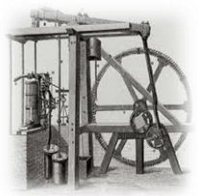


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Dexterous Gripper for Industrial Manufacturing

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OUTLINE

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- Research Background, Motivation and Objective
- Research Procedure
  - Modeling for the gripper
  - Design of an intelligent gripper
  - Performance evaluation by experiments
- Conclusions and Future Work

Motivation

Why a dexterous reconfigurable gripper?

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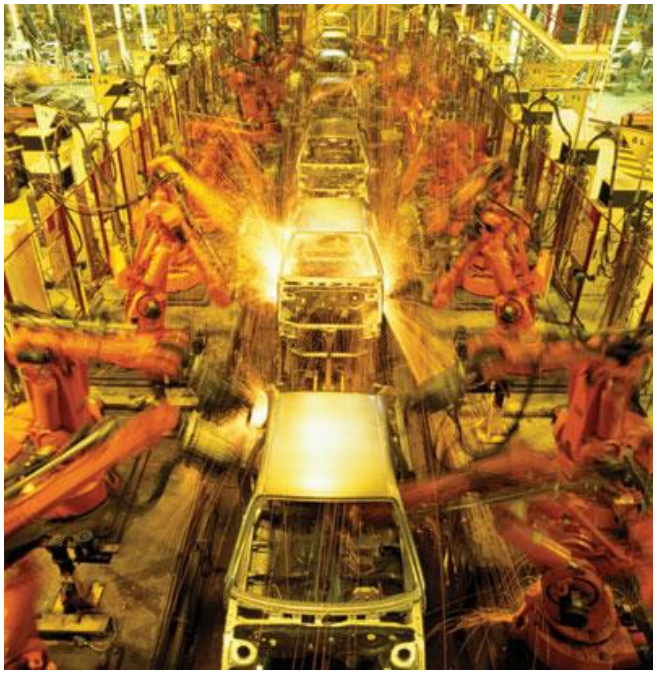
Manufacturing industries demands an increase in the level of automation in order to:



- demands an increase in the level of automation
- improve efficiency and quality of the final assembly
- reduce production time
- lower the cost of products
- improve the safety level of human workers
- Have a flexible production cycles that quickly react to changes into the product to be assembled

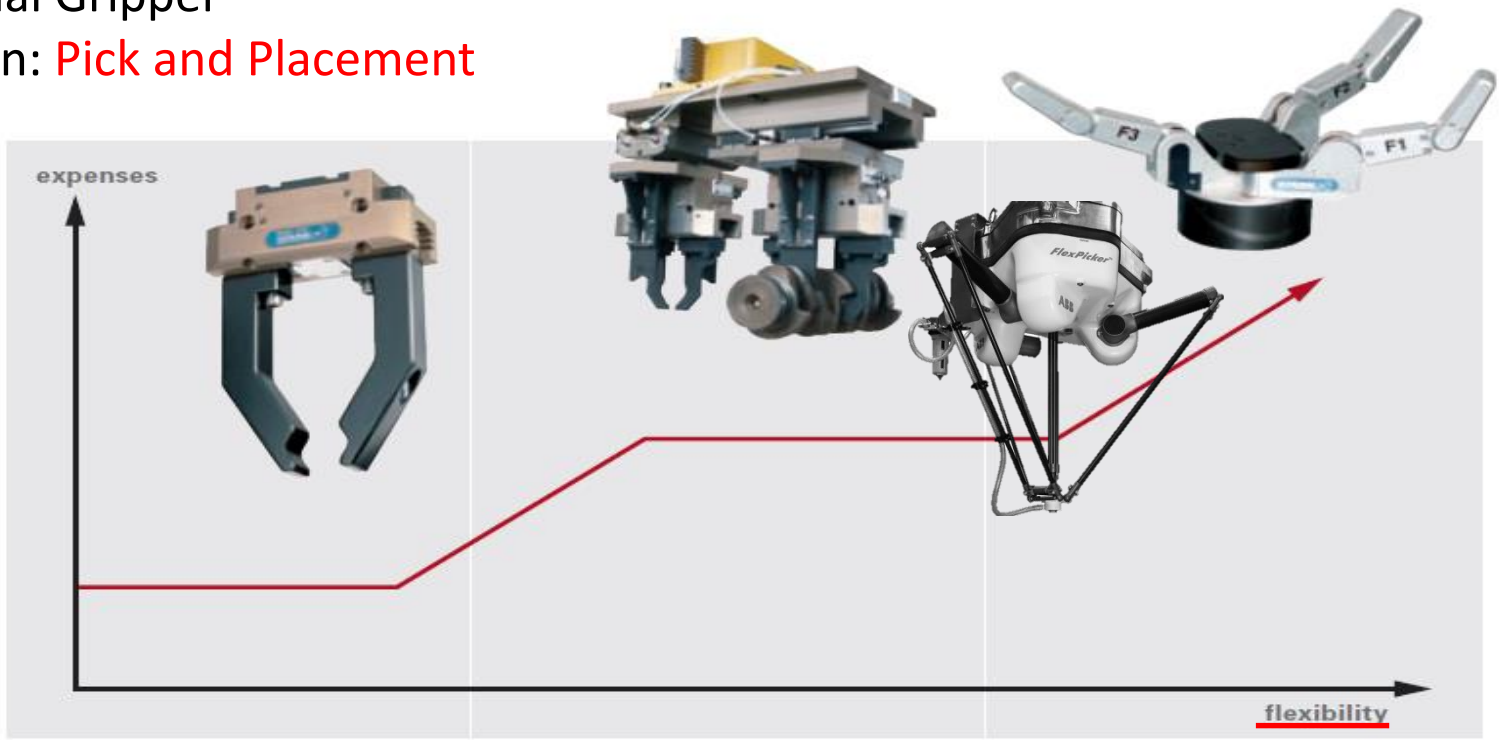
Is there a way to meet all this requirements?

Background

P&P grippers

Industrial Gripper

Function: Pick and Placement



Next generation of Industrial manufacturing requirements:

1) Inexpensive, compact, low weight and robust.
2) Dexterous, be capable of performing simple grasping and manipulation tasks, such as precision manipulation, in-hand grasp transitions
3) General to manipulate different objects and tools.

Background

P&P grippers

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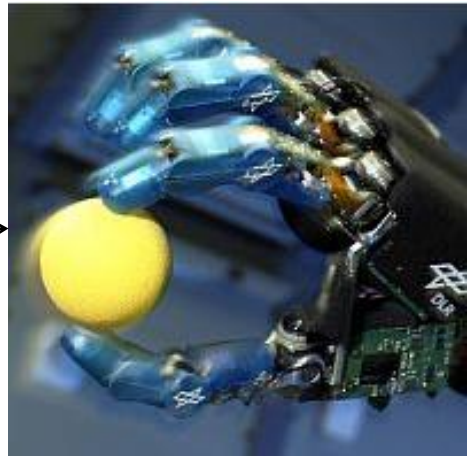
Dexterous Hands



DLR Hand II (German Aerospace Center)

DLR/HIT Hand (HIT)

...

i-HY hand (Yale Univ.)

BarrettHand (Barrett Technology Inc.)

...

Design and Development of a Multi-fingered Metamorphic Robotic Hand

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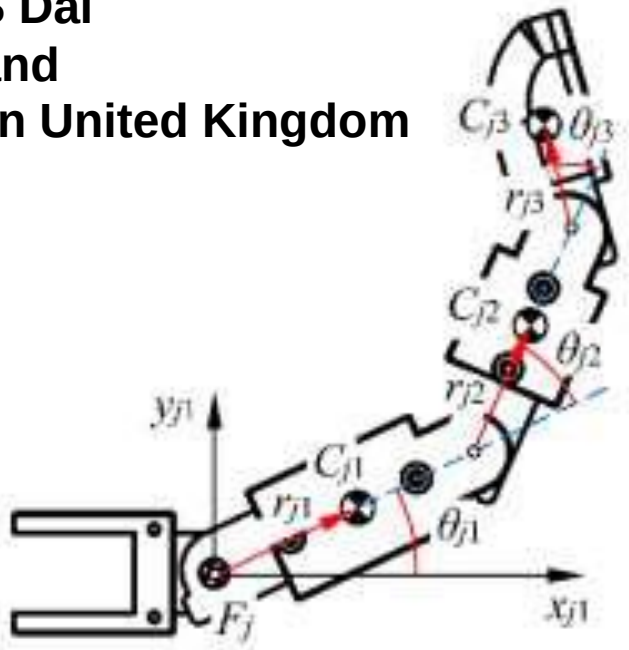
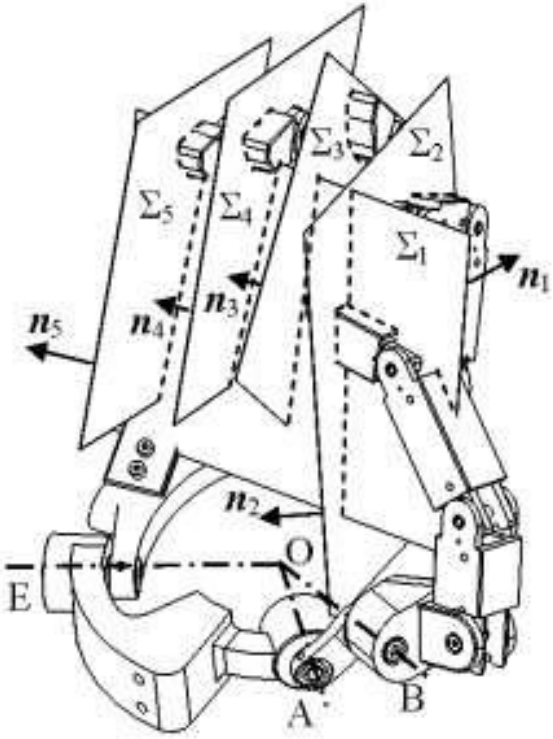
Guowu Wei and Jian S Dai
University of Salford and
King's College London United Kingdom





University of Salford MANCHESTER

KING'S College LONDON University of London

Wei, G., Dai, J. S., Wang, S., and Luo, H., 2011, Kinematic Analysis and Prototype of a Metamorphic Anthropomorphic Hand with a Reconfigurable Palm, *International Journal of Humanoid Robotics*, **8**(3), pp.459-479.

The challenge

One gripper to grasp ‘em all…

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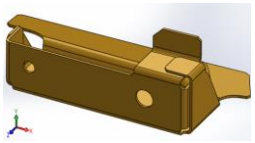
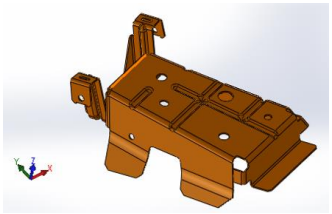
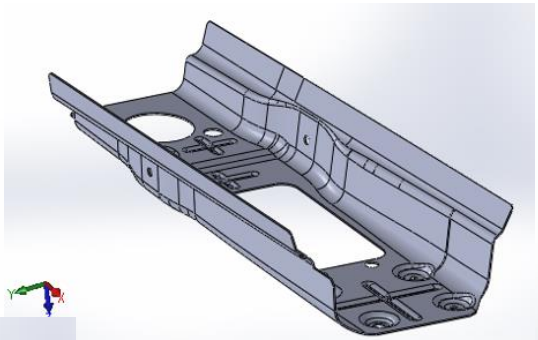
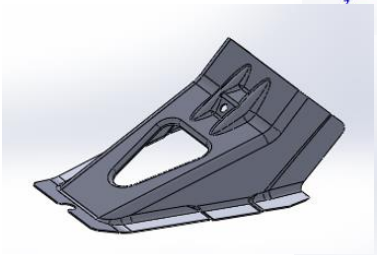
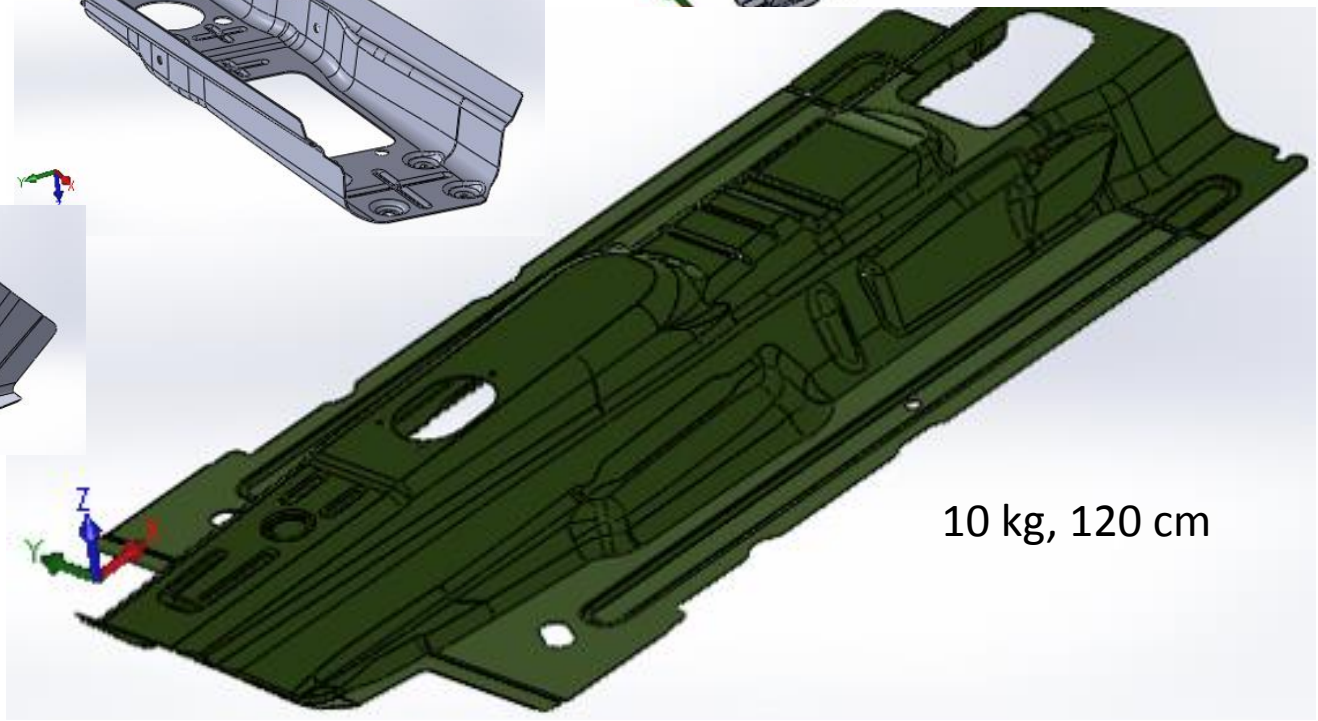




1 kg, 20 cm



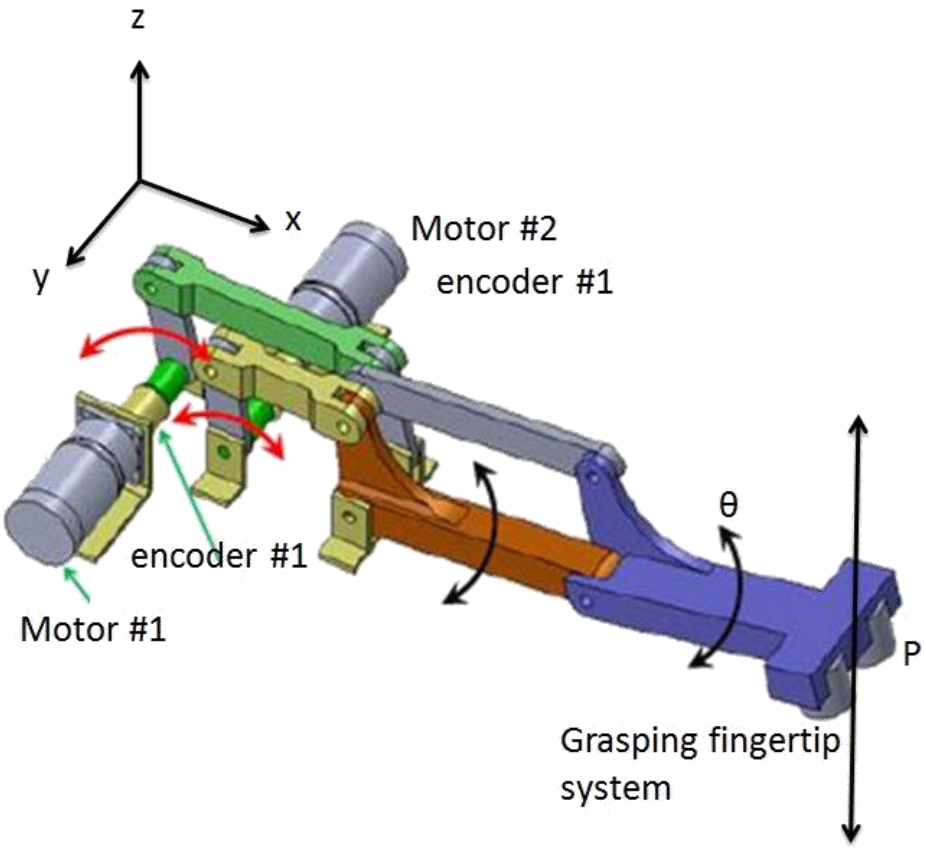


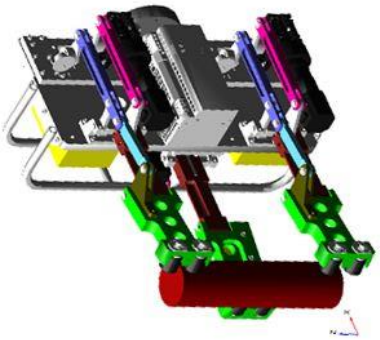


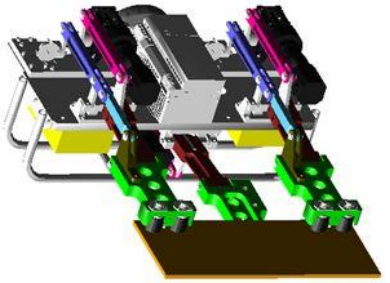
10 kg, 120 cm

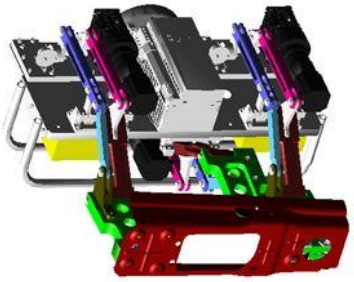
A dexterous gripper

design









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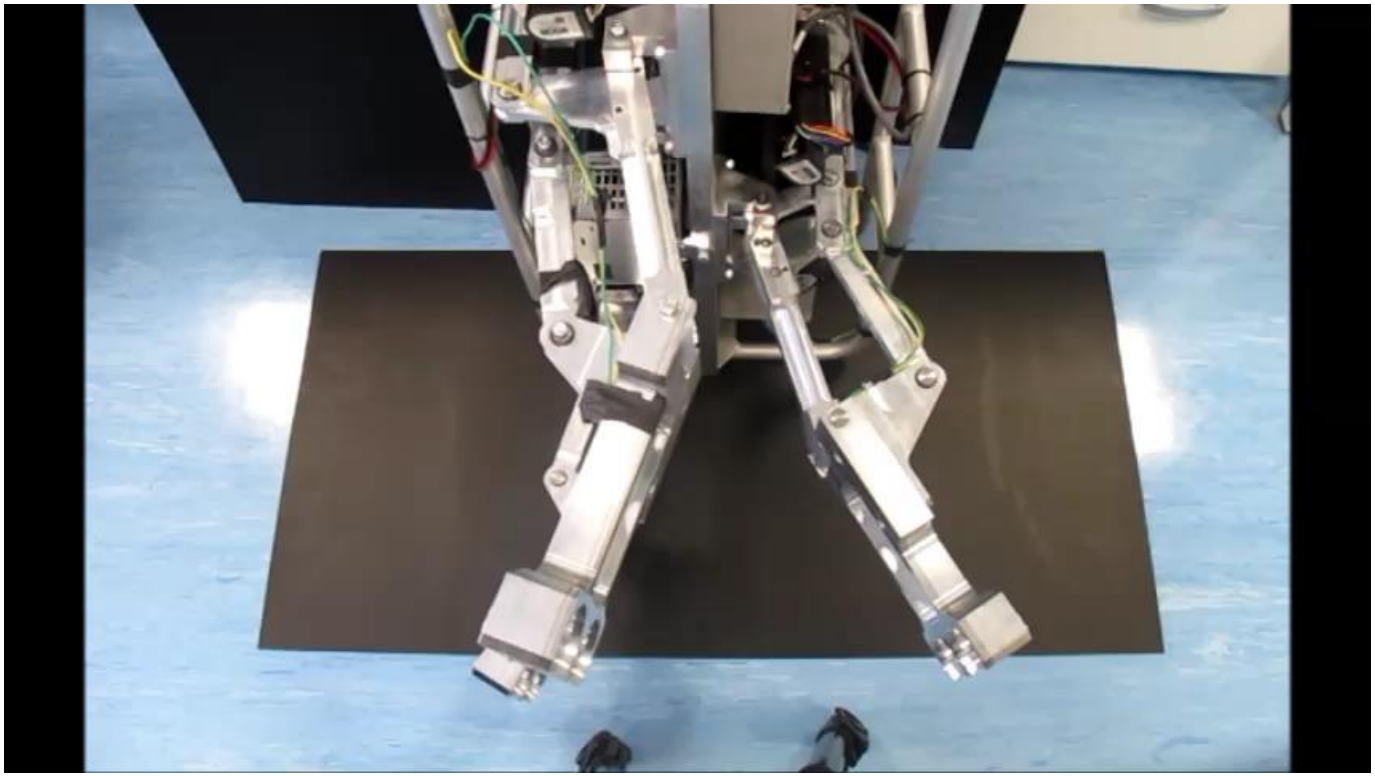

A dexterous gripper

prototype

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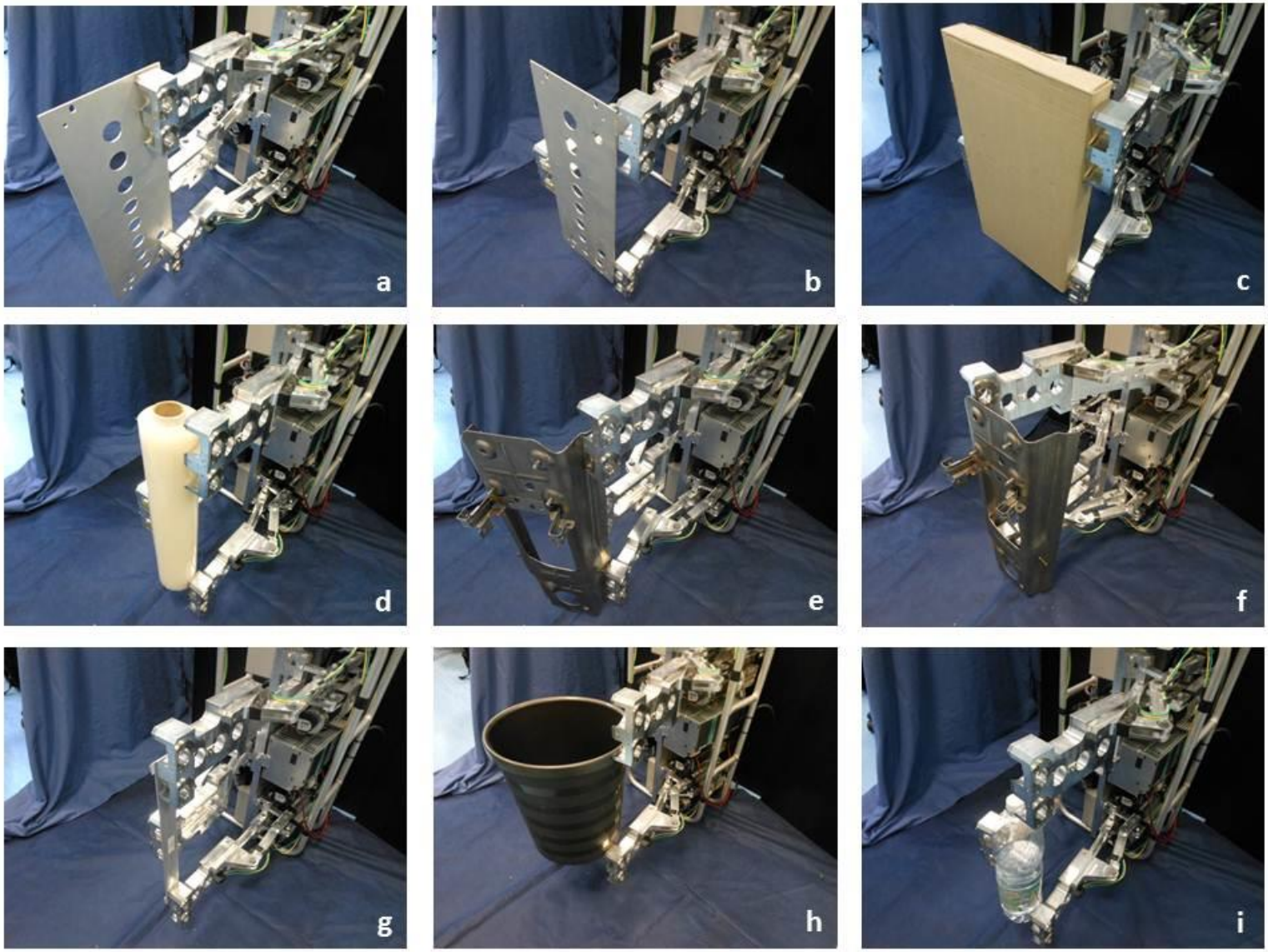

A dexterous gripper

prototype

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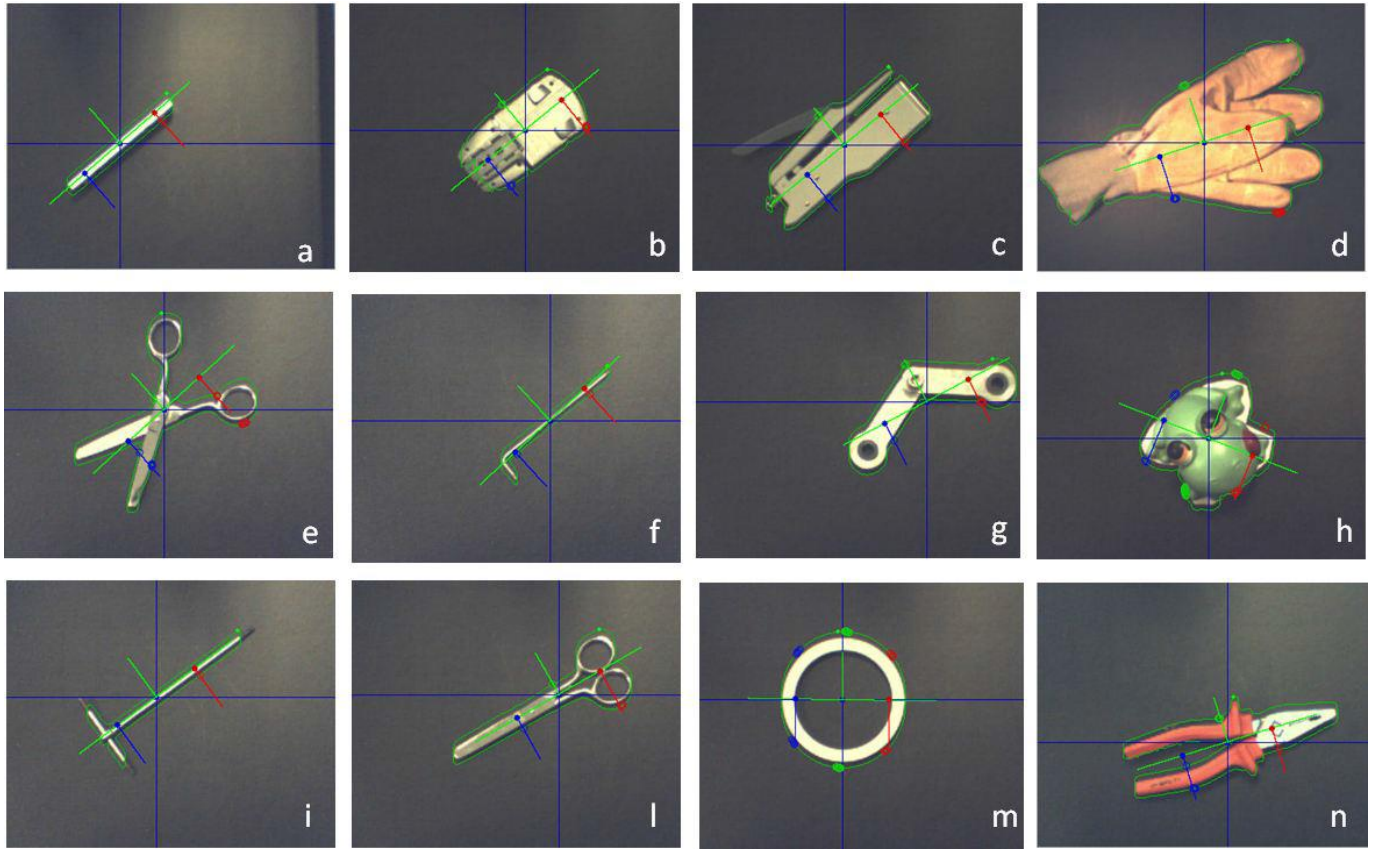
• The autonomous capabilities and the dexterity can be used to grasp parts into semi-autonomous way:



CONCLUSIONS

- A dexterous gripper has been described

- The gripper has been designed to be suitable in industrial environments

- Equipped with three fingers, each one having 2 DOF, the gripper is able to grasp parts with regular or irregular shapes in a wide range of sizes and weights

- The gripper can work as a standard tool actuated by external commands, or it can be integrated with a vision system

CONCLUSIONS

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Thanks for you attention!