

Title	ルービックキューブ攻略時における思考過程の分析
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Citation	
Issue Date	2009-03
Type	Thesis or Dissertation
Text version	author
URL	http://hdl.handle.net/10119/8085
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Analysis of Thinking Process

When Experts of Solving Rubik's Cube Solve Rubik's Cube

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March 2009

Keywords: Rubik's Cube, thinking process

There are members who can solve Rubik's Cube in my laboratory. I asked him 'How do you solve Rubik's cube?' One person answered 'It is decided how to solve Rubik's Cube. I check state of Rubik's Cube and logically solve Rubik's.' The other person said 'I solve Rubik's Cube by IKIOI ('IKIOI' is almost synonymous with 'intuitively'). I don't think how I solve Rubik's Cube.' It makes a great difference for two people to solve Rubik's Cube. I think one who solves Rubik's Cube by 'IKIOI' also solves Rubik's Cube logically. I started this research when I want to know the difference for two people to solve Rubik's Cube.

The goal of this research is to define a difference between 'solve by logic' and 'solve by IKIOI'. Approach of this research is recording process of solving Rubik's Cube using a video camera. At that time I indicate 'Please speak what you think about solving Rubik's Cube with playing Rubik's Cube.' I transcribe utterances with operating Rubik's Cube. I analyze thinking process of solving Rubik's Cube using those data.

It is difficult to record all of plays of Rubik's Cube by watching the movie although it is not difficult to transcribe utterances with operating Rubik's Cube. So, I developed the support tool of transcribing operations of Rubik's Cube. To develop the support tool, I supposed a new method of describing planer graph of Rubik's Cube. After these processes, I prepared for protocol of utterances and operation data using the movie and this tool to analyze thinking process of solving Rubik's Cube.

I considered three points of analyzing thinking process of solving Rubik's Cube. One is to prove reenacting method of solving Rubik's Cube when one solves it repeatedly. Another is to examine patterns of applying for solving Rubik's Cube when one solve more difficult cube. The other is to check differences of thinking process of solving Rubik's Cube between solving by logic and by IKIOI.

First, I analyzed method of solving of Rubik's Cube repeatedly. I extracted the characteristics from one of two data. Using the characteristics, I made a model of solving Rubik's Cube. I demonstrated the model applying to another one data.

Second, I refer to solving of different size Rubik's Cube about finding the same characteristics. Solving of Rubik's Cube of 2x2x2 and Rubik's Cube of 3x3x3 partially look like. In addition, I know a model of solving Rubik's Cube can fit not only 2x2x2 but also 3x3x3.

Third, I want to examine differences of solving of Rubik's Cube between solving by 'IKIOI' and 'logic.' So, I analyzed protocol data and operation data of solving Rubik's Cube. In conclusion, I confirmed a model of solving of Rubik's Cube can apply to both methodsg of solving by IKIOI and by logical.

In addition, I find people don't repair going back to operations when they mistakes operate Rubik's cube. Also I knew when they want to repair state of Rubik's Cube, they renew a state of Rubik's Cube and try to think.

This research used method of transcribing absolute operations. However, when anyone operate Rubik's Cube, they were decided on operation of Rubik's Cube with looking plane. So, their operation were relative for them. This is a challenge for the future that using relative operation.