## ABSTRACT

The main objective of this project is to design a lead through robot for point to point robot programming using dimensional scaling of a real-time robot to a scaled down model. In this robot, we can record, save and playback the robot motion with accuracy and precision. This root the workers to not strain to program the robot by moving the nose of huge real-time robot but through the scale downed duplicate. This ensures the method of programing much easier to use. On the actual scenario of programing, the real-time robot offers resistance to motion which causes the operator to strain to move it to required positions. This issue can be overcome through this scale down method with greater reduction in latency of relocating the nose trajectory.

## OBJECTIVES OF THE PROJECT

1. The main objective of this project is to build a robot that will be embedded with a robotic arm and can be controlled using new lead through method.
2. The robot can move to remote places and do the pick & place action of objects that are dangerous and harmful. The applications of this project is vast and can be implemented in a lot of industries.
3. To create a pick and place robot with lead through method for point to point robot programming using angular and dimensional scaling of an real-time robot to a scaled down model.
4. To increase the pick-and-package global performance in terms of flexibility, dependability and error reduction.
5. Improvement of the working conditions of operators by a proper layout design and task allocation between worker and robot.

**THE CLASSIC AND CURRENT PROGRAMMING METHOD OF INDUSTRIL ROBOT PROGRAMMING IS OF THREE METHODS:**

# OFFLINE PROGRAMMING:

In this method, the person who specialized in robotics or mechatronics can program the robot even he/she is anywhere across the world.

In this method, the working envelope or volume of the specific robot is provided to the programmer with the coordinates that the robot have to move on.

So through these data, the programmer will program the robot as per the requirement without being near to robot.

The major drawback of this type robot programing is, the person has to assume the workspace and do a hard coding. Which means the program can't be executed if the work space is altered. We need to proceed with the programmer for smaller changes in the work envelope of the robot.

This can be used in the production of large scale repetitive or continuous production industries.

The robot is too costly, we have to hire a high programming skilled technical person with higher employee package.

This method is not convenient in production with varying product cycles. Which means for an industry with varying products according to the client, can’t be handled through this method.

# TEACH PENDENT PROGRAMMING:

In this method, the person who program the robot, holds a remote that was equipped with numerous buttons and rotary encoders.

This method is widely used about 90 percent in industries.

Here, the motion of the robot is controlled and programmed through part by part through remote with data consisting the angular inputs to joints if the links driven by a servo motor.

or else if it is a stepper motor driven, then the number of steps to be rotated is calculated by the coordinates input to the robot.

However the programing method is widely applicable, the person has to be near to the robot with the remote linked through wires.

It increases the halt time in the production which means during production, if there is any error related to robot tolerances or production output, the time taken to trouble shoot the program code will be longer. Which for industries it’s a greater drawback. Which ultimately leads to termination of project. It requires a high programming knowledge person to program and also for trouble shooting the machine

# LEAD THROUGH ROBOT:

It is a simpler way to program a small sized robot with low precision.

In this method, a robot will be programmed by moving its end effector or the tip through our hand manually and let the robot to know what the path and point it need to follows.

In this method, the programmer need not to be a skilled professional.

The drawback of the method is there is a higher risk of moving a robot arm by standing nearer to it. Even though the programing method is simpler, this can't be applicable in larger robots.

The time taken to move and program the robot is relatively shorter than the other two methods of programing. But the toughness is since the robot offers resistance to motion, as the size of the robot increases, the muscular movability of the programmer will become complicated.

# ADVANCED LEAD HTROUGH ROBOT: (Our project)

This is our new idea to improve the method of already existing lead through robot.

In our method, a scale down model is made as realistic with the original industrial robot with a method called dimensional scaling.

We scale down the dimension of the original robot to the small model.

While moving the small model, the real-time robot will move according to this model.

The major advantage is that to move a robot with random position is quicker than conventional methods. But for our case as the small model can be moved easily, without any longer muscular effect, the real-time robot replicates the action to be followed from the model.

This is simply like a shadow function.

Not only controlling the robot on live, it can also be programmed with point to point function by just pressing a button for confirmation of position to be programmed after placing the model to certain position as we needed.

Later then, it can be played back with a looped operation and so it will repeat the same function again and again. this tends to larger benefits like,

As this is easier way to program, we need not to hire an expert in robot programming but can make him/her to train a person in simpler manner.

This robot is highly effective in small scale industries followed by batch production type of manufacturing.

The reason we prefer is, in these type of industries, the robots are need to reprogram as per the batch changes.

In this type, we couldn't apply for large scale manufacturing with high precision outputs. But can be used as a replace for robots that are programed with conventional lead through method.

These are highly applicable for welding, painting, pic and place, package handling and in place of warehouses.

As the robot is easier to teach what to do, the halt time is reduced which is a huge benefit.

As this robot is live to work on convenience, it can be used in hazardous places like nuclear power stations...we can use this robot for handling radioactive substances with a long range of control.

This method is very safe as we need not to be nearer to the robot for programming or live controlling.

As this will not require a huge expensive robots and highly skilled programmer, this will make people to move on to robots in easy case. That’s why we think this is a game changer in the manufacturing industry especially in small and medium scale industries.