A through-the-wall radar, built on a chip smaller than a grain of rice, has been developed by a team of researchers at the Indian Institute of Science (IISc), led by Gaurab Banerjee, Associate Professor at the Department of Electrical Communication Engineering.

Developed using Complementary Metal Oxide Semiconductor (CMOS) technology, this radar has a single transmitter, three receivers, and an advanced frequency synthesizer capable of generating complex radar signals, all packed together into a tiny chip. Its small size can enable mass production at a low cost. Such radars have wide-ranging applications in the defense sector, as well as areas such as healthcare, transportation and agriculture.

"Only a handful of countries in the world today have the ability to put the entire electronics of a radar on a chip," says Banerjee.
TWR radar package in its test board with the chip placed on top for comparison. Credit: ARSL, IISc

Although the chip was originally developed for airport security-related applications, Banerjee's group is also exploring applications in other areas such as healthcare.

For instance, it can be used to monitor the health of elderly people. There are more than 100,000,000 elderly people in India, with many living on their own. If they slip and fall, and it goes undetected, it can lead to severe long-term problems.

Although cameras and wearables have been used to monitor their movements, there are concerns about privacy and inconvenience. TWR radar systems, therefore, offer a convenient alternative.

"It might be possible for a centrally-placed TWR system to scan the house, and construct a model of..."