Research Article

Available Online at: www.ijpir.com

International Journal of Pharmacy and Industrial Research

ISSN	Print	2231 – 3648
	Online	2231 – 3656

ENHANCING THE ARCHITECTURAL DESIGN OF AI-INDUSTRIAL HEALTH CARE RESEARCH ROBOTS

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Abstract
In the modern technological era, the usage and utilization of Artificial Intelligence Enabled industrial healthcare Robots is inevitable. In industrial applications, the robots perform a wide role from lifting the objects up to fix all the components in a suitable framework. They lift massive objects, move with blurring speed, and repeat complex performances with correct precision. Still an outside of carefully controlled settings, even the most sophisticated robot would be unable to get you a glass of water. The everyday manipulation tasks the take for granted would stump the greatest robot bodies and brains in existence of current application of day to day life. Manipulation for Human Environments and production of the necessary products as well as the research applications. In this paper to focus on the proposal of improving the architectural design of Artificial Intelligence Enabled Industrial robots.

Keywords: Industrial, Robots, Artificial Intelligence, Architecture and Design.

Introduction
Commercially available robotic toys and vacuum cleaners inhabit the living spaces, and robotic vehicles have raced across the desert. These successes appear to foreshadow an explosion of robotic applications in the daily lives, but without advances in robot manipulation, many promising robotic applications will not be possible. Whether in a domestic setting or the workplace, would like robots to physically alter the world through contact. Robots have long been imagined as mechanical workers, helping us in the daily life. Research on manipulation in human environments may someday lead to robots that work alongside us, extending the time an elderly person can live at home, providing physical assistance to a worker on an assembly line, or helping with household chores. To date, robots have been very successful at manipulation in simulation and controlled environments such as a factory.

Outside of controlled environments, robots have only performed sophisticated manipulation tasks when operated by a human. Within simulation, robots have performed sophisticated manipulation tasks such as grasping convoluted objects, tying knots, and carrying objects around complex obstacles. The control algorithms for these demonstrations often employ search algorithms to find satisfactory solutions, such as a path to a goal state, or a set of contact points that maximize a measure of grasp quality. For example, many virtual robots use algorithms for motion planning

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that rapidly search for paths through a state space that models the kinematics and dynamics of the world.[1]

Most of these simulations ignore the robot's sensory systems and assume that the state of the world is known with certainty. For example, they often assume that the robot knows the three-dimensional (3-D) structure of the objects it is manipulating. Within controlled environments, the world can be adapted to match the capabilities of the robot. For example, within a traditional factory setting engineers can ensure that a robot knows the relevant state of the world with near certainty. The robot typically needs to perform a few tasks using a few known objects,[2] and people are usually banned from the area while the robot is in motion. Mechanical feeders can enforce constraints on the pose of the objects to be manipulated. In the event that a robot needs to sense the world, engineers can make the environment fathomable to sensing by controlling factors such as the lighting and the placement of objects relative to a sensor. Moreover, since the objects and tasks are known in advance, perception can be specialized and model-based. Factories are not the only controlled environments in which robots perform impressive feats of manipulation.[3]

Researchers often simplify the environments in which they test their robots in order to focus on problems of interest. So far, successful demonstrations of research robots autonomously performing complicated manipulation tasks have relied on some combination of known objects, simplified objects,[4] uncluttered environments, fiducially markers, or narrowly defined, task-specific controllers.

Related work

A. Operated by Human

Outside of controlled settings, robots have only performed sophisticated manipulation tasks when operated by a human. Through teleoperation,[5] even highly complex humanoid robots have performed a variety of challenging everyday manipulation tasks, such as grasping everyday objects, using a power drill, throwing away trash, and retrieving a drink from a refrigerator (Fig. 1). Similarly, disabled people have used wheelchair mounted robot arms, such as the commercially available Manus ARM (Fig. 2), to perform everyday tasks that would otherwise be beyond their abilities. Attendees of the workshop were in agreement that today's robots can successfully perform sophisticated manipulation[6] tasks in human environments when under human control, albeit slowly and with significant effort on the part of the human operator. Human environments have a number of challenging[7, 8] characteristics that will usually be beyond the control of the robot's creator. The following list briefly describes some of these Characteristics.

- People are present: Users who are not roboticists may be in the same environment and possibly close to the robot.
- Built-for-human environments: Environments and objects will usually be well-matched to human bodies and capabilities.
- Other autonomous actors are present For example; pets and other robots may be nearby.
- Dynamic variation: The world can change without the robot taking action.
- Real-time constraints: In order to interact with people and match the dynamics of the world, the robot must meet real-time constraints.

Variation in object placement and pose[9, 10] for example, an object may be placed in a cabinet, on a table, in a sink, in another room, or upside down.

Fig. 01: Retrieval of Drinks from refrigerator

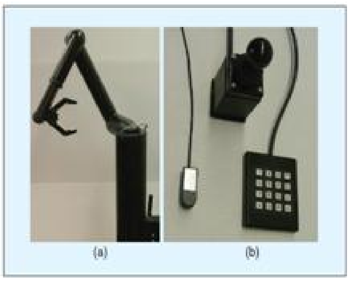

Fig. 02: Manus ARM –Commercial product

For example, lighting variation, occluding objects, background sounds, and unclean surfaces are not uncommon. People handle these issues daily. If you were at a friend's house for the first time and you were told to get a drink out of the refrigerator, you would most likely have no difficulty performing the task even though at some level everything would be different from the previous experiences. In fact, most cooks could walk into a well-stocked kitchen that they've never seen before and cook a meal without assistance. Although robots should not need to have this level of capability to be useful, a human's great facility with such dramatic variation has a very real impact on the types of environments people inhabit.[3]

Proposed architectural design

The major components of AI enabled Industrial Robots (AIIR) are; processing segment and memory. In general, the objects comes closer to the vision contact of robots are undergone for segmentation by using any one of the image processing segmentation techniques. Thereafter, it will be stored into the memory for future references. The following block diagram (Fig. 3) illustrates the proposed architectural design of AIIR;

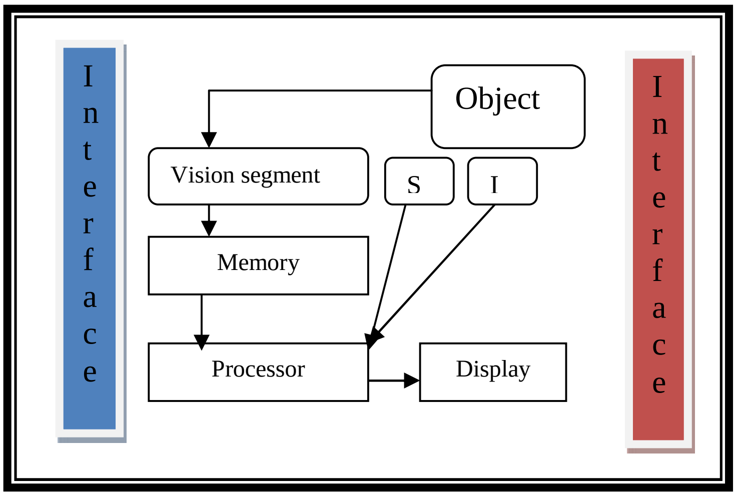

Fig. 03: Architecture of AIIR

The object comes closer to the vision segment will be transferred into the memory for store and process operational feature. The processor takes referential objects from the memory and makes the segmentation of the object by using any one of the digital image processing segmentation algorithm.

The segmentation having two parts: segmented object and the indexing for the segmented components. The required objects will be processed by the processing unit and to display the result as per the client requisition. For this reason, the 100 percentage of success will depends on the storage classification process and if the object is new , then immediately allocate a new storage for the incoming object and display the message " it is new in this zone" along with the similarity for the image which one is already occupied into the memory.

Conclusion and future work

In the amount of research work being done for bringing robotics into the current industry is definitely growing, although not yet very large. As has been seen, several key aspects are being addressed. Component specification are studied at NIST, hardware interfacing is done at different research laboratories. The component and architectural design concept is included in the design is very wide research area in the artificial intelligence enabled implementation of robots. However, the components are only considered to exist within the particular system and are exclusively tailored for that. Usage of such a component in another framework is then not possible without adaption. This adaption will in many cases be a too high price to pay for a potential user, and the component might well be abandoned for in-house development. It is also unlikely that the research community as a whole would agree on a common architecture for conducting research. It will be addressed in the future work as a continuation of this research work.

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