# Gesture designated & Voice Controlled Mechatronic Hand using Myograph Sensors

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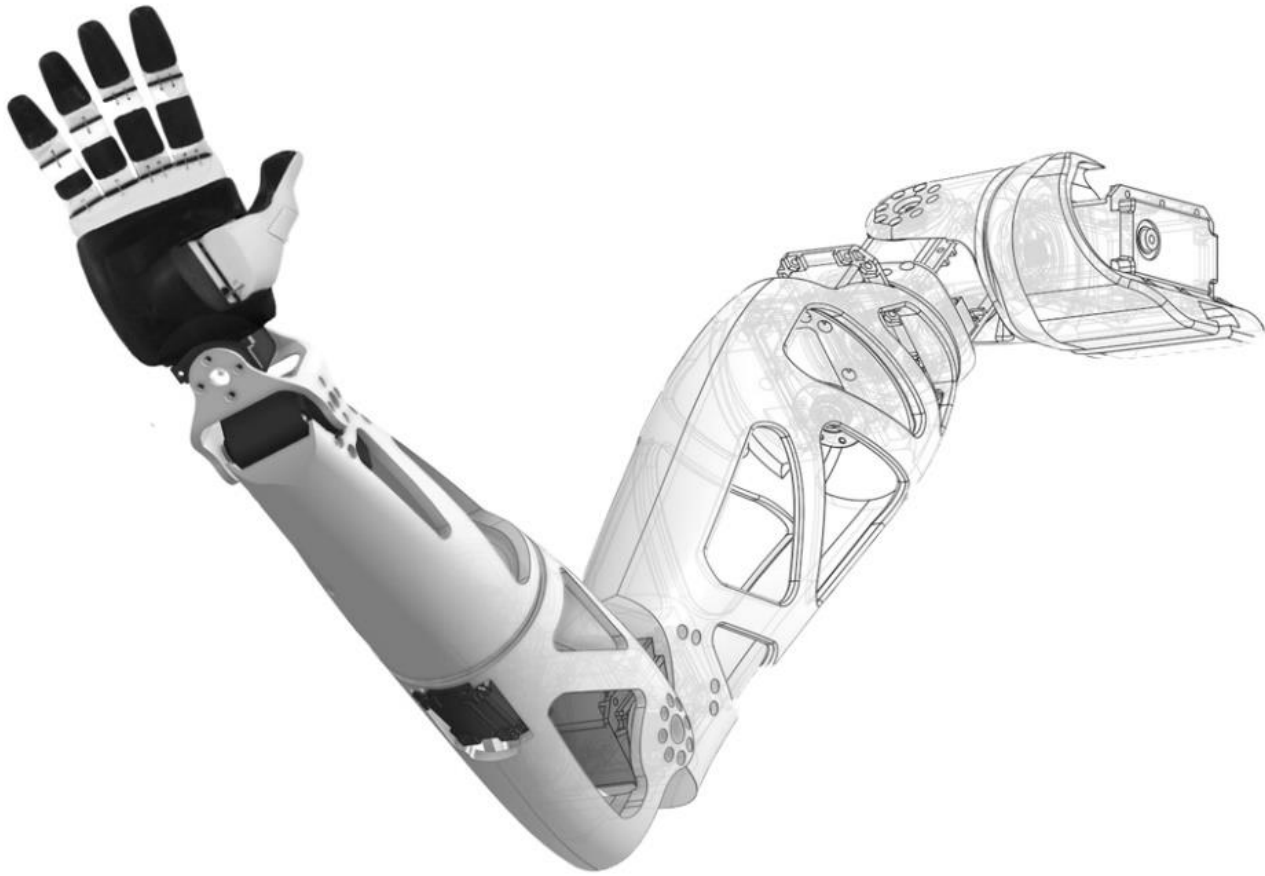


# OBJECTIVE

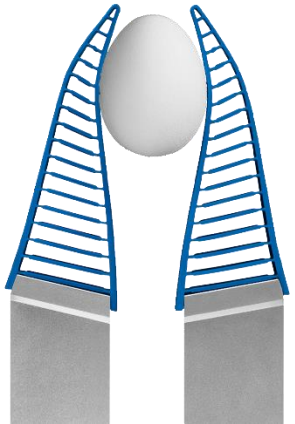
- To automate Robotic Hand in several applications with predefined operations using Programming, Voice Control & imitate real time Gestures.

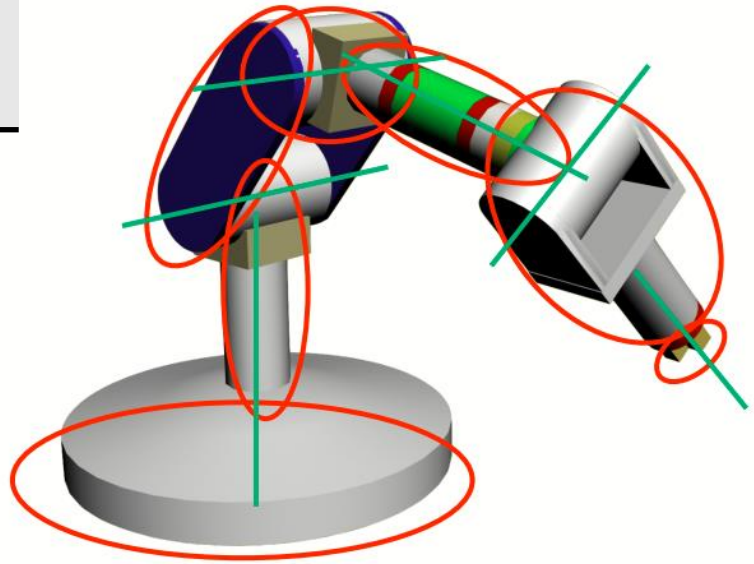
# KEY FEATURES

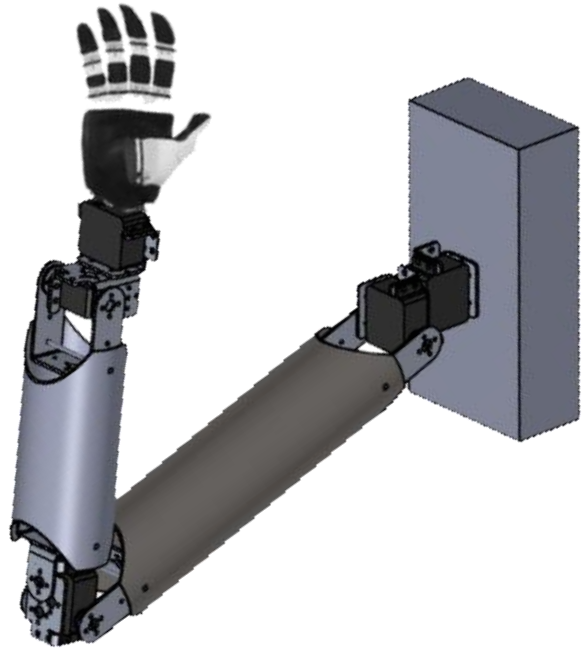
- 7 DoF (Replica of Human Hand)
- Gesture Control
- Voice Control
- Arduino ATmega328 & RaspberryPi 3B+
- Adaptive Flexible Gripper
- Shape Recognition with VCSEL & ToF

# ADVANTAGES

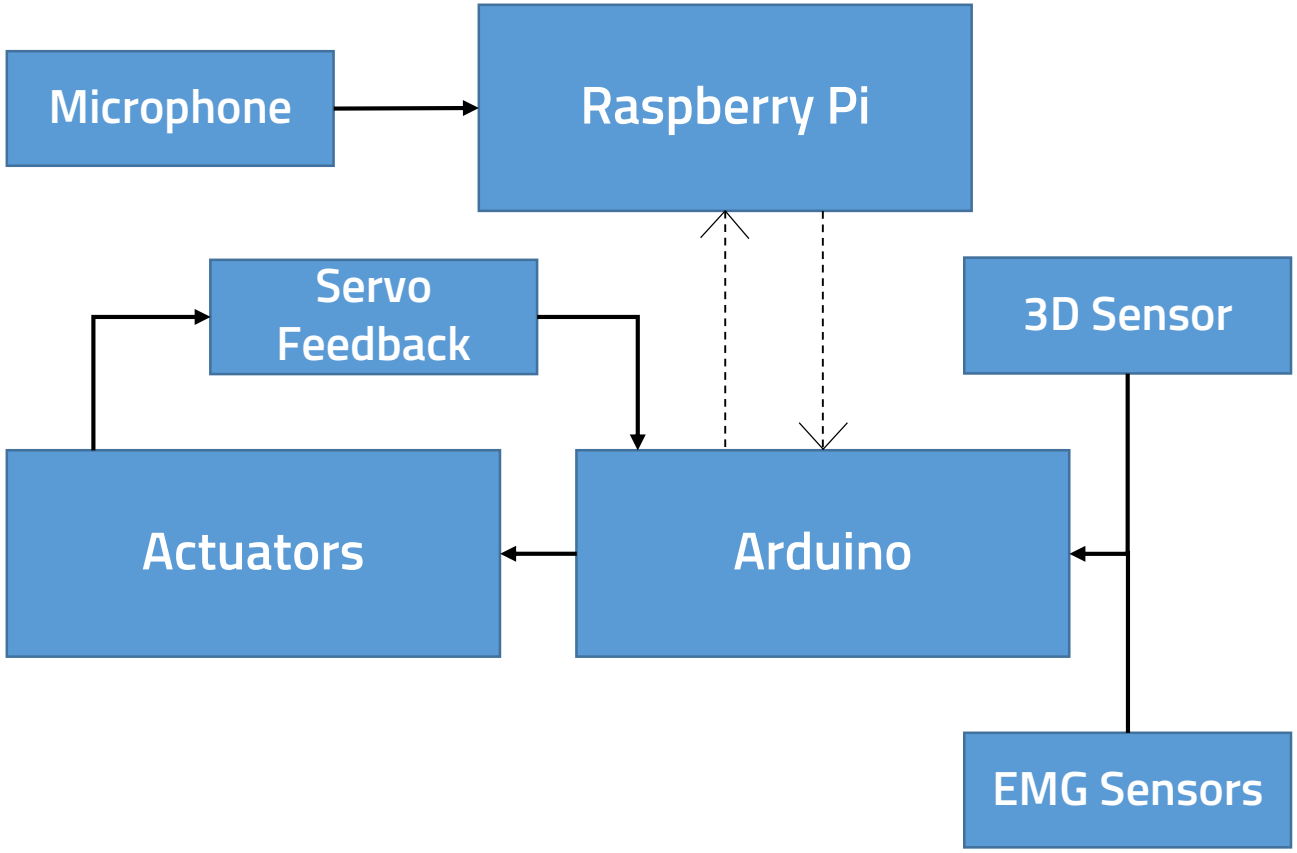
- The real time Gesture recognition will be done with several Myographic sensors.
- Pre-defined actions performed over Voice Command.
- No Tendons are used. Flexible Grippers are provided for better grip.
- VCSEL will be used for Object detection and Shape Recognition which provides power efficiency.





# BLOCK DIAGRAM

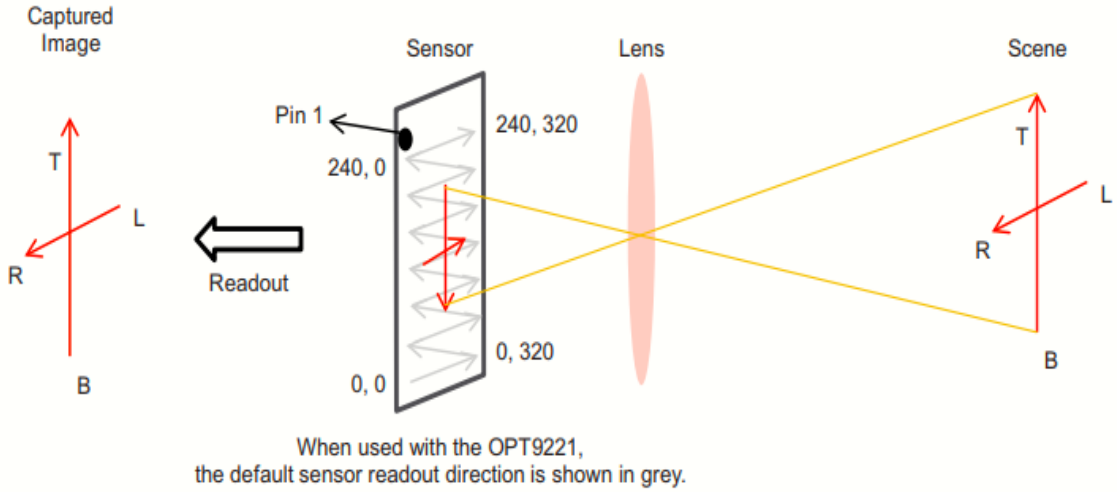



# LANGUAGE

- C (Arduino, AVR)
- Python (Python 3, Anaconda)
- MATLAB / R (DIP, Point Cloud IP)

# SOFTWARES

- Solidworks(designing & modeling)
- Simulink(control system design)

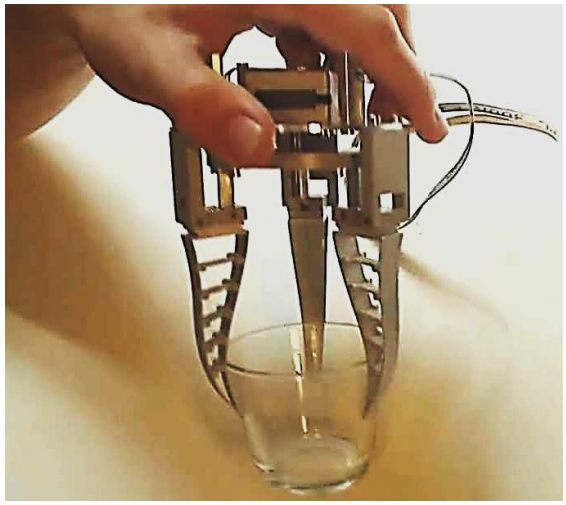


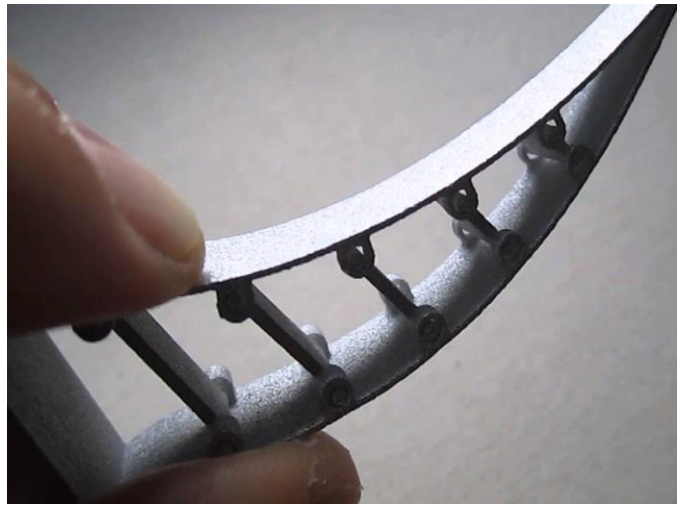

# ESTIMATED COST

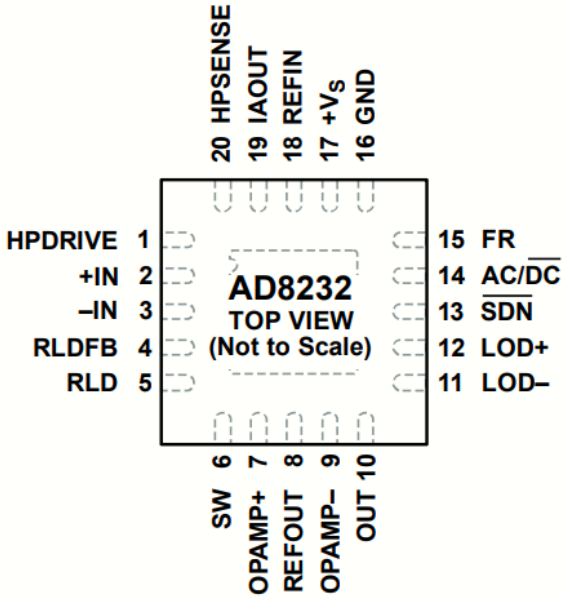
- ₹ 40,000 – 50,000

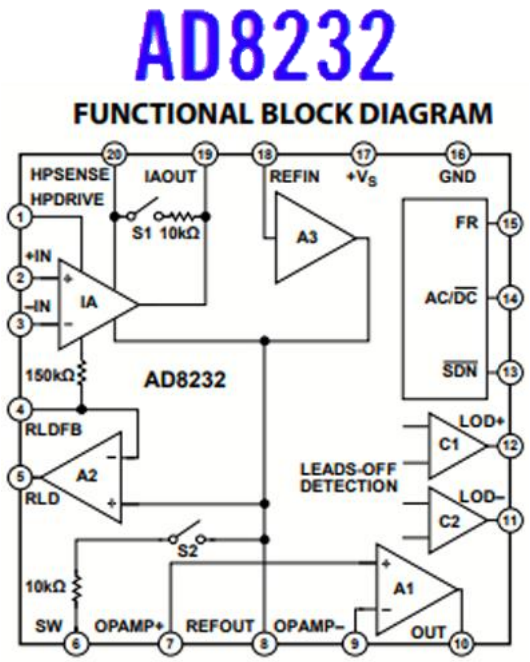
# FLEXIBLE GRIPPER

- Flexible-finger hands/grippers have advantages over rigid ones when used in grasping tasks.
- They absorb energy during the impact, which make them suitable in delicate manipulation or human interaction.
- Comparatively lighter and reduces usage of 10 micro motors.







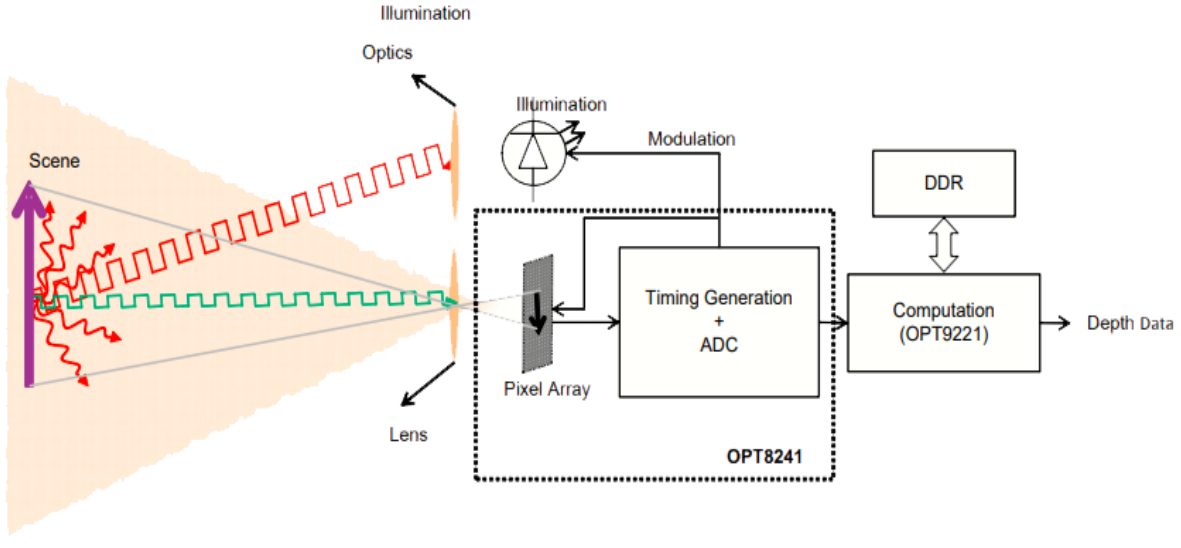




# ELECTROMYOGRAPHY SENSOR

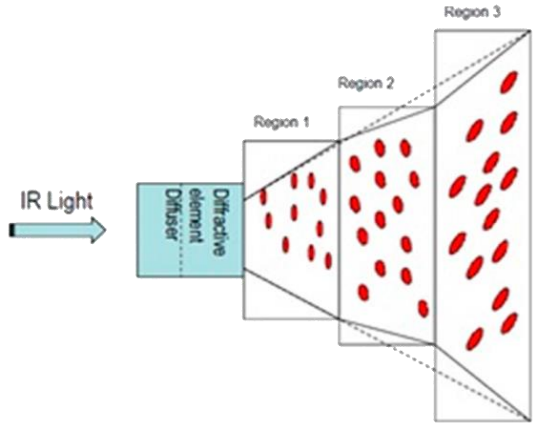
- It allows the user to measure the electrical activity of muscles. It can be used as a control signal for prosthetic devices.
- Use your muscles to control any type of actuator (motors, servos, LEDs etc.) interact with the environment with your own muscles.
- This sensor will measure the filtered and rectified electrical activity of a muscle, depending the amount of activity in the selected muscle.
- An electromyograph detects the electric potential generated by muscle cells.

# TIME OF FLIGHT

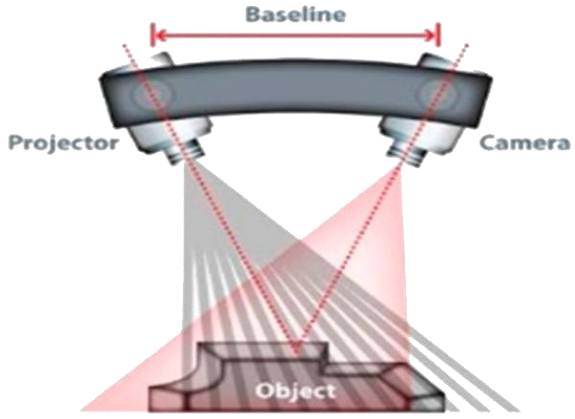
- Time of Flight (ToF) is a property of an object, particle or acoustic, electromagnetic or other wave. It is the time that such an object needs to travel a distance through a medium.
- The measurement of this time (i.e. the time of flight) can be used for a time standard, as a way to measure velocity or path length.
- The distance is measured by Law of Motion equations.




3D ToF Camera



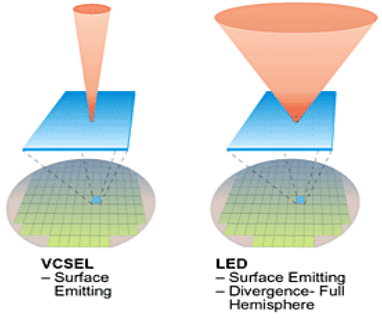

(a)




(b)

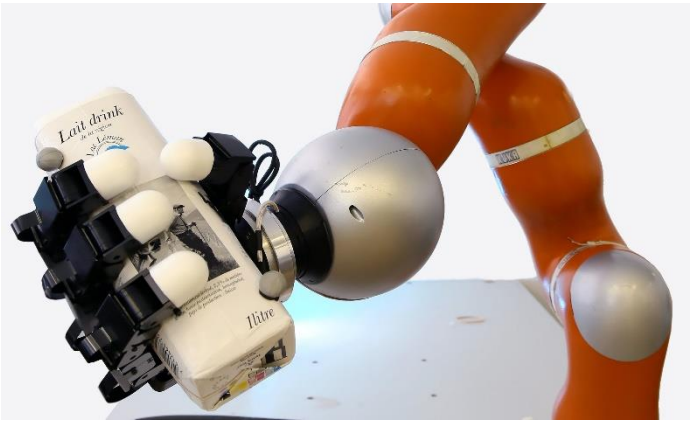
# VCSEL

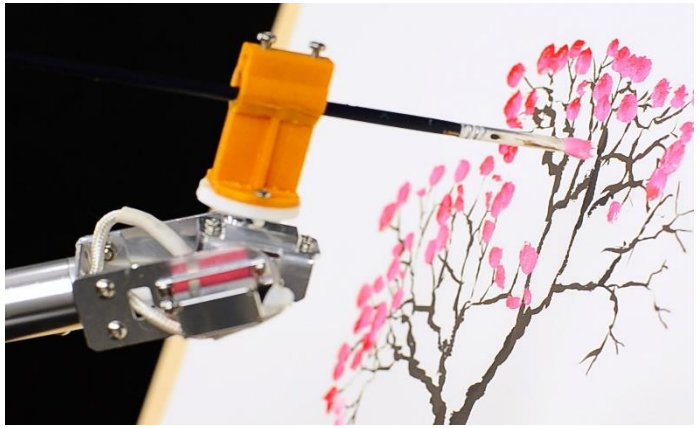
- It stands for Vertical-Cavity Surface Emitting Laser.
- It is a type of semiconductor laser diode with laser beam emission perpendicular from the top surface instead of Cavity formed in conventional Laser.
- Used in Fiber Optic Communications, Precision Sensing, Computer Mice, Laser Printers, Augmented Reality etc.

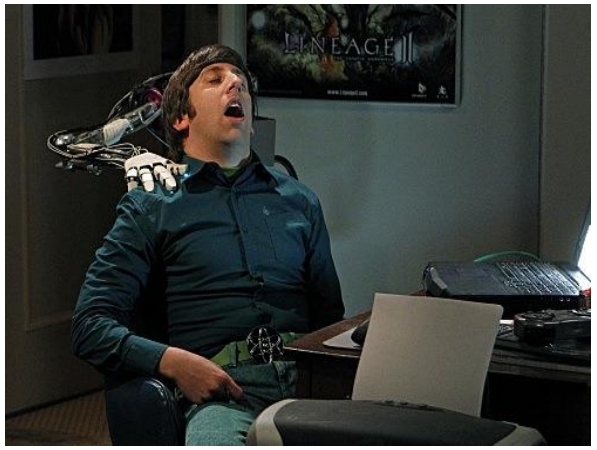


# APPLICATIONS

- Manipulation (Pick & Place)
- Machine Assembly
- Spray Painting
- Arc Welding
- Packaging (Gluing)
- Prosthetic Arm







THANK YOU