

TOP 10 RESEARCH
ACHIEVEMENTS

Gold and Bronze Medalists in Cybathlon 2020: The Fastest and the Most Versatile Wearable Robot in the World

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The Cybathlon 2020, an international competition for innovative assistive robot technologies for people with disabilities, was held for Korean teams at KAIST on November 13. The teams Angel Robotics 1 and 2, both from the Robotic Systems Control Laboratory and a robotics startup company led by Professor Kyoungchul Kong of the Department of Mechanical Engineering, competed against twelve other international teams and placed the first and the third.

1. Background

The development of medical and rehabilitation technology has increased the life expectancy of the spinal cord injury (SCI) patients. The robotic technologies for these people have an ample room for development in that the current ones are yet to be fully and naturally incorporated into the wearers' daily lives. The blueprint of those improvements should mainly be focused on accomplishing the agility and versatility, which are the essential prerequisites for carrying out the various tasks in our daily lives. Accordingly, a research team in KAIST sets a goal to create the most functional wearable robots for the people with disabilities and to evaluate the technical performance via the global competition in Cybathlon 2020.

2. Key features

The factors that make the WalkON Suit the fastest and the most versatile wearable robot in the world.

Highest walking speed among wearable robots

The exoskeletal walking had been too slow for the daily lives, not even being able to assist in crossing the crosswalk for the given period. The walking speed of WalkON Suit is now similar as the normal walking speed, i.e., 0.84m/s, which is the world record.

Faster task completion time than those of the powered wheelchairs

The wheelchairs have been widely used as an equipment for the movement of the people with disabilities. The results of Cybathlon 2020, however, verify that the agility of the WalkON Suit in completing the tasks match those of the powered wheelchairs, even superior for some tasks.

Descending stairs while facing forward, one stair per step

As walking down the stairs has been the most challenging task, other research teams had chosen a way to walk backward. This method, however, is dissimilar to the natural human motion nor is it practical for the daily lives of people. The team of KAIST successfully developed the technology of walking down one stair per step.

The aim of benefiting more people with our technology

The assistive methodologies and hardware components are not intended for the usage of just one person; it rather has been directed toward a more widespread usage by the public. We have enriched our research by the help of six disabled participants in preparation for the competition.

3. Summary of the global competition

Rank	Research Team	Race 1		Race 2		Race 3	
1	KAIST	100	4m 46s	100	3m 57s	100	3m 47s
2	Twice	100	5m 21s	100	4m 40s	100	4m 49s
3	KAIST	100	6m 11s	100	6m 39s	100	5m 51s
4	IHMC Robotics	85	6m 00s	100	6m 51s		

The results of the powered exoskeleton race in Cybathlon 2020 are given in the table. Our team won both the gold and bronze medal by carrying out all of the 6 tasks without any failure while accomplishing the best record among all the teams.

4. Expected effects

The competition in Cybathlon 2020 further accelerated the advancement of robotic technology. People with disabilities such as complete paraplegia, spinal cord injuries, etc., are expected to be more capable of utilizing the most advanced technologies in motion assistance. In the near future, the wearable robots may improve the quality of lives of our target users and assist in them achieving more in their lives. With the accomplishment in Cybathlon 2020, we have proved that this future is near us in KAIST, Korea.



Research outcomes

[Award] Gold medal in Powered Exoskeleton Race of Cybathlon 2020
 Bronze medal in Powered Exoskeleton Race of Cybathlon 2020

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