

## Study on the brain mechanism in visual assistance for the blind

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### Abstract

There are a very few people have the ability to “see” the surroundings by the echoes, which is called echolocation. The study of the brain mechanism of echolocation can not only help to improve the blind assistance device, but also provides a window into the research of brain's plasticity. In this presented paper, we developed a wearable system to transform the spatial information captured by camera into a voice description and feed it back to users which is inspired by echolocation. After training, users can sense the surroundings by using the acoustic the feedbacked from the blind assisting device. Compared with natural echolocation, it's easier to learn and be applied in daily life. In addition, the device achieves higher resolution. In this study, two trained blind subjects and two non-trained sighted volunteers were tested by using functional magnetic resonance imaging (MRI). We obtain the fMRI images of subjects' brain activity when they were listening to the sound of the wearable prototype. Intriguingly, we find that after training with the blind assistance system, the blind' visual area of the brain have been activated when they are dealing with the acoustic feedback from the device.

### Biography:



**Yaozu Ye** was born in China in 1996. He received the bachelor's degree from Zhejiang University in 2018, and is currently a Ph.D. candidate at the College of Optical Science and Engineering, Zhejiang University, China. His current research interests are visual-to-auditory sensory substitution mappings and blind assisting device.



**Kaiwei Wang** received his BSc and PhD degree in 2001 and 2005 respectively, both at Tsinghua University, Beijing, China. He joined the Centre for Precision Technologies, University of Huddersfield, in October 2005 as a postdoctoral Research Fellow under the support of International Incoming Fellowship awarded by the Royal Society and then by EPSRC of UK. From 2009, he has been working with Zhejiang University as an associate professor. To date his research has been primarily concerned on intelligent guide for the visually impaired.