共 同 研 究 成 果 報 告 書

提出日：2019 年　9　月　30　日

名城大学　学長　殿

受 入 引 受 教 員 （共同研究者）	所 属 ・ 職 名	理工学部・教授
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研 究 員 氏 名	王　玉鵬（オウ　ギョクホウ）	
共 同 研 究 期 間	2019 年 6 月 1 日〜　2019 年 8 月 31 日（3 ヶ月 0 日間）	

共 同 研 究 要 旨	高齢者のケア、高齢化した障害者のリハビリテーションなどについて、日本、中国のような高齢化社会では重要課題として位置づけ,共同研究を行うべきであると思う。介護者の負担軽減を図るための研究も行われている．介護ロボットを普及するために以下の研究を行う。 (1)介護現場ニーズを調査研究 介護従事者の負担軽減の観点から、日本・中国介護現場においてロボット技術で解決すべき問題を調査する。 (2) 介護施設内の巡回ロボットについて基本要素技術について調査・研究 介護現場で実際に使えるロボット介護機器の導入を進めることにより、高齢者の自立支援、介護実施者の負担軽減を通して、巡回ロボットを調査する。
共 同 研 究 成 果	王先生は 2019 年 6 月 1 日から 2019 年 8 月 31 日まで 3 ヶ月の間に、以下の項目で調査研究を行った。 (1) 上肢リハビリテーションロボットの調査 (2) 手リハビリテーションロボットの調査 (3) 下肢リハビリテーションロボットの調査 (4) インテリジェント車椅子の調査 また、ロボット工学の発展に伴い、小型化と軽量化だけでなく、実用性に近い人工知能ロボットが継続的に開発され、人々に役に立つための知的支援機器とリハビリテーションロボットの開発が必要である。

（提出先：名城大学国際化推進センター）

共 同 研 究 終 了 報 告 書

提出日：2019年 9月 30日

名城大学　学長　殿

研 究 員 氏 名	王　玉鵬（オウ　ギョクホウ）	
研 究 期 間	2019年6月1日〜　2019年8月31日（3ヶ月0日間）	
受 入 引 受 教 員 （共同研究者）	所 属・職 名	理工学部・教授
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研 究 課 題 名	The Development of robot for old age care and rehabilitation
研 究 結 果	The Development of robot for old age care and rehabilitation 　　With the consent of the school，I was fortunate enough to be invited by Professor Yang Jianming from Meijo university to Japan for a three-month visit (2019.6.1〜2019.8.31). During my visit, I studied the related technology of robot for old age care and rehabilitation. Now I made the following report on my visit and study. 　　The rehabilitation robot is a new type of robot. It belongs to the scope of medical robots. It is divided into rehabilitation robot and assisted rehabilitation robot. The rehabilitation robot's main function is to help patients complete the recovery of motor function training, such as walking training, arm training, spine training, neck training and so on. Through doing thousands of repetitive motion to drive limb training, rehabilitation robot can stimulate and rebuild the nerve of the controlled limb movement, thereby restores limb motor function, this way is a new clinical intervention way. 　　(1) Upper Limb Rehabilitation Robot 　　The laboratory of Professor Yang Jianming have conducted research for a force feedback teleportation robotics and web-based remote upper limb rehabilitation robot. The laboratory of Professor Yang Jianming successfully developed a practical remote upper limb rehabilitation system, and also successfully developed the human neuromuscular electrical signal intelligent detector and EEG detector. In recent years, Many rehabilitation robots have been successfully developed, for example composite motion of shoulder and elbow rehabilitation robot, shoulder rehabilitation robot and hand rehabilitation robot and others, and clinical application were done, and preliminary results have been observed in the rehabilitation of the old hemiplegic patients; two-bar linkage rehabilitation device, 5 DOF upper limb rehabilitation robot, upper extremity hemiplegia rehabilitation robot and motor function rehabilitation robot have been developed.

(2)Hand Rehabilitation Robot

The laboratory of Professor Yang Jianming developed some of the non-market-oriented training devices, such as the hand function rehabilitation bionic gloves using stimulating electrodes for functional electrical stimulation on the muscles. The technology of wearable multi-degree-of-freedom hand function rehabilitation robotics mainly contains the development of hand rehabilitation robot prototype, cooperative control of the patients with active intent, virtual reality technology and so on. The laboratory carried out research for the technology of the rehabilitation robotics remote operation, successful researched the practical remote upper limb rehabilitation system, EMG signal intelligent detector and EEG intelligent detector.

(3)Lower Limb Rehabilitation Robot

Lower limb rehabilitation robotics is the international forefront of technology. The laboratory of Professor Yang Jianming has made great breakthroughs in many aspects such as the new mechanism design, control strategy, supple drive and control, human-computer interaction, virtual reality, biofeedback adaptive and so on. Research results have recumbent position lower limb rehabilitation robot, multi-function walker robots.

(4) Intelligent Wheelchair

The smart wheelchair is the electric wheelchair applying intelligent robot technology, the integration of a variety of areas, including machine vision, robot navigation and positioning, pattern recognition, multi-sensor fusion, and user interface. The intelligent wheelchair is also known as intelligent wheelchair mobile robot or wheelchair-based rehabilitation robot.

The automatic navigation intelligent wheelchair developed by the laboratory of Professor Yang Jianming is the smart wheelchair with a visual and password navigation features and voice to interact with people. The basic functions of the system of intelligent indoor electric wheelchairs helping move is: you can change the attitude to meet the need of the user for lying, sitting and standing; you can take advantage of the visual servo technology independent traffic bedstead; up and down the stairs.

With the development of robotics, artificial intelligence robot, which is not only miniaturization and lightweight, but also closer to practical is continually developed. People are looking forward to the future of intelligent assistive devices and rehabilitation robot.

（国際化推進センター処理欄）