

## REMOTE CONTROL OF PNEUMATIC ACTUATOR BY ANDROID APPLICATION

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**ABSTRACT:** Automation refers to the use of computers and other automated machinery for the execution of business-related tasks. Automated machinery may range from simple sensing devices to robots and other sophisticated equipment. Automation of operations may encompass the automation of a single operation. This project is to control a simple pneumatic cylinder open source software or Android phone which is quite common handheld device used by half of the globe.

### I. INTRODUCTION

Main objective is to control a pneumatic cylinder by using the components such as a Bluetooth transceiver, Arduino Uno microcontroller and a simple pneumatic cylinder working system with its finished electric circuit. In certain applications the microcontroller based systems has to be connected with the Bluetooth network which will enable a user to control the system by tapping the phone. Remote control, especially when this no ethernet or Wifi in the outdoor, has been a very profound things in the past. With Arduino and some other related modules. And, it is also quite easy, even for the beginners. All the controlling of the pneumatic systems performed now is carried out using a PLC or other electric circuit boards which are manually controlled. This system is designed to assist and provide support in order to fulfil the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home. The main control system implements wireless Bluetooth technology to provide remote access from PC/laptop or smart phone[1]. Vehicle Security has become one of the major problems for owners. The aim to trace the vehicles and stop the vehicle in any remote place without supplying the power to that system by remote currently almost of the public having an own vehicle, theft is happening on parking and sometimes driving insecurity places. The safe of vehicles is extremely essential for public vehicles. Vehicle tracking and locking system installed in the vehicle, to track the place and locking engine motor. The place of the vehicle identified using Global Positioning System (GPS) and Global system mobile communication (GSM)[2]. Android application that interfaces with the security system using wifi direct technology. The wifi technology is relatively new as compared to other

technologies and there is huge potential of its growth and practical application. The android application loaded on mobile devices, can connect with security system and easy to use GUI. The application developed to command lock, unlock or video monitoring of the home. The security system then acts on these command and responds to the user. The CMOS camera and the motion detector are attached with security system for remote surveillance[3]. Smart Home is the term commonly used to define a residence that uses a home controller to integrate the residence's various home automation systems. The most popular home controllers are those that are connected to a Windows based PC. In our research we presented a part of smart home technology which using Bluetooth in a mobile device, so it will more easy and efficient to use. It also based on Android and Arduino platform both of which are free open source software. In this paper, a system called door locks automation system using Bluetooth-based Android Smartphone is proposed and prototyped[4].

### II. ACTUATOR TYPES

Electric motor-based actuators are commonly used due to their low weight, size and cost, high power and ease of integration. However, they are difficult to use in force control because of their high stiction and reflected inertia [3]. Fluid based actuators such as hydraulics and pneumatics are well suited for force control because controlling fluid pressure controls force. Hydraulic actuators are capable of large forces, however their large weight limits their use to heavy robots e.g. ASV [5]. McKibben artificial muscles are not attractive for control due to their non-linear response, hysteresis and small stroke. Pneumatic cylinders are cheap, light, have a compact footprint and are naturally compliant. However, they can have high stiction, making small forces difficult to attain, and they are low in power density. Also their natural compliance makes position control difficult [6], [3]. Researchers who have used pneumatic cylinders in legged robot designs have pursued control strategies other than force control with poor results. For example STIC [6] and Robot III [3] required physical assistance to walk.

### III. METHODOLOGY

The process of controlling a pneumatic system using an

android phone can be explained as. Process initiation at user end, Input processing and signal transmitting, Signal reception analysis and re-processing. Everything starts with the screen of an android phone is touched this acts as the input element, The input transmitted using Bluetooth dongle, The signals which are received by the modem are further processed and passed to the Arduino board and Movement of the Pneumatic cylinder piston which is controlled by the solenoid is controlled by the electrical impulses produced by the electric circuit. On changing in the position of the cylinder's piston, the display in the hand held device of the user has to be updated.

#### IV. RESULTS AND DISCUSSION

The whole idea of the project is to control a pneumatic cylinder using an open source application As an Example phenomenon we are taking Android here. Where in this mechanism, a cylinder of which the piston movement is controlled by a direction control valve. The valve which consists of a solenoid which can be controlled by an electric circuit which in turn connected to a Arduino Uno R3 board. This Arduino board is programmed to control the signal flow of current to the solenoid, but the control of this Arduino board is given to the user who holds an android device. A well-developed android application can control the overall project, which makes it easier. This overall process is explained using the screenshots of the developed android application.

#### V. CONCLUSION AND FUTURE WORK

Same concept can be applied to control many other devices and Pneumatic Cylinder can be also controlled by the other existing technologies

#### REFERENCES

- [1] De Koster, R., Le-Duc, T., and Roodbergen, K.J. (2007), Design and control of warehouse order picking: a literature review. *European Journal of Operational Research* 182(2), 481-501.
- [2] R.I. van Hoek, "The rediscovery of postponement a literature review and directions for research", *Journal of Operations Management* 19 (2001) 161–184.
- [3] Le-Duc, T. and De Koster, R., Travel distance estimation in a single-block ABC storage strategy warehouse, in B. Fleischmann and B. Klose (eds.) *Distribution Logistics: advanced solutions to Practical Problems*, 2004, 185-202.
- [4] <http://arduino.cc/en/Main/arduinoBoardUno>
- [5] [http://www.atmel.com/dyn/resources/prod\\_documents/doc8161.pdf](http://www.atmel.com/dyn/resources/prod_documents/doc8161.pdf)