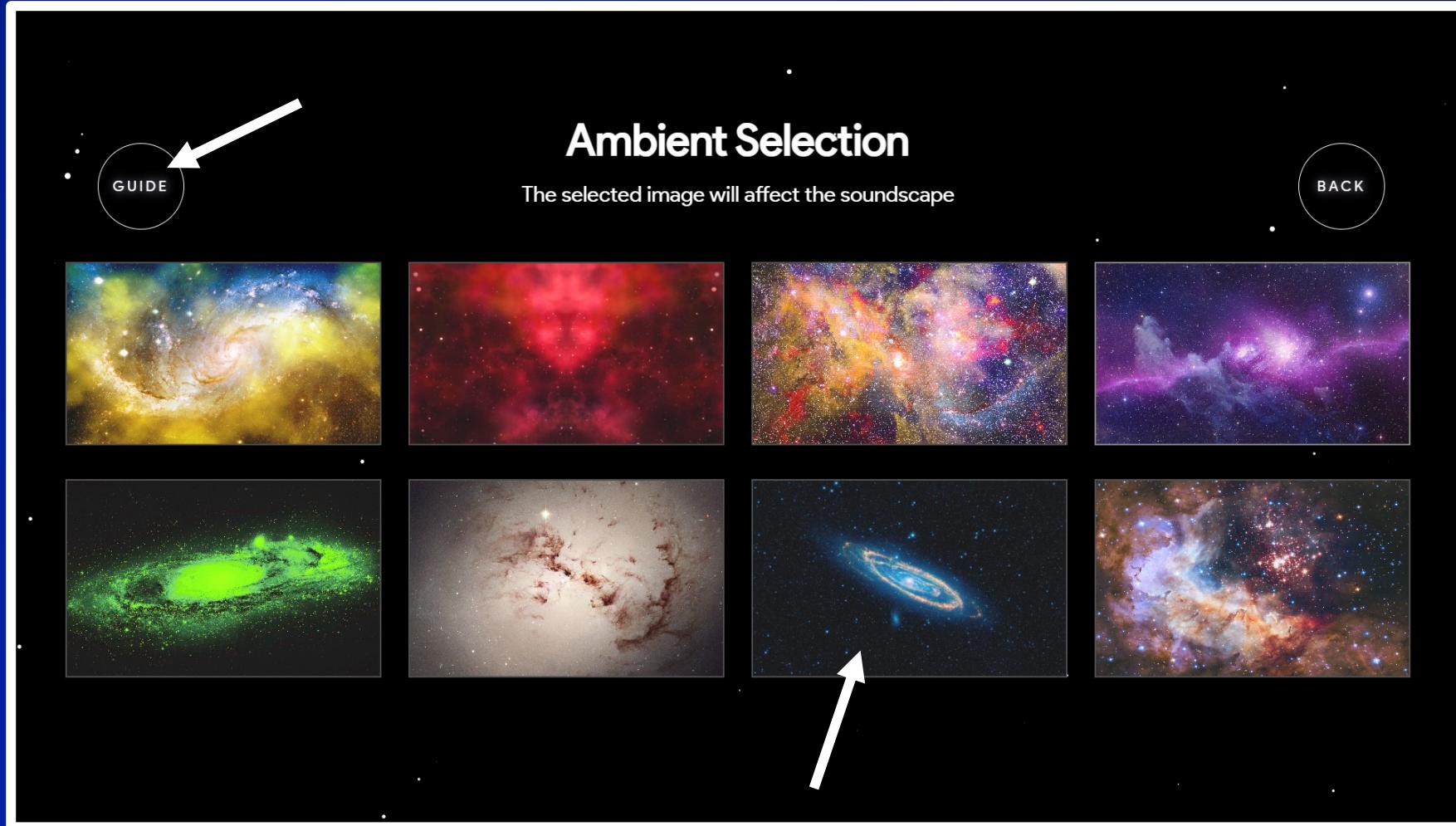
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START MENU

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EXTRACTED PARAMETERS

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Soundscape



#EFE6CA	#E1D07B	#D2C4B5	#DABC36	#BDA779	#BEAC3E	#B58F27
#698BAA	#75845A	#A67912	#8E6710	#6D5C16	#3B5B5F	#643B07
		#093B61	#2C1B0B	AVERAGE		

Detected key: D

Detected mode: Lydian

Detected progression: I - V - VI - IV

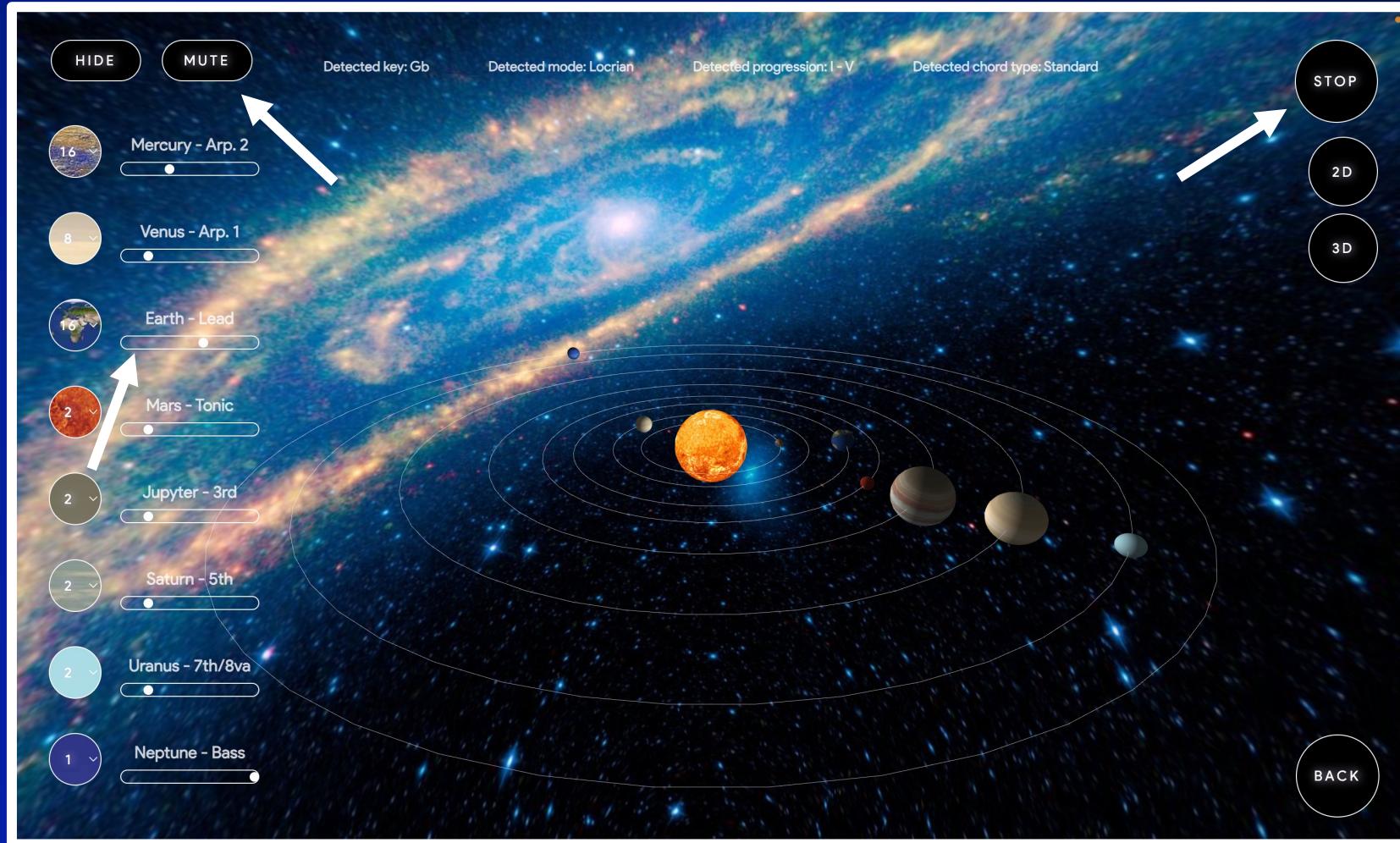
Detected chord type: Seventh



NEXT BACK

3D VISUALIZER

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CONCLUSIONS

- +> Many possible rhythmic combinations
- > Harmonic complexity derived from images
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- > Additional sets of instruments could be added
- > Additional customizable controls
- > Additional colors of the scale (e.g., 9th, 11th)

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THANK YOU
FOR YOUR
ATTENTION

