

PIANO 04h

for MIDI player piano
with human performer and *PAPAGEI* software

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PIANO 04h is an improvisational piece for MIDI player piano played simultaneously by a human performer and the *PAPAGEI* (Parametric-Algorithmic Patchbay-Accompanist Generating Events by Improvisation) software developed by Clarence Barlow and Salman Bakht. While the human performer plays on one half of the piano (below or above middle C), *PAPAGEI* generates a piano on the other half. This accompaniment is generated by mapping musical parameters of the human performer to parameters which define a set of output melodic streams.

The algorithm for generating the melodic streams was created by Clarence Barlow and first implemented in his software package, *AUTOBUSK*. *PIANO 04h* was first performed by Joann Cho who also provided suggestions on the compositional system.

Output Speed: 7 pulses / second
Lower Range: C1 – B3 (C4 = middle C)
Higher Range: C4 – B6
Note Triggers: A0: human performer to higher range,
 C#7: human performer to lower range

Input Parameter	Output Parameter	Relationship
Pitch	Tonic	Direct
Avg. Key Velocity	Key Velocity	Direct
Register	Metricity	Inverse
Key Velocity	Tonality	Direct
Width	Density	Direct
Number of Notes	Melodic Range	Inverse

PAPAGEI generates a melodic stream for each key (up to a maximum of 8) pressed by the human performer. The human performer begins the piece in the lower range of the piano keyboard (C1 – B3) with the automatic accompaniment in the higher range (C4 – B6). By pressing the lowest piano key, A0, the human performer switches positions with the software. When the human performer is in the higher range, pressing C#7 will return the positions to the original state.

The human performer is free to perform as they would like, but should be aware of the system's parametric mapping, the relationship between their performance (referred to as the "input" below) and what is generated by the software (referred to as the "output"). The output speed is fixed at 7 pulses per second. The tonic (keynote) of each output melodic stream is defined by the pitch of the corresponding input note. The key velocity of the output will match the average key velocity of the input.

Other input parameters are mapped to output parameters as described below:

Register -> Metricity (Inverse Relationship): Notes played in the lower end of the input range will result in more metric output streams, with certain pulses emphasized relative to the others. Attacks are triggered more often in these pulses. Additionally, the pitches of these attacks will likely have a stronger tonal relationship to the tonic (which is the corresponding input pitch). Input notes in the higher end of the range will result in an output stream with equal emphasis on each pulse. (Attacks are always on a fixed pulse grid.)

Key Velocity -> Tonality (Direct Relationship): Notes played with greater key velocity (loudness) will result in a more tonal output stream and vice versa. Here, “tonality” is based on the relationship of notes in the melody to the tonic. More strongly related pitches (for example, an octave above the tonic) are more likely to occur when there is high tonality. At zero tonality (with nearly silent input pitches), each pitch has an essentially equal probability of playing.

Width -> Density (Direct Relationship): “Width” here is defined as the interval between the lowest and the highest input key being played at a given instant. A greater width results in a higher density of attacks for each output streams. When only one pitch is played, the width is considered to be at a minimum, resulting in the lowest output density.

Number of Notes -> Melodic Range (Inverse Relationship): The melodic range of the output melodies (the maximum pitch distance between one note and the previous one) has an inverse relationship with the number of input notes. When a single input pitch is played, the output melody has a melodic range of seven semitones. When eight (or more) input pitches are simultaneously played, the output melody has a melodic range of zero, meaning that each melody will repeat the same pitch (resulting in a fixed eight note chord) until the number of notes decreases.

The human performer is encouraged to consider their improvisation to be, in part, a traversal of different values in these parametric mappings. At the same time, they should be aware of how their improvisational impulses are supported or discouraged. Hence, the piece mediates between the training of the performer and the tendencies of the system.