

# W PitchD W

the PhD's pitch



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Our PhD members explain to students, colleagues and professors...

## An Optimized Compressed Sensing Decoder based on Deep Neural Support Prediction



*Mr. Luciano Prono, PhD Candidate, DET.*

Compressed Sensing (CS) is a widely researched technique employed to lower energy consumption of signal acquisition. It is especially suited for naturally sparse signals such as human body biosignals. These type of signals can be linearly mapped on a lower dimensional space through a simple vector-matrix multiplication. From this, the recovery of these signals can be partitioned in two steps: support estimation phase (i.e., the retrieval of the positions of the coefficients in the sparse vector) and coefficient estimation phase. Support estimation can be performed with an oracle based approach on a deep neural network. The output of the oracle can be then used to estimate the coefficient by solving the Least Mean Square (LMS) problem. This approach allows the definition of an encoder-decoder pair with state-of-the-art recovery capabilities when applied to biological signals such as ECG and EEG.

## A Possible Solution to Stabilize the Future Power Grid and Enabling Electric Vehicle Integration

*Mr. Francesco Giordano, PhD Candidate, DENERG.*

The power grid is assisting a huge transformation thanks to the adoption of renewable resources. In particular, renewables have enabled bidirectional power flows, no longer only from high and medium voltages to low voltage but also vice versa. This phenomenon, together with the fact that wind and solar energies are not easily foreseeable and programmable, leads to the need to rethink a more flexible electrical network able to store a greater electricity capacity. On the other hand, another revolution is increasingly making its way. The transport sector is destined to converge rapidly towards electricity. The combination of these two revolutions can represent a risk for the stability of the power grid but also a crucial opportunity not to be missed.



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