Guided Jigsaw Puzzle Solver on Smartphone

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Automated jigsaw puzzle solving has long been an intriguing problem in image processing community. If the complete puzzle picture is not known, people have to implement complicated algorithms using shape and color [1] and even texture [2] of each piece to solve a jigsaw puzzle. With the guide of the complete picture (which is always given in real life jigsaw puzzles), the puzzle solver would work in a straightforward way. 1. The solver memorizes the feature of each piece. 2. The solver looks for similar feature on the completed picture and determines the position of the given piece. Once implemented on a smartphone, the solver could serve as a helpful guide to solve real jigsaw puzzles, as it could capture the image of the completed image and the pieces through the phone's built-in camera. With some modification, we imagine such a jigsaw solver might serve other real-life purposes such as barcode detection [3] and road sign recognition [4].

The goal of our project is to design and realize a guided jigsaw puzzle solver on Motorola® DROID smartphone. In the first step, we will design an algorithm that searches for the location of a small piece of picture on a complete map. Secondly, we implement this algorithm on the smartphone and make it applicable for solving real jigsaw puzzles. If we are successful and still have time, we may modify this tool and investigate other real-life applications.

[1]M.G. Chung, M.M. Fleck, and D.D. Forsyth, "Jigsaw Puzzle Solver Using Shape and Color", in *Proc. of ICSP*, 1998.
[2]M. S. Sagiroglu and A. Ercil, "A texture based matching approach for automated assembly of puzzles," in *Proc. 18th ICPR*, 2006, vol. 3, pp. 1036–1041.
[3]Michael Rohs, "Real-World Interaction with Camera-Phones", in 2nd International Symposium on Ubiquitous Computing Systems (UCS 2004), Tokyo, Japan, November 2004.
[4]Piccioli, G., De Micheli, E., Parodi, P., and Campani, M., "A Robust Method for Road Sign Detection and Recognition," *Image and Vision Computing*, vol. 14, no. 3, pp. 209-223, 1996.