UNIVERSITÀ DEGLI STUDI DI PADOVA

MIMOSA - A data-driven context-adaptive channel sounding method for large-scale multiple-input multiple-output (MIMO) systems to boost next-generation Wi-Fi network efficiency

The digitalisation of society is leading to the creation of virtual worlds where people can meet, work, and access services remotely. This calls for fast and reliable wireless connectivity to provide Internet users with a fully immersive experience. While Wi-Fi is ubiquitously being used for indoor connectivity, current networks are unable to fulfil the data rate requirement of emerging applications and the massive service request of the huge number of Wi-Fi terminals, which are growing at a rate of more than 4 billion devices per year. The multiple-input multiple-output (MIMO) technology would theoretically make Wi-Fi able to meet such requirements by concurrently transmitting several data streams via multiple antennas. However, the airtime overhead imposed by the periodic exchange of control data for channel sounding – the procedure that enables MIMO transmissions – does not scale well with an increasing number of antennas. To address this daunting challenge, MIMOSA will lay the technical and scientific foundations of a new method for MIMO channel sounding that will drastically reduce the airtime overhead. MIMOSA will research and develop advanced signal processing and deep learning algorithms to customise the sounding to the specific MIMO deployment and propagation environment, while controlling the computational complexity based on the required communication performance. MIMOSA's sounding will enable the efficient implementation of large-scale MIMO, which allows serving multiple devices simultaneously without impacting the network energy budget. This will help reach the EU's Digital Decade target of providing all households with Gigabit connectivity through sustainable networks by 2030. The research will be conducted at Northeastern University (USA) and the University of Padova (Italy). MIMOSA's sounding will be designed and evaluated via extensive data-collection campaigns with custom testbeds and commercial Wi-Fi devices available at the two institutions.

UNIPD Supervisor: Michele Rossi
MSCA Fellow: Francesca Meneghello
Department: Information Engineering
Coordinator: Università degli Studi di Padova (Italy)
Total EU Contribution: Euro 396.991,08
Call ID: HORIZON-MSCA-2024-PF-01
Project Duration in months: 36
Find out more: https://cordis.europa.eu/projects/en