

**PROTOTYPE**

# **BIONIC HAND FOR DISABLED PERSONS**

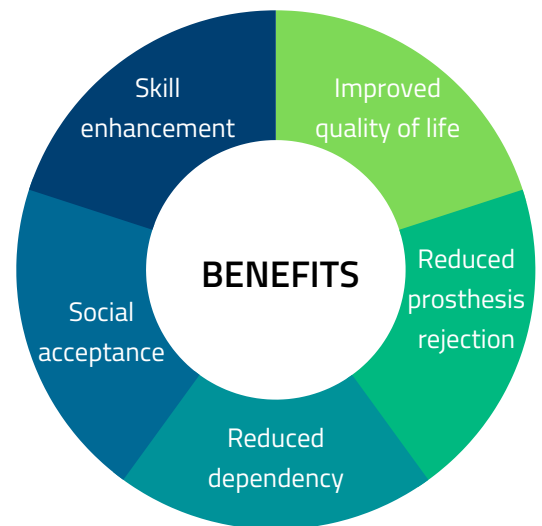
**Prof. Pankaj Khatak, Munish Kumar**

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Engineering  
GJUST, Hisar

# Our vision

We envision a bionic hand mimicking the characteristics of a natural human hand that would enable persons with disabilities to regain their functional capabilities with a sense of empowerment.

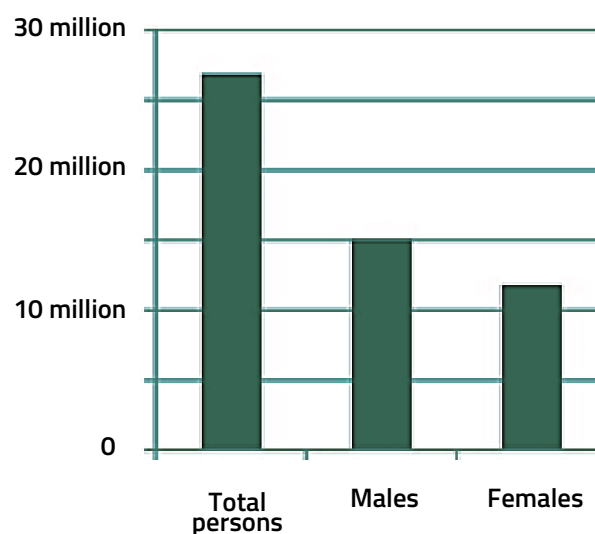
We aim to develop an advanced, low-cost, and multifunctional bionic hand for upper limb amputees. An early-stage prototype of the bionic hand has been built successfully to validate proof of concept.





## The Problem

- Population of persons with disabilities (PWD) in India is 26.8 million.
- 71% of PWDs live in rural areas, literacy rate of PWDs is 55% and employment rate is 7.5%.
- 50% PWDs are dependent on others for their living.
- Poor social and financial condition of PWDs.
- Decreased quality of life, confidence, self-esteem, and loss of human resources.
- Commercial prosthetic hands possess limited functionality and high cost.



**Population of PWD in India**

*Disabled Persons in India - A Statistical Profile 2016*  
Ministry of Statistics and Program Implementation,  
Govt. of India



# Bionic Hand

The project was supported by  
PDU Innovation & Incubation Center,  
GJUST, Hisar.

**Budget - Rs. 20 lakh**

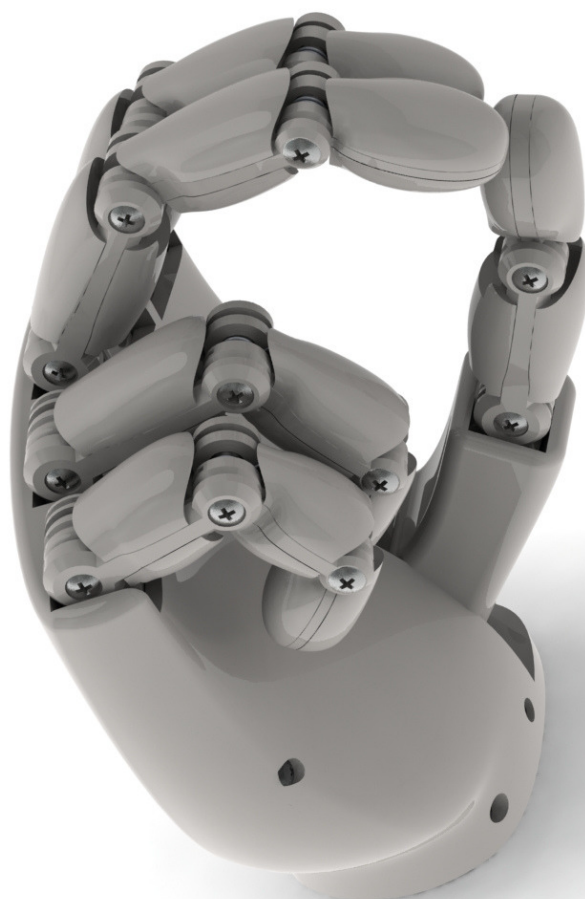
**Duration - 19 months**

(Sept 2019 - March 2021)

Early-stage prototype  
developed to validate our proof-  
of-concept.

Acquires neuromuscular signals  
from the human body and  
classifies commands through  
machine learning.

Capable of identifying various  
neuromuscular signals and  
convert into grip movements  
similar to a natural human hand.



The project team looks forward to developing a functional prototype of  
the bionic hand; and test on amputees under real-world conditions.  
The team requires funds to support the work further.

# Future work

- To develop a functional prototype of the bionic hand.
  - Design and control improvements.
  - In-lab performance evaluation of the prototype.
  - Assessment of the prototype on amputees for the execution of activities of daily living.

## Project Team



### Prof. Pankaj Khatak

Having a doctorate in Mechanical Engineering and IIT alumni., he is now a faculty member in Mechanical Engineering at GJUST, Hisar. His research is focused on robotics, CNC, and thermal engineering.



### Mr. Munish Kumar

A research scholar in Mechanical Engineering at GJUST, Hisar. He is an M.Tech in Mechanical Engineering and has knowledge of design, robotics, programming, manufacturing, product development, and project management.

For any query, suggestion or to discuss an opportunity, contact us at: -

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munish.nc@gmail.com

Team members:

#### Mr. Ganga Singh

He is an M.Tech in Mechanical Engineering and has knowledge of computer-aided design, simulation, mechanical testing, and 3D printing.

#### Mr. Hemant Kumar

He is an M.Tech in Internet of Things (IoT) and has knowledge of programming, electronic systems, sensors, robotics, and machine learning.

#### Ms. Mukesh Rohilla

She is a Masters in Prosthetics & Orthotics (MPO) and has knowledge of prosthetic devices, amputee ergonomics, socket design, and fitment.



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