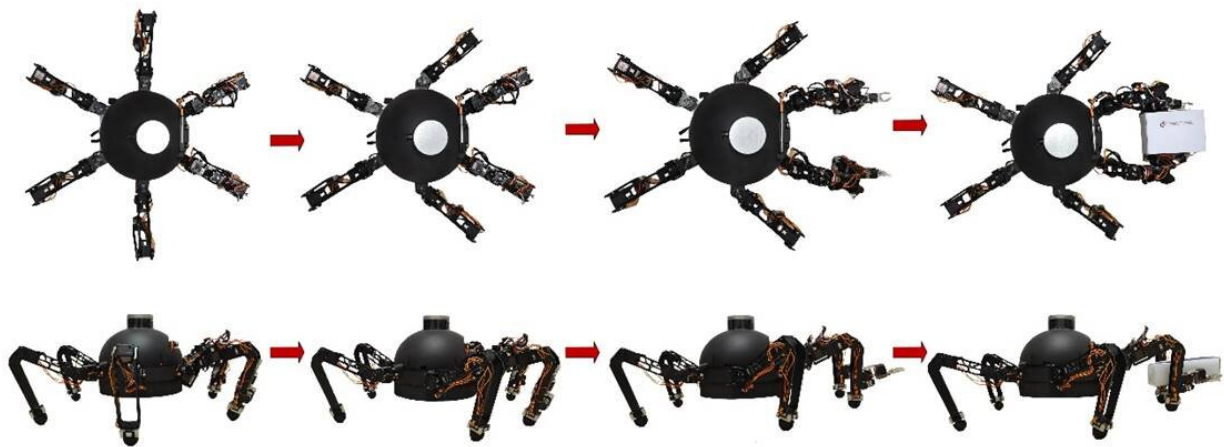


The ALLOMAN hexapod robot is a novel multifunctional platform with leg-arm integration

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ALLOMAN utilizes two leg-arm integration limbs to perform the coordinated clamping task. Credit: Yi Zheng, Kun Xu, Yaobin Tian, Xilun Ding

A research group from Robotics Institute of Beihang University, China has developed a novel multifunctional hexapod robot with leg-arm integration, named ALLOMAN (Arm-Leg Locomotion and Manipulation). This robot possesses various "fixed" manipulation functions besides locomotion, and the researchers have achieved mobile manipulation function on this robot successfully, which is difficult for legged robots. Their study can be found in the journal *Frontiers of Mechanical Engineering* on 8 April, 2022.

With the widespread application of legged robots in various fields, the demand for robots with flexible manipulation ability is increasing. As the implementation of manipulation for most legged robots requires adding an extra arm, this design could result in adverse performance, such as high costs, low efficiency and poor flexibility. Hence, the research group proposes a novel limb design based on "limb mechanism," which is equipped with different end-effectors to improve the [robot](#)'s working performance. The hexapod robot performs the coordinated clamping function, and besides clamping, shearing and coordinated shearing functions can be realized as well.

In addition to [locomotion](#) and "fixed" manipulation, mobile manipulation (manipulating while moving, not manipulating after moving) is a valuable research topic that can improve the motion flexibility of the legged robot. "Manipulating while moving is an effective way for an animal to increase efficiency and gain time. For the novel hexapod robot presented in this study, due to the leg-arm integration mechanism and the high fault tolerance of the limbs, the robot can evidently achieve mobile manipulation function," said associate professor Kun Xu, an author of the study. The research group of Profs. Xilun Ding and Kun Xu is one of the pioneer research groups studying intelligent legged robots in China. This research group has been performing related research for more than 20 years, and has realized plentiful theoretical research and application achievements. The group-owned Multi-mode Mobile Manipulating Robot Lab possesses a strong technological base and discipline advantage.

"ALLOMAN [hexapod robot](#) is an experimental prototype at present and it's still far from perfect. Next, we will focus on the improvement of prototype development and the implementation of more manipulation functions. This work is being advanced step by step and will be applied in many fields, which is in urgent need of multifunctional platform[s] such as city security, antiterrorism manipulation, and planetary

exploration in the near future," Ding said.

More information: Yi Zheng et al, Different manipulation mode analysis of a radial symmetrical hexapod robot with leg—arm integration, *Frontiers of Mechanical Engineering* (2022). [DOI: 10.1007/s11465-021-0664-0](https://doi.org/10.1007/s11465-021-0664-0)

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