Docket #: S14-059

WiDeo: A Motion Tracing Camera using WiFi Signals

Researchers in Prof. Sachin Katti's laboratory have designed and implemented WiDeo, a motion tracing camera using WiFi signals as the light source. This novel system enables accurate, high resolution, device-free human motion tracing in indoor environments using WiFi signals and compact WiFi radios. It can track fine grained motion of humans through walls and other objects without the need for any wearable device on the human body. WiDeo has been prototyped using off-the-shelf software radios. Studies show that it accurately traces motion even when there are multiple independent human motions occurring concurrently (up to 4) with a median error in the traced path of less than 12cm. WiDeo has broad applications such as security, navigation, search and rescue, and people monitoring.
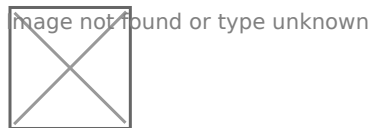
Figure

Figure description - WiDeo in operation: The compact WiFi AP in the study integrates WiDeo's motion tracing functionality, and can reconstruct the hand movement made by humans in the living room. WiDeo traces motion even though the AP is separated by a wall and does not have a LOS path to the humans, and doesn't require that the humans have any RF devices on them.

Stage of Research

- Experimental prototype tested
- Building practical prototype to demonstrate capabilities in real time

Applications

- Security
- Navigation
- Search and rescue operations
- Gesture recognition
- Elderly and child monitoring

Advantages

- **Accurate**
- **High resolution**
- **Penetrates walls and other objects** as RF signal penetrates most materials used for partition in office or home.
- **No wearable device on body required** - The system can track fine grained motion of human without the need for any wearable device on the body.

Publications

- Patent Publication [WO/2015/168700](#)
- Joshi, K., Bharadia, D., Kotaru, M., & Katti, S. WiDeo: [Fine-grained Device-free Motion Tracing using RF Backscatter.](#)Proceedings of the 12th USENIX Symposium on Networked Systems.Design and Implementation (NSDI '15). May 4–6, 2015, Oakland, CA, USA.

Patents

- Published Application: [WO2015168700](#)
- Published Application: [20170090026](#)
- Issued: [11,209,536 (USA)](#)

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