

Title of the doctoral program

Computer and Control Engineering

Title of the research activity

Cloud-based multimedia communication optimization based on Quality of Experience

Short description of the research activity

Recent years have witnessed an amazing growth of multimedia delivery services over the Internet. However, several challenges need to be addressed to provide efficient real-time services in this context.

For example, how to efficiently compress and transmit high-resolution high-quality content, whose demand is expected to grow quickly in the next few years, is still an open research problem. On one hand, multimedia encoders are typically optimized using relatively simple signal-to-noise ratio metrics which may not be well correlated with the Quality of Experience (QoE) of the users. On the other hand, having more sophisticated QoE metrics could also help in the transmission/delivery optimization phase as it allows to identify the most important aspects of the content that need to be preserved for an optimal experience.

One of the key issues to achieve an optimal experience in practice is to identify important elements in the multimedia content and treat them differently by means of, e.g., perceptually-weighted parameters, during the encoding and transmission phase. The research group is currently working on incorporating some advanced QoE metrics into a multimedia encoding and transmission framework. The activity will mainly focus on the case of video transmission but audio can also be considered.

The PhD candidate will perform research in this area, developing strategies for the optimization of content compression and transmission over the Internet for the case of multimedia data encoded according to state-of-the-art codecs such as HEVC. Performance will be measured in terms of Quality of Experience (QoE) metrics. Particular attention will be devoted to the possibility to adapt such algorithms to the situation in which most of the processing is performed in the cloud.

Scientific responsible (name, surname, role, email)Enrico Masala, Assistant Professor, enrico.masala@polito.it**Number of vacancies for XXXI cycle (3 years program)**

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Specific requirements (experiences, skills)

Technical requirements and skills:

Good programming skills (C and, preferably, C++), analytical skills. Knowledge of networking protocols, Internet applications, basics of multimedia compression algorithms and standards (e.g., principles of JPEG, MPEG, etc.). Knowledge of scripting languages (e.g., python, bash) is a plus. Knowledge of the GNU/Linux environment is appreciated but not strictly required.

Website of the research group (if any)

<http://media.polito.it>