THE ANNALS OF "DUNAREA DE JOS" UNIVERSITY OF GALATI
FASCICLE XII, WELDING EQUIPMENT AND TECHNOLOGY, ISSN 1221–4639
YEAR XX, 2009

ARTIFICIAL INTELLIGENCE IN WELDING PROCESSES

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ABSTRACT

The paper presents some modern approaches recently applied, in order to conceive command systems for electric arc welding equipment based on intelligence techniques similar to human thinking.

Artificial intelligence initial approaches are based on techniques which nature created in time, as for example genetic algorithms, self-improving progressive strategies, cellular automate and neural systems.

Because of the imposed working speed on the present artificial intelligence and cognitive computation techniques, there were three approaches imposed in order to accomplish the intelligent control of the welding equipment: expert systems, systems based on fuzzy logics and artificial neural networks. After analyzing the structure and the components of the expert systems used for welding, the paper presents the applications on fuzzy logics, the functioning steps of a fuzzy controller and classic controllers fuzzy equivalence.

Expert and fuzzy logics systems influences experts' knowledge and offer solutions based on their own experience, whereas neural networks perform self-instruction, establishing correlations between different tasks after the analysis of experimental data and examples, without the expert's intervention. In order to facilitate their understanding, the presentation of all these artificial intelligence techniques is accompanied by concrete exemplifications from the welding area.

KEYWORDS: welding, artificial intelligence, fuzzy logic, neural networks, expert system.

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