

Biologically Inspired Robots as Artificial Inspectors - Science Fiction and Engineering Reality

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ABSTRACT

Imagine seeing an inspector conducting NDE on an aircraft and suddenly you notice something weird – this is not a real person but rather it is a robot. Your first reaction would probably be “it’s unbelievable but he looks so real” just as you would react to an artificial flower that is a good imitation. This science fiction scenario could become a reality at the current trend in developing biologically inspired technologies. Terms such as artificial intelligence, artificial muscles, artificial vision and numerous others are increasingly becoming common engineering tools. For many years, the trend has been to automate processes in order to increase the efficiency of performing redundant tasks where various systems have been developed to deal with specific production line requirements. Realizing that some parts are too complex to handle by a simple automatic system, robotic mechanisms have emerged to handle delicate and complex tasks. Aircraft inspection has benefited from this evolving technology where manipulators and crawlers are now commercially available for rapid and reliable inspection. One of the limiting factors that hampered the wide use of robotics for inspection of aircraft and other complex structures is the economical aspect of handling small quantities of complex parts. Autonomous robots, which may look like human, can potentially address the need to inspect structures with configuration that are not predetermined. The operation of such robots may take place at harsh or hazardous environments that are too dangerous for human presence. Inspired by science fiction making such robots is becoming increasingly an engineering reality and in this paper the state-of-the-art will be reviewed.