Special Issue Reprint

Robotic Non-destructive Testing

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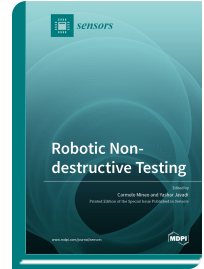
Non-destructive testing and evaluation are commonly referred to as the vast group of analysis techniques used in civil, medical, and industrial sectors to evaluate the properties of materials, tissues, components, or structures, without causing any damage. Automation offers many benefits for non-destructive testing to cope with increasing demands, including improved reliability and higher inspection speeds. Additionally, robots enable inspections in locations that are not easily accessible to human operators and allow for humans to be removed from potentially dangerous environments. However, the perceived complexity and high costs have limited the adoption of automation. As a result, the full potential that could be derived from the seamless integration of robotic platforms with sensors, actuators, and software has not been fully explored; it could still revolutionise the way that automated inspections are performed and conceived. The recent advancements in electronics, robotics, sensor technology and software pave the way for new developments in automated testing and data-driven autonomous robotic inspections in several sectors. This Special Issue aimed to attract the latest research outcomes in the field of robotic sensing. Five papers relate to inspection systems based on robotic fixed-base manipulators, three of which are associated with in-process inspection in manufacturing applications (robotic wire-arc welding and additive manufacturing). Four papers report research advancements in mobile robotic-enabled sensing.

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