DESIGN AND FABRICATION OF WIRELESS BASED AUTOMATIC TOOL TRANSMISSION SYSTEM

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Abstract-

The need for automated tooling in flexible machining, assembly, and sheet fabrication systems is reviewed. The various methods of implementing these systems, their benefits and drawbacks are discussed. The basic modules of automated tool transfer, storage, loading/unloading, and management are described together with the appropriate level of automation for each module. The advantages and prerequisites for unmanned machining systems, the current sensing methods and the tool replacement strategies are also reviewed. The importance of a tool database, its uses and structure are highlighted. Finally, the design and evaluation of automated tooling systems and operating strategies, with the aid of discrete events computer simulation are discussed. An existing computer package which is capable of simulating automated tooling systems for flexible manufacturing systems is presented.

Now days, by improving technologies various techniques are implemented in the advanced manufacturing systems to improve the production, quality and efficiency of the products in this competitive world. In this report we are implementing a new technique on automatic tool transmission system by using wireless technology. In previous, we have only automatic tool changer, according to machine specifications, but no tool transmission system is used. In this project, the automatic transmission of tool to the machine is outlined. The automatic movement of tools, as well as parts, within the flexible manufacturing concept is technically possible now. The future advantages of automatic tool transmission system include reduced tool inventories, low manpower requirements and also improve the capability for an unmanned operation. This report describes a tool for check over the execution of automatic tool transmission system performance associated flexible manufacturing system.

Index terms **-** Embedded System, Aurduino , Bluetooth.

I. INTRODUCTION

The key factor in the success of computerized manufacturing system is their ability to route work pieces among workstations. This integration of work stations is accomplished via a computer-controlled material handling system for the work pieces. As manufacturing systems are becoming more refined, and as material handling systems become increasingly more sophisticated, it is not uncommon to have automated routing of tools to workstations as well. In essence, CMS could conceivably consist of two material handling systems: one for workpieces and another for tools. Such simultaneous routings of workpieces and tools could be a major element in the design of future CMSs.

The automatic movement of tools, as well as parts within the flexible manufacturing system is now technically possible. This report describes a tool for investigating the performance of automatic tool handling systems associated FMS.

This work uses simulation to describe the prospective system. In particular, combined network and discrete event mode, written in a SLAM simulation language is used. The model is of a modular construction, to facilitate its use for different system configuration in the future. The tradeoffs between the advantages provided by automatic tool handling and the increased system costs because of the associated hardware are outlined. An illustration of the search for the satisfactory tradeoff is FMS and assessing their effects on system performance.

II. OBJECTIVE

The main objective of this project is designing and demonstrating a system that can be controlled through wireless communication systems like wifi, Bluetooth, pc remote control which can be perform the tasks of avoidance of human efforts to improve robot technology. This is completely achieved by fully automation technology to handling the materials as well as tools. The automatic material handling is existing but the automatic tool handling by using wireless technology is new.

II. EXISTING SYSTEM

Automation is the technology by which a process or procedure is performed without human assistance. In a flexible manufacturing system, material handling is going on by full automation process. By improving the technology, tool handling system is also improved as like as material handling system. And also most of the CNC machines has been operated by automatic tool changing system.

Automatic control is the use of various control systems for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching on telephone networks, steering and stabilization of ships, aircraft and other applications and vehicles with minimal or reduced human intervention. Some processes have been completely automated.

III.PROPOSED SYSTEM

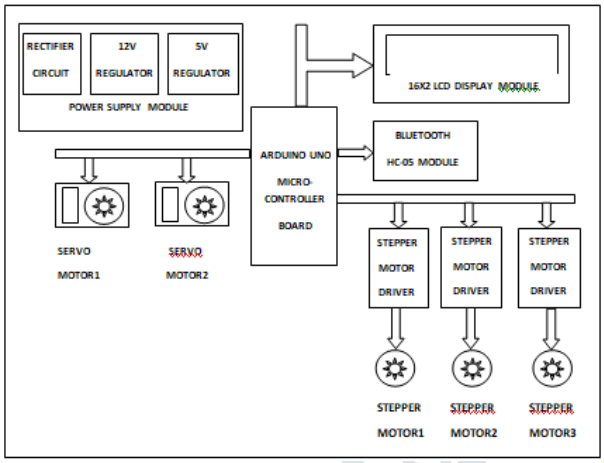

Fig.1: Block diagram of a automatic wireless tool transmission system

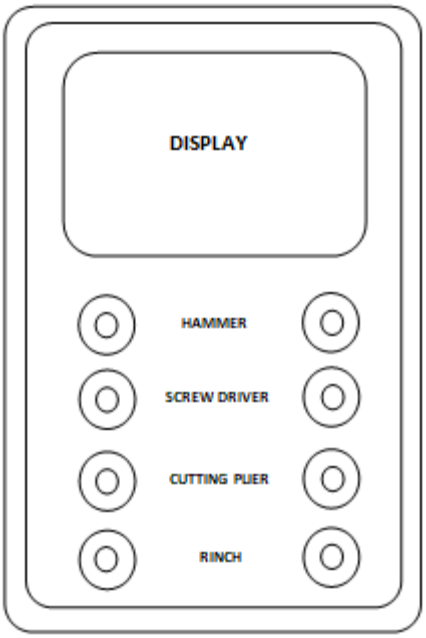

Fig.2: Android app to control the system via wireless transmission

A. Project Description

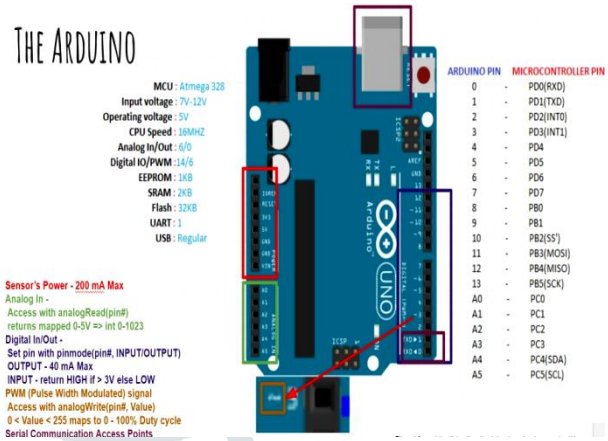

Fig.3: Arduino Micro Controller

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

B. Hardware Components

i. BLUETOOTH MODULE

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.

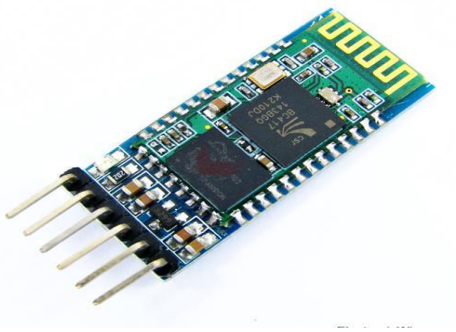

Fig.4: Bluetooth module

ii. LCD 16x2 Display

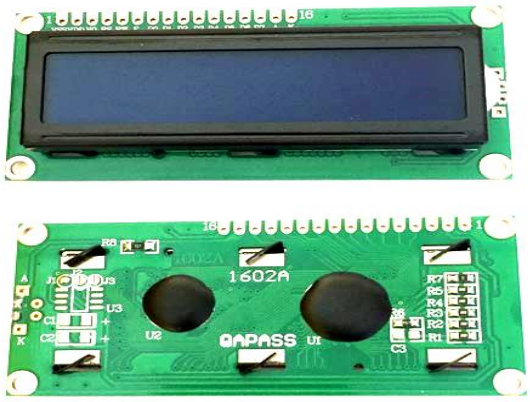

Fig.5: LCD Module

iii. Stepper motor

A stepper motor is an electromechanical device it converts electrical power into mechanical power. Also it is a brushless, synchronous electric motor that can divide a full rotation into an expansive number of steps. The motor's position can be controlled accurately without any feedback mechanism, as long as the motor is carefully sized to the application. Stepper motors are similar to switched reluctance motors.

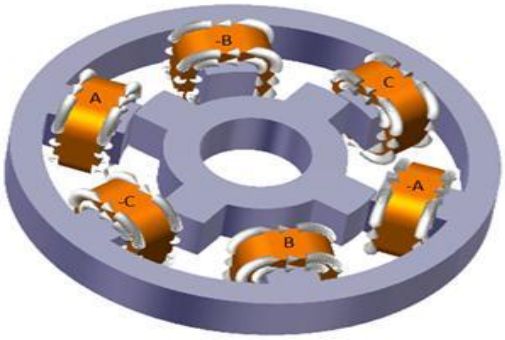

Fig 6: Stepper Motor

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iv. Servo motor

A servo motor is one of the widely used variable speed drives in industrial production and process automation and building technology worldwide. Although servo motors are not a specific class of motor, they are intended and designed to use in motion control applications which require high accuracy positioning, quick reversing and exceptional performance.

Fig.7: Servo Motor

v. *Pulley*

The function of a pulley is to lift/move heavy objects by changing the direction of the force on a flexible cable. It also consists a wheel with a groove in its outer edge and an axle. With the help of ropes, chains or cords, a pulley makes moving objects easier. Pulley reduces the force given to get the work done.

Fig.8:Pulley

v. Timing Belt

A timing belt, timing chain or cambelt is a part of an internal combustion engine that synchronizes the rotation of the crankshaft and the camshaft(s) so that the engine's valves open and close at the proper times during each cylinder's intake and exhaust strokes. In an interference engine the timing belt or chain is also critical to preventing the piston from striking the valves. A timing belt is usually a toothed belt -- a drive belt with teeth on the inside surface. A timing chain is a roller chain.

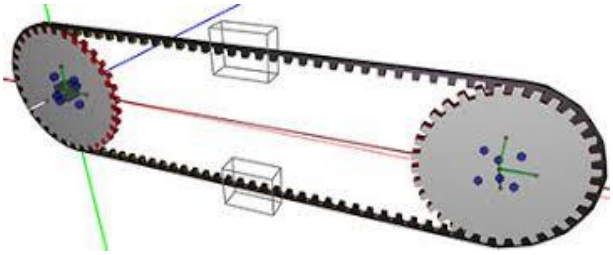
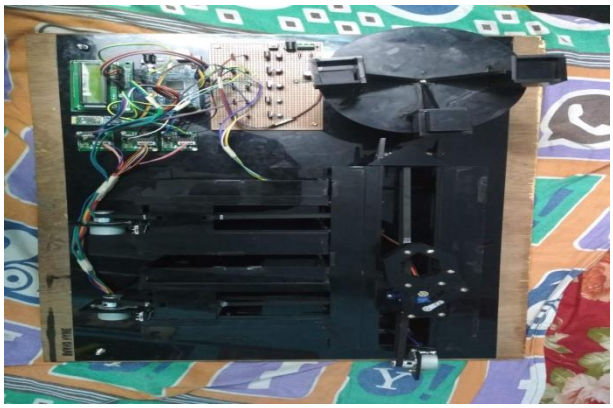
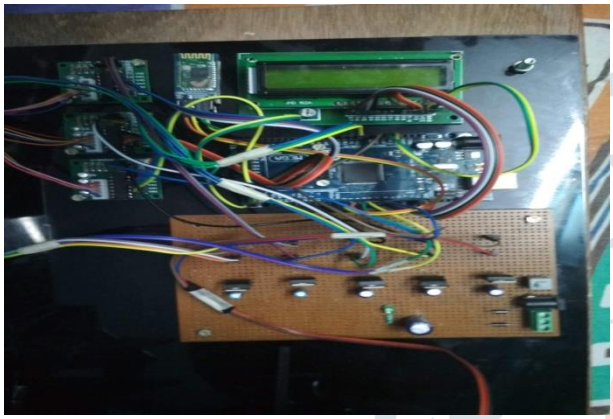


Fig.9 belt

V .EXPERIMENTAL RESULTS





VI. CONCLUSION

The project deals with designing a simple, highly efficient, cost effective and easy to operate Real time weather monitoring system using Raspberry pi to monitor various weather parameters of the desired location and transmit it to webpage created for remote monitoring & to LCD for local monitoring. Even Real time prior Thunder/Lightning prediction system detected successfully.

FUTURE SCOPE

The following are the future scope of the proposed system:

- Early detection of earthquakes and tsunamis can be done by monitoring seismic activity using sensors without the need to visit the unreachable or unsafe site. This can help in early and effective disaster management operations.
- Combustion gases and pre-emptive fire conditions can be detected to define alert zones. Similarly, forest fires can be detected at an early stage even though human presence is very less in dense forests.

REFERENCESS

[1]. Design and implementation of IoT system and equipment for lightning parameter monitoring by Daoru Pan ; Fan Wu ; Yuanan Liu ; Tingyan Zhang ; Jian Gao ; Hansheng Cai published at international journal IEEE Print ISBN: 978-1-5090-5184- 7

[2]. Design and implementation of digital system for cost effective lightning detection sensor node by Nikhil B.gaikwad; Ajay kandare; Avinash.G keskar. Electronic ISBN: 978-1-5090-3038-5 IEEE

[3]. Design of Real-time Weather Monitoring System Based on Mobile Application using Automatic Weather Station by Aris Munandar*, Hanif Fakhrurroja, Muhammad Ilham Rizqyawan, Rian Putra Pratama Electronic ISBN: 978-1-5386-0510-3 IEEE

[4]. AirSense: Opportunistic Crowd-Sensing based Air Quality monitoring System for Smart City by Joy Dutta, Firoj Gazi, Sarbani Roy and Chandreyee Chowdhury. 978-1-4799-8287-5/16/$31.00 ©2016 IEEE

[5]. IoT based Data Logger System for weather monitoring using Wireless sensor networks by Kondamudi Siva Sai Ram, A.N.P.S.Gupta International Journal of Engineering Trends and Technology (IJETT) – Volume 32 Number 2- February 2016

[6]. Internet of Things (IOT) Based Weather Monitoring system by Bulipe Srinivas Rao, Prof. Dr. K. Srinivasa Rao, Mr. N. Ome. International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Vol. 5, Issue 9, September 2016.

[7]. S. Jaya Kishore, M. Lava Kumar" Structural Analysis Of Multi-Plate Clutch" International Journal of Computer Trends and Technology (IJCTT) – volume 4 Issue 7–July 2013.

[8]. Coyle, J.J. (1992). Management of Business Logistics. Mason, OH: South-Western. p. 30

[9]. Waters, T.R. (1994). *Applications Manual for the Revised NIOSH Lifting Equation*. Cincinnati, OH: Centers for Disease Control and Prevention.

[10]. Average U.S. rate from 2005-2009 (*"Real interest rate". The World Bank. Retrieved 2015-05-15.*).