Dexterous Gripper for Industrial Manufacturing

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OUTLINE

- 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?

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?
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

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

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

The challenge
One gripper to grasp ‘em all...

1 kg, 20 cm

10 kg, 120 cm
A dexterous gripper design
A dexterous gripper prototype
A dexterous gripper prototype

- 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

Thanks for your attention!