VISION-BASED CLOSED LOOP VIBRATOR CONTROL

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ABSTRACT

Vibratory feeders are commonly used in the manufacturing industry to align and feed various types of parts into machines. The primary types of feeders are circular and linear. The main parts are the feeder bowl and the drive unit. The bowl is equipped with traps that ensure the parts are all oriented in the same way. The movement of parts happens by vibrating the bowl feeder.

Since the mechanical properties of the feeders can change over time or depend on what parts are being fed, they require calibration to ensure a good and stable feeding speed and optimal power consumption. The frequency of the vibrations should be close to the system's resonant frequency.

Currently, there are two main ways of calibrating the vibrators; by using accelerometers that are temporarily placed to measure the performance and calibrate, or using a sticker which is inspected while the vibrator is working to determine its amplitude. Both ways are manual and not continuous.

The project's goal is to use cameras to determine the amplitude of the system and implement a control loop that will ensure the vibratory feeder always works with optimal performance. Different approaches will be tested, such as short exposure time and long exposure time, and different lighting types.

Figure 1: Vibration feeder

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