DEVELOPMENT OF SEMI-AUTOMATED SYSTEM FOR WORK PIECE LOCALIZATION ON COMPUTER NUMERIC CONTROL MACHINES

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Abstract

The development of a mechanism to achieve precise and efficient work piece localization in Computer Numeric Controlled (CNC) milling centers has attracted the attention of scientists since recent past. Since CNC milling centers are largely used in the "Die and Mould" Industry which is the mother of all other industries, it is even more important to research into this field.

Digital Image Processing could be used to address the above issue, provided the users feel comfortable and the manufactures gain confidence for incorporating such mechanisms in CNC machine designs. Therefore it should embark on a simple pragmatic methodology, yet must yield better results than existing techniques.

Although many research attempts have been made during the past to tackle this issue, it shows that there is a lapse between research findings and practical use. Therefore this research is focused towards finding a simple, competent mechanism making use of digital image processing techniques. MATLAB which is a powerful programming tool, has been used in this research in establishing the process.

The main spotlight of the research is to find the edge position in respect with the "Absolute Coordinate System" of the machine which could then be translated into the "Work Piece Coordinate System". Digital images are capable of generating millions of independent information which has the power of deriving much crucial information regarding the work piece against information taken from few points by conventional and optical methods. This research also opens many avenues towards new research areas as "future works" in order to fine tune the main objective as well as to explore new paradigms in CNC machine operation towards making the machines "intelligent".

CNC milling centers are made to work with a very high degree of accuracy. This attribute is used in deriving simple ways by reusing it to elevate the simplicity of the methodology.

The results that were found promises that by properly incorporating digital image processing techniques in CNC machinery. It could definitely contribute to make the operation efficient by cutting down the setting time, achieving very high levels of accuracy and opening up avenues for advanced research areas.