

# DE LA SALLE UNIVERSITY

## A B S T R A C T

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Image processing and pattern recognition (IPPR) techniques as applied for determining holes on a printed circuit board (pcb) and numerically-controlling a Drilling Machine System (DMS) is the main theme of this masteral thesis.

An image of a printed circuit board (pcb) pattern is captured using a video camera interfaced to the commercially-available VIDEO BLASTER multi-media card, which has a built-in digitizer and frame grabber aside from its other functions. The captured image is then stored as an 8-bit gray level Tag Image File Format (TIFF) file. The IPPR software reads this image and is then processed using techniques like histogram computation, smoothing through mask filters, thresholding and binarization. After the image processing stage, through template matching, the holes, edges and lines pertinent to the pcb are detected and transformed into a set of useful data declaring the position (x and y location) and size of all holes on the pcb in millimeters. This information is then stored as an ASCII text file. This file serves as an input to another software module, the DMS program. This program embodies routines for controlling the drilling machine.

The IPPR and DMS software modules were implemented using C++.

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