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Designing Arc Welding Application along with Conveyor using PLC Programming

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A B S T R A C T

Fully autonomous only showed up in the second 50% of the twentieth century. The principal carefully worked and programmable robot, the Unimate, was introduced in 1961 to lift hot bits of metal from a die throwing machine and stack them. Business and industrial robots are boundless today and used to perform employments all the more efficiently, more precisely and all the more dependably, than people. They are additionally utilized in certain occupations which are excessively grimy, perilous, or dull to be appropriate for people. Robots are broadly utilized in manufacturing, get together, pressing and bundling, mining, transport, earth and space investigation, medical procedure, weaponry, laboratory research, wellbeing, and the mass production of consumer and industrial merchandise

INTRODUCTION:

The innovation of the mechanical robot goes back to 1954 when George Devol documented a patent on a customized article move .After collaborating with Joseph Engelberger, the primary robot organization, Unimation , was established and placed the principal robot into administration at a General Motors plant in 1961 for removing parts from a bite the dust throwing machine. The greater part of the using pressurized water impelled Unimates were sold through the next years for workpiece taking care of and for spot-welding of vehicle bodies. The two applications were fruitful, which implies that the robots worked dependably and guaranteed uniform quality. Before long, numerous different organizations.

Three Laws of Robotics:

A robot may not injure a human being or, through inaction, allow a human being to come to harm. A robot must obey the order siven to it by human beings, except where such orders would conflict with the First Law. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Payload :

The capacity of the robot in lifting a weight.

The payload is the most extreme burden that a robot can convey in its work. For instance, the payload can be from 3Kg to 1300Kg as indicated by various model sorts. On the off chance that you need the robot to convey the objective work piece starting with one working position then onto the next, you have to include the heaviness of the work piece and the heaviness of the robot's gripper to its evaluated payload prerequisite. It is likewise imperative to take note of that the heap required by the robot is identified with the separation of the end load. For model, you can check the heap tallying drawing strategy of

SOOYEE Robot SYB1410B.

Speed: the robot can position the end of its arm.

This parameter is firmly identified with every client. Truth be told, it relies upon the process duration that the activity needs to finish. The determination table shows the most extreme speed of the model robot, yet we should realize that thinking about the quickening and deceleration starting with one point then onto the next, the genuine speed will be among 0 and the greatest speed. This parameter is typically communicated in degrees/second. Some robot producers likewise mark the most extreme speeding up of the robot.

Repeatability:

How well the robot will return to a programmed position.

Compliance:

Measure of the amount in angle or distance that a robot axis will move when a force is applied to it.

An industrial robot should not move on the application of an external force. They are provided with a magnetic locking which helps them to stay in same position even a external force is applied on the system.

Mechanical structure of Industrial Robots:

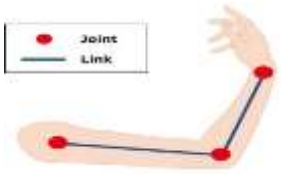
Mix of links and joints. Relating it to a human body, parts that can unreservedly curve and move about, for example, the elbow and shoulder, are the joints, and the bones associating those joints are comparable to a robot's links. The standard of moving joints and transmitting power through the links is normal in the two people and robots.

A human elbow and shoulder are joints and the bones interfacing them are links.

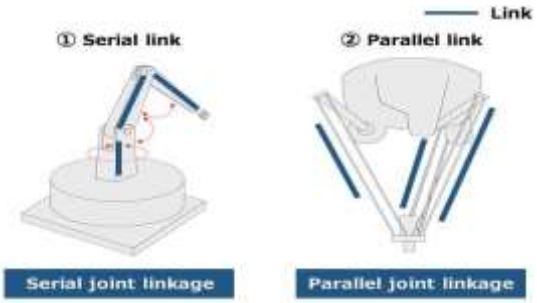
Robots are generally ordered into two kinds as indicated by how their links are organized:

1. Serial link and
2. Parallel link

The human arm is sorted as a serial link since its joints the shoulder, arm and wrist are adjusted in arrangement.



Industrial robots are classified into several categories such as vertical articulated type and horizontal articulated type (Selective Compliance Assembly Robot Arm-SCARA), depending on the joint movements and the structure. Please see the article below for more information.



Robot and human movement correlation:

Presently, how about we investigate the development of a vertical explained type having a similar mechanical structure as a human arm for instance. A vertical verbalized robot is a modern robot with a serial link structure. It is commonly made out of six joints (6 tomahawks).

The accompanying figure shows a correlation among robot and human development

CONTROLLER:

The controller is the "brain" of the industrial robotic arm.

It works as a computer and allows the robot to also be connected to other systems. The program is inputted with a teach pendant to the controller.Many of today's industrial robot rms use an interface that resembles or is built on the Windows operating system.

The advanced PC (both the equipment and the product) goes about as a

Much the same as the human arm, the robot comprises of what is known as a controller having a few joints and connections Manipulator alludes to the life structures of the robot which includes the auxiliary parts like wrist, base, arm which are associated by a progression of joints and connections. The mechanical structure of controller that comprises of inflexible bodies associated by methods for joints, is divided into an arm that guarantees versatility and arrive at capacity of the robot to required area. A manipulator is a gadget used to control materials without direct physical contact by the operator. The applications were initially for managing

with radioactive or biohazard us materials, using robotic arms, or they were utilized in blocked off spots. In later advancements they have been utilized in differing scope of uses including welding automation, robotic surgery and in space. It is an arm-like instrument that comprises of a progression of fragments, normally sliding or jointed called cross-slides, which handle and move objects with a number of freedom. In modern ergonomics a controller is a lift-help gadget used to enable specialists to lift, move and spot articles in process that are excessively substantial, excessively hot, too enormous or in any case unreasonably hard for a solitary laborer to physically deal with. Rather than essentially vertical lift helps (cranes, lifts, and so forth.) controllers can reach in to restricted spaces and evacuate work pieces. A genuine model would expel enormous stepped parts from a press and setting them in a rack or comparative dunnage. In welding, a section blast controller is utilized to expand testimony rates, reduce human error and different expenses in an assembling setting. Furthermore, controller tooling enables the lift help to pitch, roll, or turn the part for fitting arrangement. A model would expel a section from a press in the flat and afterward pitching it up for vertical situation in a rack or turning a section over for uncovering the rear of the

TYPES OF INDUSTRIAL ROBOTS

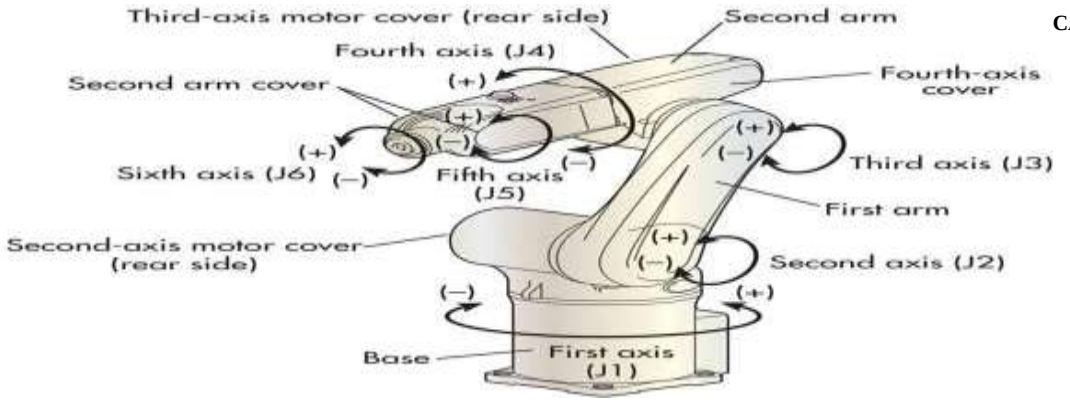
1. Articulated
2. Cartesian
3. Polar
4. Cylindrical
5. SCARA
6. Delta

ARTICULATED

This robot design features rotary joints.Can range from simple two joint structures to 10 or more joints. The arm is connected to the base with a twisting joint.

The links in the arm are connected by rotary joints.Each joint is called an axis and provides an additional degree of freedom.

CARTESIAN



These are also called rectilinear or gantry robots.Cartesian robots have three linear joints that use the Cartesian coordinate system (X, Y, and Z).

They also may have an attached wrist to allow for rotational movement. The three prismatic joints deliver a inear motion along the axis.

CYLINDRICAL

The robot has at least one rotary joint at the base and at least one prismatic joint to connect the links.The rotary joint uses a rotational motion along the joint axis, while the prismatic joint moves in a linear motion.Cylindrical robots operate within a cylindrical-shaped work envelope

INTRODUCTION TO ROBOT WELDING TECHNOLOGY:

Welding is an innovation that gives the quickest, most grounded, and most affordable strategy for joining metals. The field of welding has moved fromcoal-terminated heaters and sledges utilized for manufacturing iron, to present day techniques, for example, the concentrated quickened free electrons of the electron shaft process and the benefits of robots and lasers. Welding had its old beginnings in the flames of metalworkers, who could manufacture two white-hot bits of metal along with hammer blows and tolerance Preliminary, the basic meaning of welding was "joining metals through warming

them to a liquid state and melding them." With expanding progress in welding procedures and strategies, the definition has needed to change. It is very consistent with state that the weld is more grounded than the base metal. Close to the great application regions of welding, for example, shipbuilding, car producing, building development, and pipelines, at present welding methods are being utilized in increasingly complex application fields including airplane, space vehicles, and atomic reactors.Routinely, arc welding and oxyacetylene fuel welding were two primary welding strategies however at present progressively current advancements are being utilized, for example, beat GTAW, plasma welding and cutting, lowered bend, beat GMAW, and electron shaft and laser welding. Fundamentally, there are two kinds of welding.

Arc Welding Application Along With Conveyor Using Sequence Programming

Welding is a technology that provides the fastest, strongest, and most economical method of joining metals. The field of welding has moved from coal-fired furnaces and hammers used for forging iron, to modern methods such as the concentrated accelerated free electrons of the electron beam process and the advantages of robots and lasers. Welding had its ancient origins in the fires of blacksmiths, who could forge two white-hot pieces of metal together with hammer blows and patience.

In the present day global marketplace, manufacturing organizations are facing national as well as international competition, forcing them to further improve their performances. To this effect, the concept of Computer Integrated Manufacturing (CIM) have been introduced in various production environments with different purposes including human productivity improvement, product quality improvement, capital resource productivity improvement and providing rapid response to the market demands. The CIM strategy is to integrate the information bases of the various units of automation within the traditional framework of manufacturing. In this respect CIM can be viewed as a closed loop control system where a typical input is the order for a product and the corresponding output is the delivery of the finished product.The most commonly used robot configurations are articulated robots, SCARA robots, Delta robots and Cartesian coordinate robots, (aka gantry robots or x-y-z robots). In the context of general robotics, most types of robots would fall into the category of robotic arms (inherent in the use of the word manipulator in the above-mentioned ISO standard). Robots exhibit varying degrees of autonomy: Some robots are programmed to faithfully carry out specific actions over and over again (repetitive actions) without variation and with a high degree of accuracy. These actions are determined by programmed routines that specify the direction, acceleration, velocity, deceleration, and distance of a series of coordinated motions. Other robots are much more flexible as to the orientation of the object on which they are operating or even the task that has to be performed on the object itself, which the robot may even need to identify. For example, for more precise guidance, robots often contain machine vision sub-systems acting as their "eyes", linked to powerful computers or controllers. Artificial intelligence, or what passes for it, is becoming an increasingly important factor in the modern industrial robot.

INTRODUCTION TO ROBOT SIMULATION SOFTWARE

Motosim EG:

Motosim EG (Motoman Simulator Enhanced Graphics) is a comprehensive software package that provides accurate 3D simulation of robot cells. This powerful simulation software can be used to optimize robot and equipment placement, as well as to perform collision detection, reach modeling and cycle calculations. It also provides accurate offline programming of complex systems.Motosim EG reduces programming time, thus increasing the uptime of the production equipment. New parts can be programmed offline before production begins, and existing robot programs can be modified to increase efficiency and reduce cycle time – without sacrificing production schedules.

Hardware Requirements:

When simulate follow situation, PC with high-end CPU or graphic board may need.

- Many robots are used.
- High-capacity CAD data is used.
- Collision check is used.

SOFTWARE SIMULATION

Software Used : **Motosim E G 2017**

MOTO = Motoman SIM = Simulator

E = Enhanced G = Graphics

The ladder diagram consists:

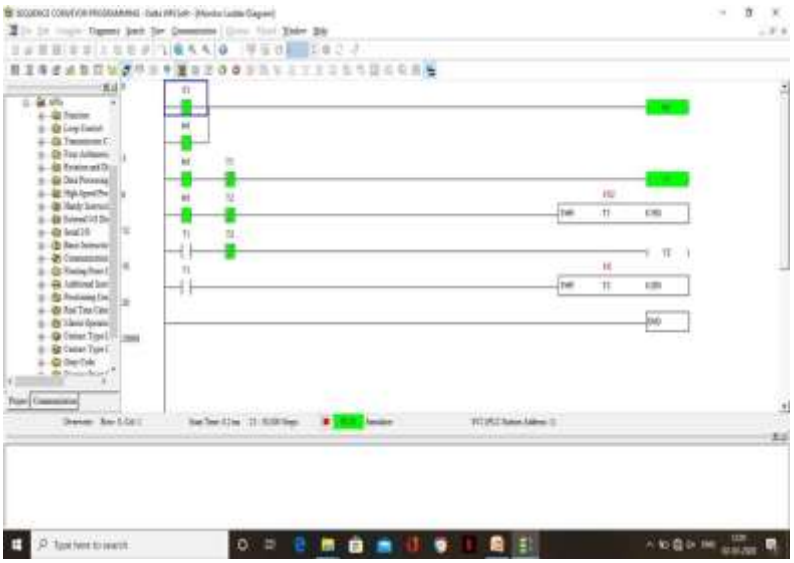
S1 - SENSOR

M1 - MEMORY COIL Y1 - CONVEYOR

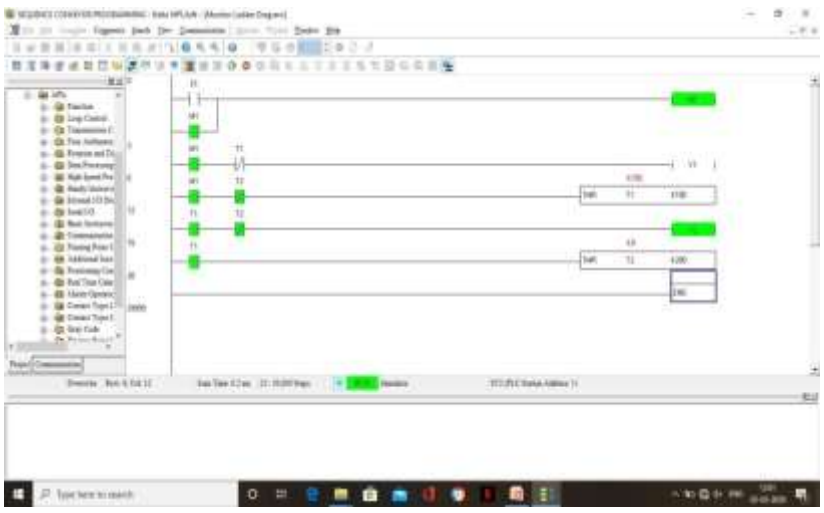
Y2 - ROBOT

T1 & T2 - TIMERS

- When the power supply is given to the sensor and PLC, they are switched on after that when the S1 (sensor) is on the passes to memory coil which is connected to Timer (T1) as shown in (fig a) (TMR T1 K150), here TMR T1 is nothing but the Timer1 and K150 is the Minutes in which the sensors will wait, Which means the box which is attached to the conveyor will move to the respected position and when the Timer stops then the conveyor will power off and thereby the Robot will act which means the Robot will perform their task and complete their given task.



In meantime the Timer (T2) i.e. {TMR T2 K200} will act and when the Robot work will completed the timer get over and it automatically stops and again the process continues going.



Conclusion

This project introduced the idea of a system in which the majority of robots in industries, factories, warehouses, and laboratories work for humans. There Are Many Uses For Robots. For instance, it stimulates the economy since companies must be effective to compete in their industry. Hence, having robots makes business owners more competitive since they can complete tasks faster and better than humans, such as building and assembling cars. Robots today play a variety of roles in both industry and research, but they cannot perform every job. Lastly, as technology advances, new applications for robots will emerge, bringing with them fresh perspectives and opportunities.

REFERENCES

1. Understanding FACTS: concepts and technology of flexible AC transmission system" N.G. Hingorani, L. Gyugyi, ", IEEE PRESS, 2000. Standard Publishers Distributors,Delhi.
2. D. Murali, Dr. M. Rajaram, Active and Reactive Power Flow Control using FACTS Devices International Journal of Computer Applications (0975 – 8887) Volume 9– No.8, November 2010.
3. A. P. Usha Rani and B. S. Rama Reddy Modeling and Digital Simulation of Interline Power Flow Controller System, International Journal of Computer and Electrical Engineering, Vol. 2, No. 3, June, 2010 1793-8163
4. Performance Evaluation of a Distance Relay as Applied to a Transmission System with UPFC. IEEE Transactions on Power Systems. Vol.21 No.3, July 2006, Pg. No. 1137 –1147.
5. K. Manoz kumar reddy, "simulation of unified power flow controller," proceedings of National conference on recent trends in power systems and power electronics, (Feb 2012)148-151.
6. X. P. Zhang, "Modeling of the interline power flow controller and the generalized unified power flow controller in Newton power flow," Proc. Inst. Elect. Eng., Gen., Transm., Distrib., vol. 150, no. 3, pp. 268–274, May 2003