# Medical Prescription Writing Robot

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***Abstract*:- Rehabilitation technology is the application of science and engineering to the solution of human problems and limitations caused by impairments, disabilities and handicaps. Many devices are currently available for the rehabilitation population that reduce or eliminate these limitations. Unfortunately, prescriptions often fail for many reasons. Risk prescription failure can be minimized if the rehabilitation engineer and the rehabilitation physician enter into product development and utilization with a clear understanding of how a technology impacts a patient's impairment, disability and handicap as defined by the World Health Organization with selected case example and a table outlining the impact that many present and future technologies have on these variables to overcome the failures we are developing a new robot for writing a prescription. The paper presents an approach to design rapid and fluid movements of a universal robot to perform robot writing mimicking the doctor prescription writing when signing and the trajectory.**

***Keywords: Human-Machine interaction, ATMega328 Micro-controller, Bluetooth Module, Stepper Motor and Driver, Embedded C, AVR IDE.***

## 1. INTRODUCTION

Intelligent machines, including robots, autonomous vehicles, and assistance system, have been widely applied in our daily lives to support various activities, such as communications, business, transportation, and healthcare. Effective interactions between humans and machines are essential for high performance of intelligent machines. By effective information exchange and interpretation, intelligent machines are able to understand the human intentions, and thus, human-machine interactions (HMIs) are considered an important research topic to assist humans in completing tasks. A number of HMI methods have been developed to improve the capabilities of intelligent machines [1]. For instance, human gesture and recognition is a useful and widely used tool for HMI, in addition to speech recognition. In addition, reported the current development of artificial intelligence techniques for the applications areas of robotics communications, including artificial neural networks, adaptive neuro-fuzzy interference systems, machine learning, and genetic algorithms [2]. The interaction between a doctor and patient usually culminates in the writing of a prescription order. The energies, skills and time put into making a diagnosis and formulating appropriate therapy could be wasted if adequate attention was not given to the details that ought to be included in a well-written prescription [3]. A prescription order should clearly communicate with a pharmacist/dispenser what therapy a particular patient is to get: how much of a specific medicine should be taken, how often and for how long. Children have a three-fold greater risk of experiencing a medication error than adults and are more likely to be harmed. Hence the components of a prescription should be clearly written, free from writing errors, non-official abbreviation, and fulfill the legal requirements of a prescription. Prescription writing errors may be classified into two main types: errors of omission (incomplete prescription) and errors of commission (incorrect information). Since these errors are the commonest form of avoidable medication errors, it is the most important target for improvement [4]. An error is 'something incorrectly done through ignorance or inadvertence; a mistake, e.g. in calculation, speech, writing, action, etc.' or 'a failure to complete a planned action as intended, or the use of an incorrect plan of action' to achieve a given aim. Some errors will require the pharmacist simply to use additional professional judgment in the interpretation and execution of the prescription. Omission errors may cause the pharmacist, physician, and patient to waste time while the pharmacist calls the physician to complete the communication process. Whereas the errors of commission should promptly be detected and corrected, otherwise patient's health could be threatened or at least the proposed treatment program would be put in danger. The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) reported that 15% of the medication errors occurred because of illegible handwriting, problems with leading and trailing zeroes, misinterpreted abbreviations, and incomplete medication orders [5]. The above fact indicates that, the prescription writing errors leads to the medication errors. This in turn leads to the failure of therapeutic goals. Most of the prescription writing errors are avoidable errors. The pharmacist can play an important role in this regard [7]. Hence the present study was conducted to evaluate the prescription writing errors; by way of this the need of educating the prescribers in prescription writing will be determined. This will help to reduce the medication errors due to prescription writing.

### *1.1 Discussion*

The present study demonstrates a wide range of different types of errors (1.26errors/prescriptions) associated with prescriptions writing about 97.72%. Weights of the patients were not mentioned in only 8.18% of prescriptions. Whereas age of the patients were mentioned in all prescription this showed that better knowledge about importance of weight and age in pediatric patients. Prescribers name and signature were not written in 97.72% and 7.27% of prescriptions. Duration/no. of doses was not mentioned in 53.36% followed by, strength 11.80 % and

frequency 4.54% not a single error of omission found related to route of administration, dose and dosage form. Among 220 prescriptions, 79 errors of commission were found. Among them errors regarding wrong dosage form were 47 (21.36%) followed by wrong strength 13 (5.90%), wrong drug name 11 (5%) and drug-drug interactions 8 (3.63%) prescriptions. Whereas study conducted by Abdella and Wabe reported that prescribers name and signature not written in 83.6%, and 23.7% of prescriptions. Duration of treatment and strength were not written in 37.8% of prescriptions followed by frequency 23.67%, where as dose and route of administration were not written in 61.2% and 32.6%. Similar study conducted by Mugoyela et al. reported that, all prescriptions had at least one or more errors which involved omission of either the patient's age (2.9%), name (1.6%), weight (93.8%), route of administration (94%), dose (5.4%), frequency (3.2%), dosage form (24.8%) and duration of treatment (14.1%).

Errors of commission accounted for 3.1% of all prescribed medicines. The field of medicine has also been invaded by robots. They are not there to replace doctors and nurses but to assist them in routine work with precision tasks. Medical robotics is a promising field that really took off in the 1990s. Since then, a wide variety of medical applications have emerged: laboratory robots, tele-surgery, surgical training, remote surgery, telemedicine and tele-consultation, rehabilitation, help for the deaf and the blind, and hospital robots.

Medical robots assist in operations on heart-attack victims and make possible the millimeter-fine adjustment of prostheses. There are, however, many challenges in the widespread implementation of robotics in the medical field, mainly due to issues such as safety, precision, cost and reluctance to accept this technology. Medical robotics includes a number of devices used for surgery, medical training, rehabilitation therapy, prosthetics, and assistance to people with disabilities.

## 2. EXISTING SYSTEM

Reading a doctor's handwritten prescription is a challenge that most patients and some pharmacists face; an issue that, in some cases, lead to negative consequences due to wrong deciphering of the prescription. Part of the reason why doctor's prescriptions are so difficult to decipher is that doctors make use of Latin abbreviations and medical terminology that most people don't understand.In existing there is a robot is used for medical surgery in the hospital but there is no current invention is used for writing a prescription in the hospital. In current situation attainder or doctor will write a prescription manually. So there is a chance of human error, when writing an, prescriptions in the hospitals.

This is a very crucial issue when attending the patients in the hospitals. To overcome all these system we propose a new system for prescription writing without any error.To perform the task, on-line human signing standards are created first. Robot writing task is performed using these standards after that and robot signatures are acquired as a result. Finally, recommendations of robot motion improvement are given.

- ***DISADVANTAGES***
  - Human error may occurs
  - Observing the medicine details are very difficult.

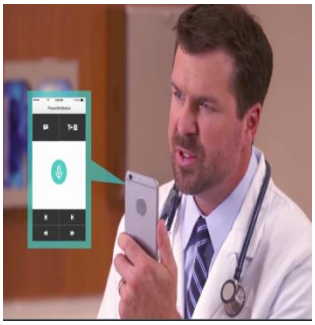
## 3. PROPOSED SYSTEM

In our proposed system, we are approaching an idea of robot writing mechanism for doctor. Prescribed medicines are told by the doctor who will be received by the mic and will be recognized by the android mobile phone and the data will be sending to the robot mechanism through Bluetooth module. Once the receiver, receives the data it will send to the micro controller. Then based on the received data the robot mechanism will start to write the data in the writing pad. By this method, robots are able to write the prescription for the doctor without any time delay and error.

In this system, we are using ATmega328 micro controller for the process. In this micro controller, we have already embedded the program for this process. In this program, human voice to text conversion which has been takes place. By using this program, robots can easily recognize the data and it will write it on the writing pad. In this digital world this system might plays an efficient role in the medical field.

- ***BLOCK DIAGRAM***

TRANSMITTER SECTION



RECEIVER SECTION - WRITING ROBOT

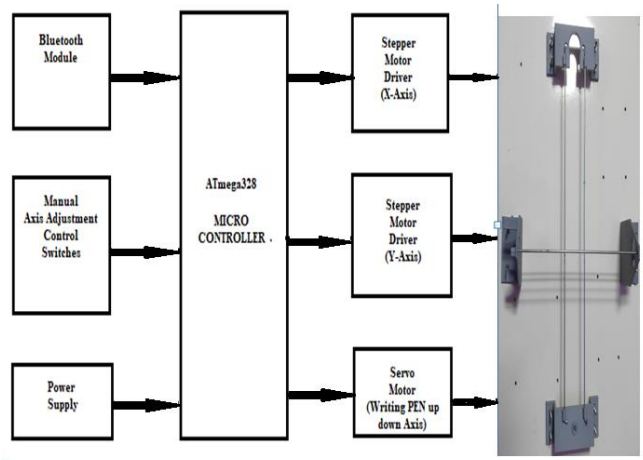



Fig.1 Proposed System Block Diagram

## 4. MECHANISM

The movement -Code file created by the help of Ink-scape software then the processing software is used to send the G-Code file to the microcontroller. Then the CNC shield drive sends the controlling signals to the stepper motors

and servo motor. Now the XY axis which operates as follows by the instructions given to the controller unit.

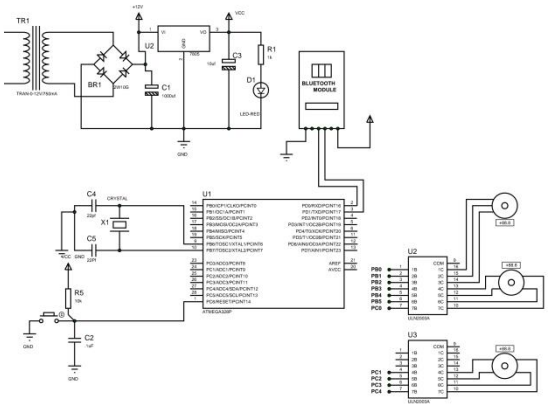



Fig.2 Circuit Diagram of Proposed System

The corresponding code is send the data to controller block is interfaced with motor driver unit along the DAC provides the pulse width signal to motor unit where it is been processed and final output is written and displayed on the paper from the output unit.

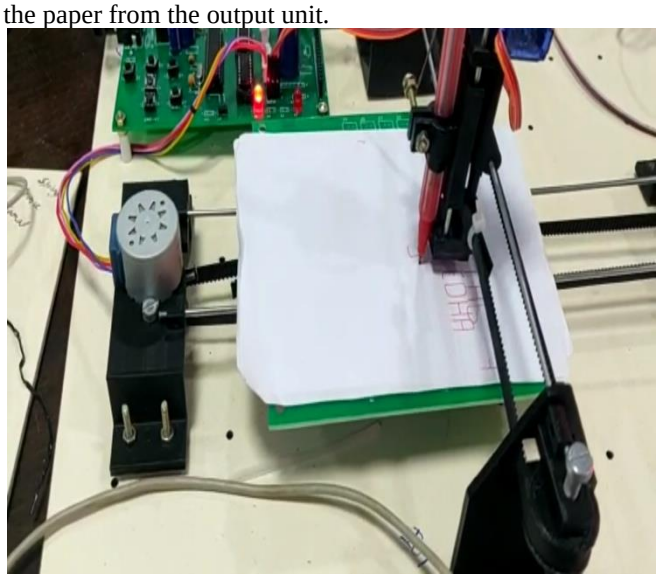


Fig.3 Hardware Design of Proposed System

## 5. CONCULSION

Prescription writing is a fundamental task performed by health professionals, incorrect prescription may lead to fatal consequences including death. Due to this consequence, we are approaching an idea to overcome this problem. In this paper, we present a method to design a robot to write a error-free prescription. This will help to reduce the medication errors due to prescription writing errors.

## 6. REFERENCES

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