



Adaptation of a Task-Oriented Agile Workcell - Automatic Robot Taping

Project Motivation & Objectives

The process of taping (covering objects with masking tapes) before conducting surface treatments (such as plasma spraying and painting) is tedious and arduous. This project aims to do surface covering process using masking tapes with the introduction of an automatic robotic system and corresponding software algorithm. Researchers will delve into the design of the automatic system working with a robot manipulator, a rotating platform, a 3D scanner and specific taping end-effectors for this process. The taping process requires correct tape orientation and proper contact to attach the masking tape to the surface. Meanwhile, the taping path intending to cover the region of interests is introduced. In such taping solutions, the taping tool and the taping software can be combined to form a very useful taping package for the taping related industrial process such as plasma spraying, surface protection.

Methodology

The overall taping process is illustrated in Fig 3. The key technology used in the automatic robot taping system is as stated below:

- A 3D scanning device to get the digital model.
- A useful end-effector to realize the taping motion.
- Determining the path planning method depends on certain constraints such as the object surface, the taping tool on the robot and the material of masking tapes used.

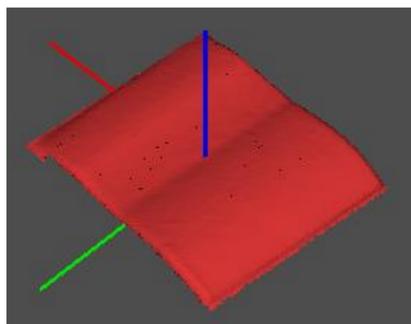


Fig 1. Model based on 3D Scanning

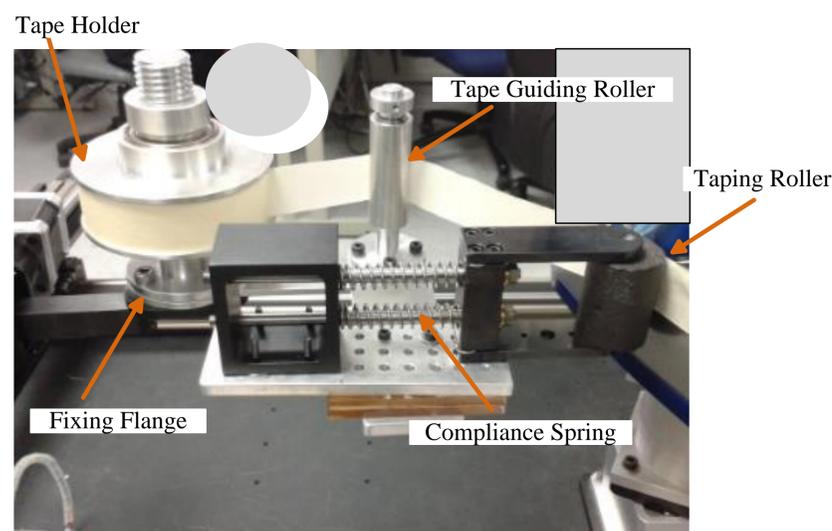


Fig 2. Taping Tool

Results

The robot system can execute the taping process based on the generated path. Examples of taping are shown in Fig 4.

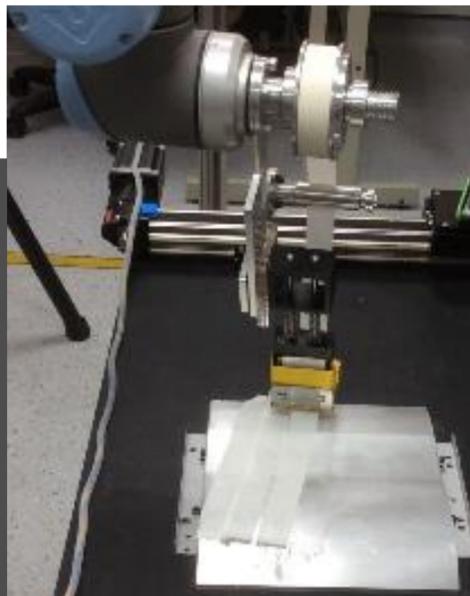
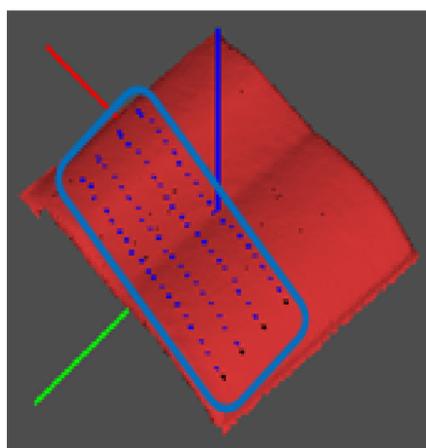


Fig 4. Path Planning and Surface Taping

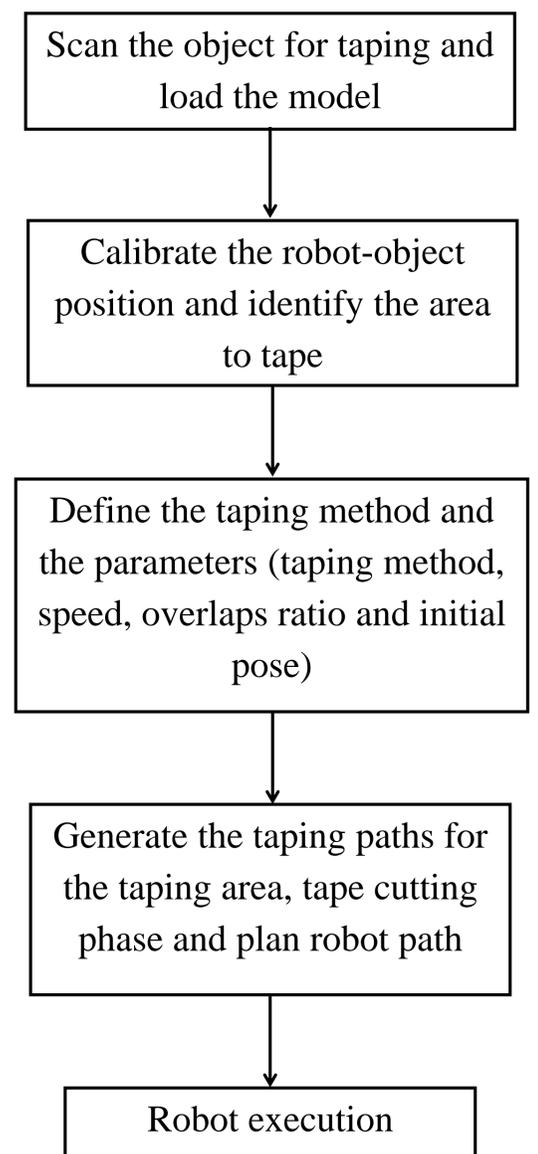


Fig 3. Taping Process

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