Perception, Control and Development Trend of Intelligent Unmanned Systems

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Abstract

With the application of cutting-edge technology in the military domain, intelligent unmanned systems will emerge as the primary equipment for future warfare. Perception and control technology play a pivotal role in enhancing the combat effectiveness of unmanned systems. The report aims to present an overview of the development trend in perception and control technology for intelligent unmanned systems, covering background, significance, research status, challenges and key technologies. The concept, advantages and status of intelligent unmanned systems based on actual combat scenarios are introduced firstly, and the typical examples of unmanned combat equipment across air, land, water and underwater domains are reviewed. Secondly, driven by the challenges faced by intelligent unmanned systems in demanding battlefields such as complex environment, intense confrontations, real-time response and incomplete information, critical technologies on environment-perception, decision-making, swarm-collaboration and human-computer interaction are elaborated in the report. Finally, the trend of intelligent unmanned systems is summarized and prospected.

Yaonan Wang is an Academician of Chinese Academy of Engineering, and an expert in robotic and intelligence control. He is serving as a professor of Hunan University and the director of National Engineering Research Center of RVC. He is currently a member of China Association for Science and Technology, the President of China Society of Image and Graphics, a CAA Fellow (Chinese Association of Automation), a CCF Fellow (Chinese Computer Federation Fellow) and a CAAI Fellow (Chinese Association for Artificial Intelligence Fellow), the vice chairman of the council of China Artificial Intelligence Robot Industry Alliance, a member of the Expert Advisory Committee of the National Natural Science Foundation of China, a standing director of CAA, a supervisor of CAAI, a member of the executive committee of Artificial Intelligence and Block Chain Technology in Ministry of Education, and the chairman of the council of Hunan Association of Automation. He was the specialist in intelligent robot area of "863 Plan", and the chief scientist of EU Fifth Framework International Cooperation Major Project. He has long been engaged in research and teaching work of robot perception, control technology and engineering application. He won 1 second prize of the National Technological Invention Award, 4 second prizes of the National Science and Technology Progress Award, and 12 first prizes of the provincial/ministerial level award. Moreover, he has published more than 200 papers indexed by SCI, published 15 scientific books, obtained more than 90 invention parents, and cultivated more than 80 doctoral students. He has won the national millions of talent project, outstanding humboldt scholar,

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