

# Mosaic for Stackable Objects

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## 1. Introduction

As an artist and scientist I have focused my research on the study of a new artistic expression that is only possible through scientific research. Although it is work in progress as a science paper, "Layered Photomosaics with Stackable and Rotatable Objects Algorithm" is suitable to express mosaic as a pile of stackable objects, which creates a very powerful artistic experience. Since it is able to express a strong link between parts and the whole, I exhibited a series of artworks made of this algorithm through art galleries and art magazines from the artistic point of view.

## 2. Related Work and Motive

In 1996 Robert Silver devised the concept of Photomosaics, [Sillers and Hawley 1997] which is a new art form made of thousands of small pictures. These pictures were then placed in patterns like traditional mosaics, but each cell is an actual photo. Unlike a traditional mosaic, each tile of a Photomosaic is a very important subject of perception. It causes an observer's delightful confusion of a subject range from elements to the whole and the whole to elements. One of the most important and laborious conditions for a quality Photomosaic artwork is an extensive and abundant image database. For six months I have tried to find a way to minimize the database size for Photomosaics without degrading image quality. My algorithm is an incidental, but successful by-product of the research.

## 3. Algorithm

The algorithm is based on conventional Photomosaics algorithm except that there are two new additional goals. One is to make cells stack, and the other is to enrich library. The three steps of my proposed algorithm are as follows:

*Step 1. Reconstruct a cell grid system by rotation:* Photomosaics use a vertical/horizontal grid system to generate cells. Rotate the grid system to find better matching images.

*Step 2. Rotate each candidate image to find the best image for each cell:* Most pictures are not tolerant of the rotation because they have a top and a bottom. The images that are suitable for this step are ones that do not hang-on-the-wall but instead lay-on-the-table. Secondly, ones that have less data loss and produce less garbage data by rotation are also suitable; valid data is an inscribed circle area of a cell. As we can see from Figure 1, the object 'Coin' satisfies the conditions.

*Step 3. Composition:* Repeat step 1 and step 2, and find several better mosaic outputs. Each output has garbage data produced by image rotation. Replace the garbage data with another mosaic output. It means that each layer stacks, and it creates illusion of a pile of objects. Later add a shadow effect to emphasize the depth. Figure 1 is one of the mosaics created by the proposed algorithm.

## References

[Sillers and Hawley 1997] SILVERS, R AND HAWLEY, M. 1997. *Photomosaics*, New York: Henry Holt, 1997.

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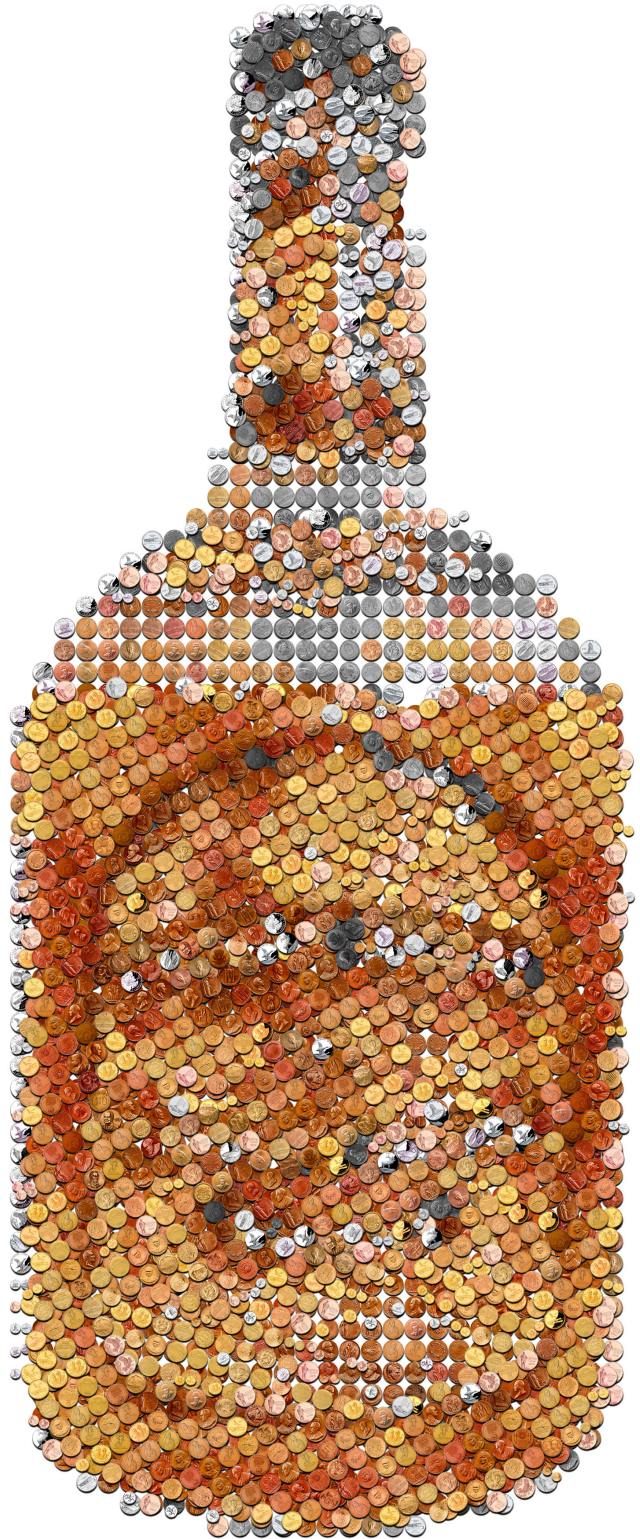


Figure 1: 'Whisky', the library is made of only two hundred images of coins. The proposed algorithm enriches database.