Artaic Innovative Mosaic

Artaic Innovative Mosaic is a mosaic assembly and design company that is separated from their competitors by their use of industrial robotics to assemble custom mosaics on the fly. It takes only thirty minutes at most to convert a customer’s photo into a mosaic tile map. This versatility allows them to compete in the custom mosaic industry for projects both large and small. The aim of this project is to help improve their assembly process.

Tile Jet – Parallel Printer

The Tile Jet mosaic assembly robot is comprised of a virtually open ended number of tile placing sub robots, each in charge of placing two different colors of tile onto a wide adhesive belt that traverses beneath them.

Development

The data layer separates the slave control program from the data link layer. The control program reads points from the queue and sets its current state. The link layer adds items to the queue and reads the state. The host control program polls the print head, and gets responses back. The print head never sends data without being prompted.

Project Goals/Objectives

It is the goal of this project to design a new specialized robotic system, capable of handling the wide variety of tile that Artaic uses, with a much higher throughput. Specifications for the system include:

➢ Tile positioning accuracy < 0.1 mm
➢ Open-ended tile geometry
➢ Greater than 8 square feet assembled per hour
➢ Compatibility with low quality, highly deformed, tile

Understanding the Problem

In an attempt to understand the best way to help Artaic several tests where performed.

➢ Tile Placement Accuracy
➢ Robot Arm Positioning accuracy
➢ Sources of Error
➢ Tile Tolerance

Tile Placement Accuracy Test

The robot was programmed to place a 10mm tile every 14 mm without the aid of a placement grid that is normally used.

Test Results: Final tile location = Robot ± Tile ± Pick location tolerances
Final tile location = ± 1.5 mm ± 2 mm ± 1 mm = ± 4.5 mm

Test Conclusion: there is no way to improve the accuracy of the original system beyond a tolerance of ± 3.5 mm without replacing the robot or tile

Conclusions/Recommendations

We have successfully laid the ground work for a new tile mosaic production system which can use a near infinite variety of tile with little to no modification. Further work is necessary to refine the control system, improve placement accuracy.

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