Crashing Waves

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INFO 490

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May 10, 2023

This work is for piano, violin, and viola and explores compositional techniques utilizing the Fibonacci sequence, cage's square root method, and random procedures. The composition you are listening to is one section of this piece that is utilizing random procedures and the Fibonacci sequence. The random procedure will be implemented with images of random subjects and environments, then a grid will be overlayed on-top of the photo to split it into sections.

On this grid, the x-axis will represent time. Each part of the photo's composition will be assigned to correspond with a different musical element as follows: exposure = dynamic (more exposure, the louder the note), overall color = duration (red: eighth rest, orange: quarter rest, yellow: sixteenth note, green: eighth note, blue: quarter note, purple: half note, pink: eighth note triplet, brown: dotted eighth note, black: quarter note triplet, white: whole rest) , and grid position = articulation (row 1: no articulation, row 2: tenuto, row 3: staccato, row 4: accented, row 5: tenuto and accented, repeat and cycle through pattern for remaining rows). Moving from left-to-right and top-to-bottom, each square will be analyzed and broken down to these three elements, therefore one square will equate to one note (each image is expected to generate 200 notes). This technique will be utilized with one picture for each of the string parts, and to help ensure some sense of relation to one another, photos chosen per part will share a theme of either location or overall color scheme. For example, the violin part could be composed of photographs that have only warm tones or the images could have all been taken in one building. The photographs for this piece will be themed as such: violin = nature, viola = food.

Along with the pictures, the Fibonacci sequence will determine the chord progression that will be played by the piano. As the sequence's number values increase beyond what would conventionally be used in music, to continue the sequence organically and make it applicable, numbers past 8 will be divided by 8 to determine which chord it will correspond to. To

demonstrate this the number 34 will be used. If 34 is divided by 8, we get a value of 4.25, following standard rounding rules it will be adjusted down to 4, and so the IV chord will be utilized in that portion of the piece. If the quotient is larger than 8, then it will be divided again by 8, so for example 144 divided by 8 is 18, and 18 divided by 8 is 2.25 and so the resulting chord will be the II chord.

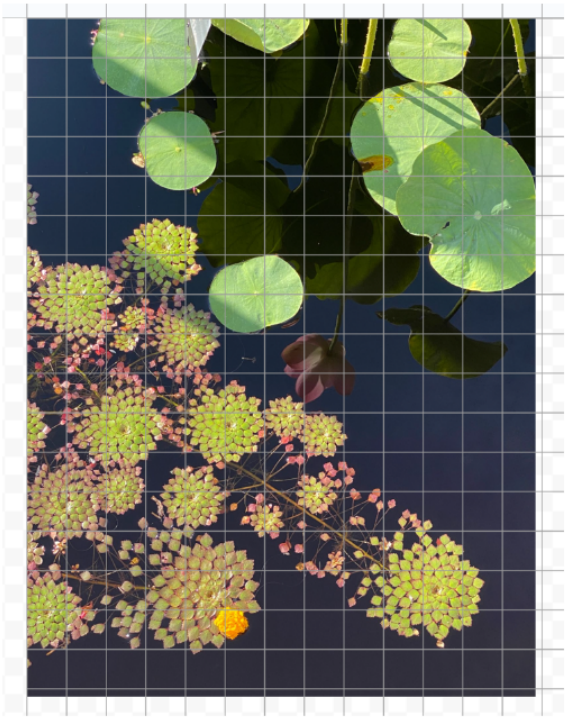
To generate the scale that will be utilized for the composition, a sieve was constructed. The base generator interval was 2 semitones which initially gives me 2 semitones (base), 4 semitones (base + base), 6 semitones (base + base + base), and so on. This sequence can then be represented mathematically by the equation step(n) = n * generator where “step(n)” means the nth step in the sequence, and “generator” means what size the generator’s interval is in semitones. To then create the musical scale, I selected a subset of the possible steps which was based on a pattern that was defined by the sieve implementing these figures into a second formula: sieve(n) = (n mod 12) in {0, 2, 3, 5, 7, 8, 10} and in this formula “sieve(n)” means whether the nth step in the sequence is approved essentially (if it is “true”) and “mod” means the modulus operator. Using this sieve, I get the following “approved” steps:

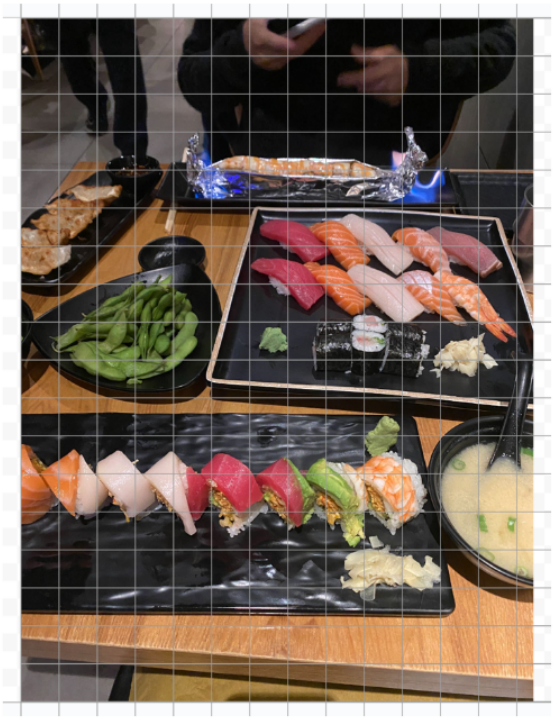
- sieve(1) = true, so first step is selected (2 semitones)
- sieve(2) = false, second step skipped
- sieve(3) = true, so third step is selected (6 semitones)
- sieve(4) = false, fourth step skipped
- sieve(5) = true, so fifth step is selected (10 semitones)
- sieve(6) = false, sixth step skipped
- sieve(7) = true, so seventh step is selected (14 semitones)

- sieve(8) = false, eighth step skipped

The starting note will be a C for the violin part and a G for the viola part. The piano will begin on a C Major chord.

With all parameters in place, the composition process can begin. The images for violin (left) and viola (right) are:





For the purposes of this composition, only squares that are at least fifty-percent full will be used and the max number of squares that each image can contribute is 200. To illustrate how the grid parameters work, let's take a look at the first square on the top left of the violin image.

This square's overall color is blue, its exposure is medium, and it is in the first row, so the first note of the violin part will be a C quarter note at *mf*. The viola part will begin with a G quarter note triplet at *mp*. Each square will go through this process and the subsequent notes that are created by it will be inputed chronologically. Though both parts will have the same number of squares, the notes will not line up with one another as randomized note lengths will vary and so one photo may not end up using all of its squares.

The result is a somewhat chaotic piece with each part having a drastically different sound from the other, but what holds it together are the shared note intervals and steady held chords from the piano. Each part plays both off of and against each other at different moments making for a fun piece with many twists and turns.