# AUTONOMOUS ROBOT ARM

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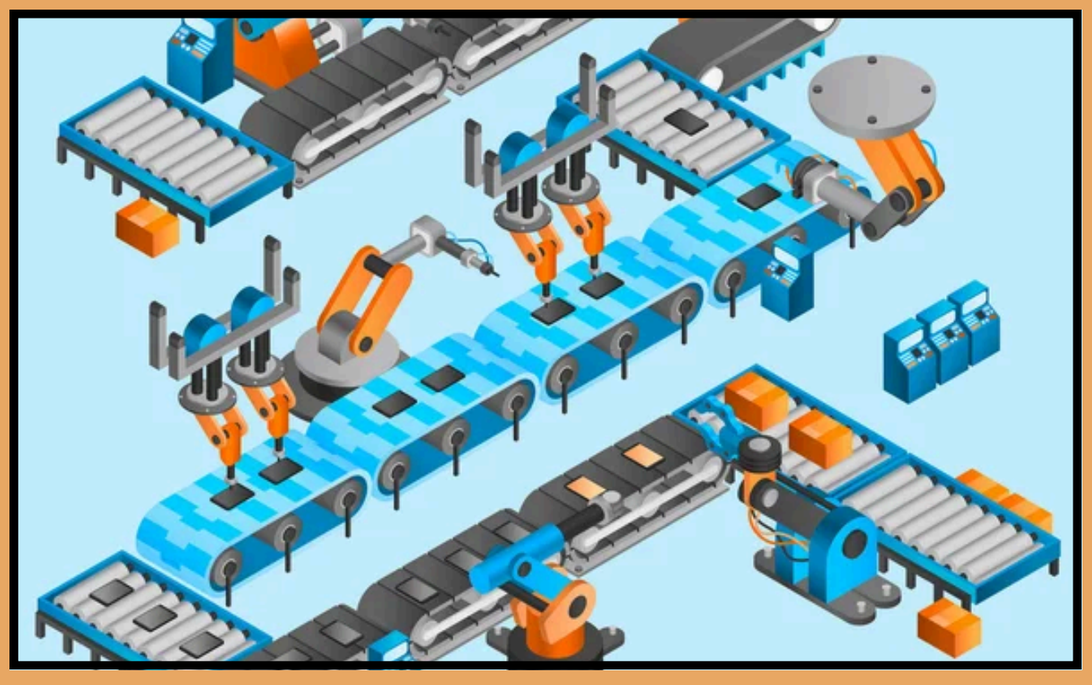
## GOAL

The goal of this project is to train a robotic arm to recognize and grasp objects using images or videos, by applying reinforcement learning techniques for autonomous decision-making.



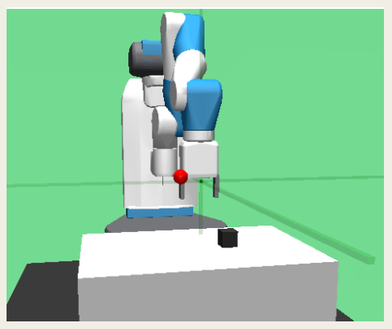
## INTRODUCTION

Robots are used for simple tasks but struggle when the environment changes. Traditional systems can't adapt to new object positions or shapes. Machine Learning (ML) and Reinforcement Learning (RL) help solve this by letting robots learn from experience. RL is great for robotics since it doesn't need labeled data and can be trained in simulations like OpenAI Gym. Tools like TensorFlow help build these models. Projects using RL and computer vision have shown success. This project trains a robotic arm with vision and the Soft Actor-Critic (SAC) algorithm to grab and move objects on its own.

## RESULTS

- The robotic arm will learn to detect and grab different objects using camera input.
- We expect the robot to increase accuracy over time through reinforcement learning.
- Performance will improve in terms of precision, speed, and adaptability.
- Training in simulation should reduce real-world trial-and-error.

Sucess rate of the
0,0% ~0,08%

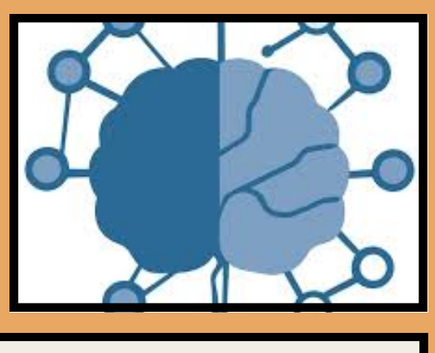


## SOLUTION

Our solution is to reduce inefficiencies in industrial processes by automating object handling using a smart robotic arm. By combining reinforcement learning and vision systems, the robot can adapt to different objects and situations without reprogramming. This makes production lines faster and more flexible. In the future, this kind of system could help many industries lower costs and reduce human error.

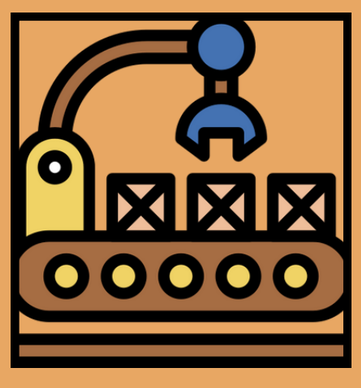
## EXPERIMENTS

We will test the robot in a simulated environment using OpenAI Gym. The robot will practice picking up different objects in random positions.



## CONCLUSIONS

Combining vision and RL can improve automation by allowing robots to adapt to different objects and tasks.



## BIBLIOGRAPHY

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[2] A. Krizhevsky, et al., "ImageNet classification with deep convolutional neural networks," NeurIPS, 2012.