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SmartTalk: Covivio

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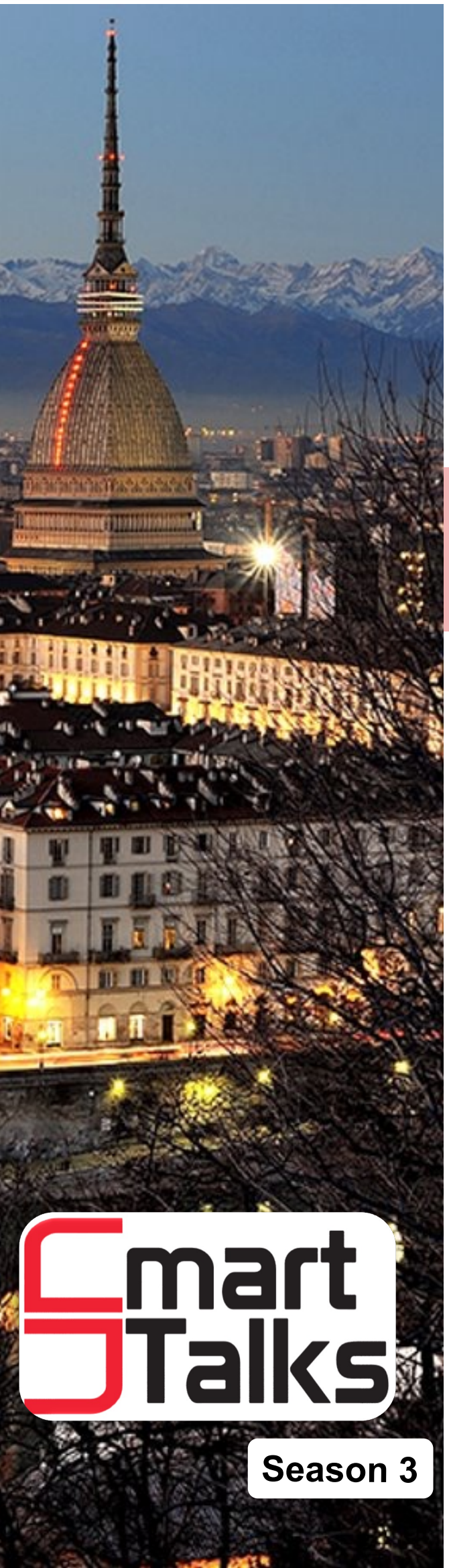

Tailai Song

Tailai Song obtained the B.Sc. in Automotive Engineering at Politecnico di Torino in 2020 and the M.Sc. in ICT for Smart Societies at Politecnico di Torino in 2022.
Currently, he is a PhD student in the Telecommunication Networks Group (TNG) from Department of Electronics and Telecommunications (DET) at Politecnico di Torino (PoliTO), Italy, and also a member of the SmartData@Polito research centre. His research focuses on machine learning techniques applied to real-time communications to improve Quality of Experience (QoE) and the objective of full-stack observability through end-to-end telemetry.

Where did my packet go? Real-time prediction of losses in networks

ABSTRACT

Real-time communication (RTC) platforms have undergone a consistent increase in popularity in recent years, and nowadays, they are fundamental for both work and leisure purposes. To ensure adequate Quality of Experience (QoE) for users of RTC services, we need proper traffic management policies, that, when critical network conditions are detected, react by operating either at the network configuration level or on the application to improve QoE. However, predicting critical network conditions, especially packet losses that are particularly harmful to QoE, is a very challenging task.

Therefore, we propose a system for predicting packet losses that might occur in the near future (i.e., in a second) for RTP streaming traffic. We analyze several ML algorithms, from standard techniques to deep neural networks and anomaly detection algorithms, and we apply them to more than 66 hours of data from two popular RTC applications. The selection of the algorithm and its tuning turn out to be fundamental to achieving good performance. In one of the best settings, which are based on a Balanced Random Forest classifier, we obtain a recall of 0.82.