



The Rise of Intelligent Robotics and its Relevance for the future

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Abstract: Robotics is a fascinating field which is ever-changing and advancing. In this article Nishant Patnaik briefly recounts the origins and development of intelligent robotics, and hints at developments for the future. Patnaik draws conclusions from research derived from numerous sources including: text and online documents, symposiums and proceedings in order to lead to the conclusion that “the substitution of sensor based intelligence for precision and speed” will remain the main propellant to incur a necessary shift in thinking.

Keywords: Artificial Intelligence Practical Robotics Intelligent Robotics

I. INTRODUCTION

When one thinks of robotics, what initially comes to mind? Is it the artificially intelligent beings depicted in science fiction novels and movies, the personal assistants of the future, or more common place items such as machinery contained within production facilities? The answer to such a question would, of course, depend upon the individual but all would be correct. The truth is that the field of robotics is vast, and ever advancing. But where is the field advancing to? In order to discuss such a topic I will first address: the origins of practical robotics, the present status and advancements within the field, and where the future is taking us.

II. REVIEW ARTICLE TEXT

Practical robotics can trace their origins to the inside of manufacturing factories and assembly lines where precision, speed, and reliability are critical. The development of precision machines' tools inspired the development of Intelligent Robotics. Initially, robots could not be programmed using a computer, making it a challenge to change the detail of their repetitive functions. During the past decade, new technological approaches have emerged revolutionizing the design of the intelligent robotic systems [1]. The flexibility of robots to carry out sophisticated, human-like, repetitive tasks marked the emergence of Intelligence Robotics. Adapting with the environmental variation could easily be accomplished with sensor feedback leading to third generation robots [2]. In the process of robot migration out of mixed automation, fully structured and used in factories and assemblies lines into unpredictable and unstructured worlds of underwater, space, on the ground, and in the air, where several of the future applications could be imagined, it clearly emerged that a complementary range of considerable artificial intelligence and sensors would be required to attain autonomy [3]. This motivation for autonomy in unstructured, unpredictable, and sophisticated environments, which is at times cohabited by humans, emerged and is still the holy grail of robotics. This has given rise to the field of 'intelligent robotics,' where reasoning, actuation, and perception are highly integrated to complete useful tasks with less human guidance.

At present, the society has access to a rich set of complex sensors, powerful and real-time computing platforms, as well as all the various types of agile mechatronic devices. This makes it possible for the society to achieve the dream of a fully autonomous robot agent that can carry out various sophisticated tasks in unpredictable and unstructured environments, while at the same time interacting freely with human beings [4]. Even though this is yet far from being achieved, various considerable advances - especially in the areas of Artificial Intelligence have been made [5]. Various manufacturing and assembly lines, especially in the automotive industry, have been at the forefront in developing these sophisticated intelligent robotic systems to aid in the manufacturing and assembling process due to their precision and speed. Several companies such as Toyota and Honda have made considerable efforts in developing some intelligent robots used in their assembly lines. Similarly, According to National Aeronautical and Space Agency (NASA), Intelligent Robotics are used to explore remote locations, extreme environments, and uncharted worlds, as in [1]. Whether human-like or not, robots may require cooperating and communicating with humans. The issue has loomed to be a difficult challenge which needs to be addressed for human and robot interaction to be useful and natural. The concept is especially true in areas of assistive technology applications where robots are needed to help frail, aged, or otherwise disabled individuals in institutional or domestic domains.

The future in intelligent robotics is quite predictable especially considering the rapid development of new technologies. Without taking into consideration Science Fiction, the anticipations regarding intelligent robotic technology development in the next decades are quite modest [6]. Intelligent robotics are likely to be used in various practical domains such as exploration in space, oceans, deserts; public and private transport; mining in dangerous environments; security and surveillance; search and rescue missions, and firefighting; entertainment; and domestic services such as cleaning. Intelligent robotics have already made tremendous contribution in the field of medicine whereby they are used during surgery because of their precision. In most of the application domains involving robotic technology, high degrees of unstructuredness are involved, where appropriate levels of artificial intelligence

regarding sensor data fusion as well as deep understanding are needed, as in [4]. Therefore, the substitution of sensor based intelligence for precision and speed to accommodate

Robotics have come from less than humble beginnings, proving themselves to be useful and time saving from the very start. Even before they possessed the ability to receive programming via computer, they were working away in factories and production lines. The public at large is still waiting for artificial intelligence to become a reality, rather than science fiction but the technology is there and it isn't a far cry to say that it is not far beyond the horizon. Once the

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unstructuredness and uncertainty will remain the primary driving force, being the necessary paradigm shift.

III. CONCLUSION

code is cracked on how to program a machine to adapt and function well in an unstructured environment, we will begin to see these goals become reality. From factories, to emergency rooms, and maybe even to your living room or kitchen – robotics have been and will be very useful tools for production, precision, and perhaps human assistance for years to come.

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