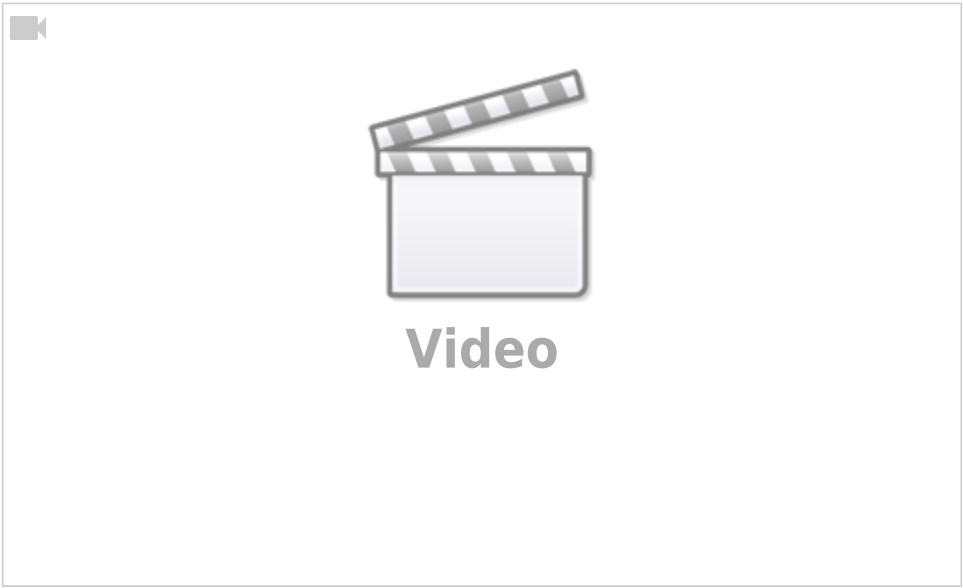
ESP32 Antenna Array Can See WiFi



From the youtube video description:

> More information is available on the project website of the ESP32 antenna array “ESPARGOS”: https://espargos.net/
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> Source code for Python library + demos: https://github.com/ESPARGOS/pyespargos (directory “demos/camera” for “WiFi camera” demo)
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> As a research assistant at the Institute of Telecommunications at the University of Stuttgart, I work on multi-antenna systems like (distributed) massive MIMO, with a focus on wireless channel measurement platforms and algorithms for processing channel measurements (classical and deep learning-based).
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> One day, my (incredibly talented) colleague Marc Gauger suggested to use ultra low-cost ESP32 chips instead of software defined radios for channel measurements. I was highly sceptical at first, but when he showed me a minimalistic prototype he had soldered together, I was intrigued by the idea of being able to demonstrate my algorithms in real time using WiFi signals. In a series of Bachelor's / Research theses, my excellent students Tim Schneider, David Engelbrecht and David Kellner helped me develop the ESP32 antenna array “ESPARGOS”.
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> Measured CSI dataset used for AoA / TDoA visualization: https://espargos.net/datasets/data/es... AoA / TDoA localization source code (needs some minor modifications to be applied to espargos-0005 dataset): https://github.com/Jeija/ToA-AoA-Augm... Channel Charting source code for the animation in the video: https://github.com/Jeija/Geodesic-Unc... Tutorial on Channel Charting: https://dichasus.inue.uni-stuttgart.d...
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> My research on (distributed) massive MIMO, Channel Charting and other algorithms for multi-antenna systems is funded by the German Federal Ministry of Education and Research (BMBF) within the project Open6GHub (grant no. 16KISK019). I also want to express my gratitude towards ARENA2036, who hosted our measurement campaign for Channel Charting, and to my colleague and Channel Charting expert Phillip Stephan, with whom I co-authored several papers on Channel Charting and who assisted me with the creation of this video.