

# A model of "musicking" driven by mediation local-global concept lattices

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**Abstract:** Musical performances are supposed to be body-experiences. That is to say, musicking is a contact-mediated action. In this work a unique approach is proposed, a system motivated to move on two-dimensional space by itself making a sense of body and environment, which are formalized to "concept lattice" on the Lattice theory. This Musicking Self-Motivated System (MSMS) creates senses of touch and auditory as sense of body and sense of external world, then fabricates a sense of body agency motivated by variance of those senses to determine the next movement. Trajectories of MSMS were spatially biased on environments of which partial properties are given randomly. It is suggested that MSMS has robust intentionality onto perpetually open environment. Here debates MSMS comparing try-and-error processing of handling an unknown, i.e. potentially-instrument.

**Keywords:** Musicking, local and global, figure and ground, formal concept, body

## 1. Introduction

"Musicking" is a concept originally urged by Christopher Small (1998), in which music is the sum of

processes of all events around places and times music is played in meanings of social

functions. Yamada, Y. et al (2008) suggested that musicking (= do music) inevitably involves

personal actions (ex. Humming in a shower room, listening to birds singing) and

bodiness (ex. Fingers to keyboard, shape of mouth for whistle). Especially in terms of the European classical music scene, the bodiness had been eliminated for centuries and the other properties have been made authorized as the essentials. In other words, those previous studies have attached to "compositions", which are separated into sounds and sequences as factors to be analyzed and controlled.

Though it is needless to say that those researching have constructed many important theories, it is impossible to clearly divide them as independent variousness for actual musical performances. Also, it's obvious that "sounds" depend on contacts of bodies and environment and that "sequences" is derived from movements of them. We can obviously suggest musicking body as a system which moves as the sequence generates the sounds and vice versa (= the syntax of a musicking body).

The musical performance is not mere following rules, or just a random walk. The movement is made to make sense as an experience. Here we get focus on the auditory sense which detects sonic informations of the external environment and tactile sense which feels the contact between the body and the environment. Each of those sense puts to reword as a proximate sense and a remote one. Because the sonic information itself is indistinctive by the distance, the auditory perception is regarded as the global sense about the environment. Otherwise the tactile perception is interpreted as a local sense of the contact between body and the

environment. As a body mediates and connects the couple of senses, the experience of the world is composed as the body sense (= the semantics of a musicking body).

While the syntactical movement directly generates the tactile sense, the auditory semantically indicates a future condition of environment. Now we assume to define the syntactical future as that the semantics is syntactically unknown. Do we always deductively determine our next behavior by the current known informations, in the cases of searching in unknown environments? No, we fabricate to estimate the future conditions via the known informations. There must be leaps of logic in the estimations when the environment is absolutely unknown. Further, the leaps may motivate the movements exposure unknown-ness.

As described above, it is suggested that the system in which the body mediates the auditory and the tactile information motivates to determine the next movement by the mediation itself would be a model of musical performance. In this study, an implementation way is introduced and discussed in terms of try-and-error processing of handling an unknown, i.e. potentially-instrument(Figure 1).

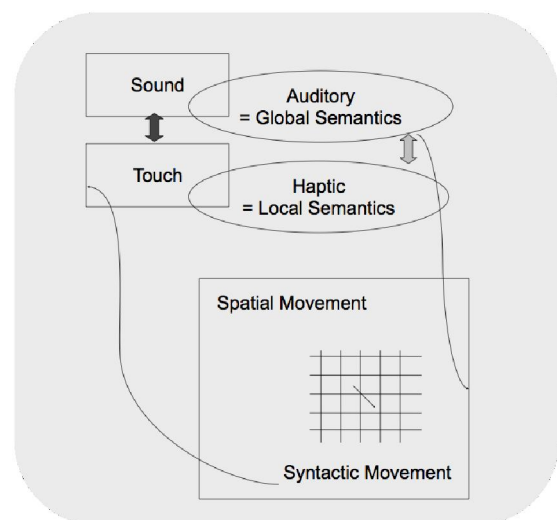


Figure 1: A conceptual schema of musicking performance illustrating the semantics-syntax loop.

## 2. Musicking Self-Motivated System (MSMS)

### 2.1. Musical performance via mediation of local and global concept lattice

The author has been suggested the Musicking Sel-Motivated System (MSMS) driven by the mediation of the concept lattice of local and global informations of agent on a 2D ground, according to Gunji et al (2002). The system has an agent moving on a 2D ground consist of cells valued natural number 0 to 4 as landmarks, the agent composes a local concept lattice as a tactile information of surroundings by the 0-4 value and directions. The local concepts generate sound which is analyzed by FFT. The sound information is composed as a global concept lattice. The agent determine the next movement by comparing the local and global lattice (Figure 2, 3, 4.). See my previous work for the details of mathematics.

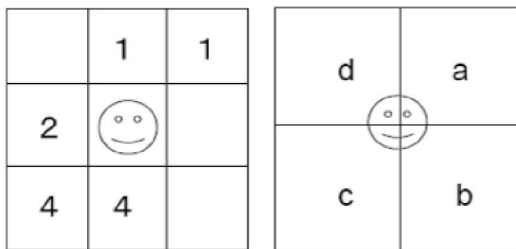


Figure 2: The agent indicated by a face at the center of each figures and the values of the 2D ground indicated 1~4 numbers in the left

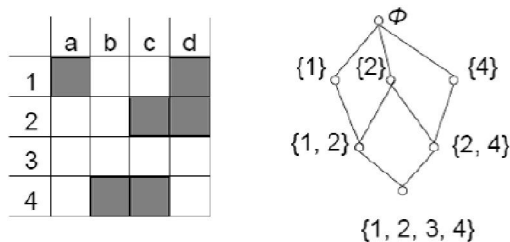


figure and the directions a~d in the right.

Figure 3: An example of the local formal context illustrated as the left table and the local formal concept lattice on the right. In this

example, the landmark value 1 is related to direction a and d, 2 to c and d, 3 to non and 4 to b and c. The formal concepts as the elements of concept lattice are  $(\Phi, \{a, b, c, d\})$ ,  $(\{1\}, \{a, d\})$ ,  $(\{2\}, \{c, d\})$ ,  $(\{4\}, \{b, c\})$ ,  $(\{1, 2\}, \{d\})$ ,  $(\{2, 4\}, \{c\})$ ,  $(\{1, 2, 3, 4\}, \Phi)$ . The system generates sounds corresponding to the elements of lattice.

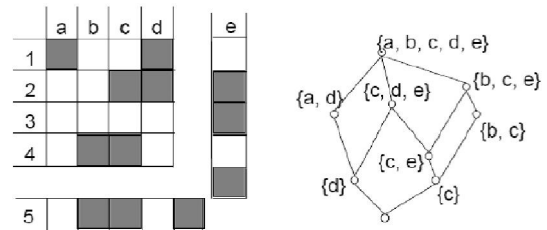


Figure 4: An example of the global formal context illustrate as the left and the local formal concept lattice on the right. The extended factors indicate the agent's future movement (=unknown condition).

In this system MSMS, the agent composes the semantics of the movement with mediation of two types of senses, tactile as local lattice and auditory as global one, which involves to make possible inconsistencies caused by the difference of them. The agent resolves the semantical incompleteness by interpretation of the unknown-ness as the syntactical future movement.

### 2.2. Experiments and Results

We investigated 10000 steps trajectories of MSMS and the control system. The control system's mediation of local and global lattice is given randomly. The trajectories of MSMS shows spatial deflections and the final points distance from the initial points are significantly bigger than the control (Figure 5). As for temporally feature, the average of distance of each 20 steps are investigated. Those are significantly shorter than the control.

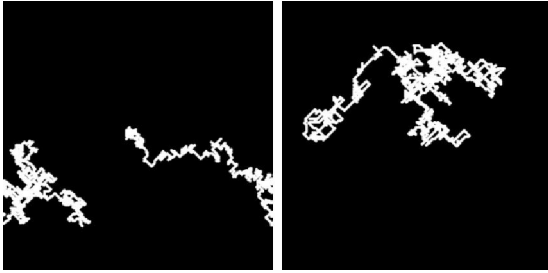


Figure 5: An example of the trajectory of MSMS(left) and the control system(right). It's obviously demonstrated MSMS's spatial deflections.

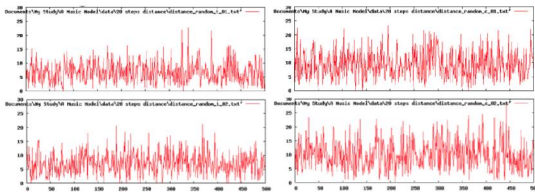


Figure 6: Examples of the transition of MSMS(left) and the control(right). The graphs show the velocity of the agent movement for each 20 steps. MSMS's velocity is smaller than the control. MSMS tends to move in local space.

### 3. Discussion and conclusion

The result shows the MSMS is spatially oriented and the velocity of each short terms is significantly small. Further more, it seems that the system could escape from the dead-

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### About the Author

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ends. It is well known that self-searching system based on simple strict rules tends to come to the dead-ends easily while the creations in the nature have abilities to solve the fixed points. Also musical composers and researchers have faced the same problem but not resolved it.

Suppose a child with a stick picked up on a road. He or she swings it, hits something around, then plays the sound of a can and gets bored it to go to find something new. The MSMS trajectories are compared to the performance of a child. Needless to say, the performance includes the tactile information of contact and the auditory sense of sounds generated by the contacts. Though those senses are seemed as independent perceptions, they depend on each other when we focus on the body that feel the music generated by movements.

Here the MSMS is implemented as an open-ended body to the environment through those sense involving mediations. At the same time, the body movement mediations open to the environment is the "musicking".

This attempt is mere one of models of musical performance which doesn't reflect classical music behaviors. However the trajectories suggested the possibilities of computational music.