Information Processing and Communications Laboratory (LTCI), IDS-MM, Equipe MultiMedia (MM), Telecom Paris

MILES

MachIne Learning for Efficient Streaming

#Networks #Algorithm #MachineLearning

TELECOM Paris

INSTITUT POLYTECHNIQUE DE PARIS

THE PROBLEM ADDRESSED

- **Video streaming** accounts for over half of internet video traffic (mostly DASH/HLS). A large share of this data is used over mobile/wireless connections. However, streaming to mobile users remains challenging due to the quickly changing network conditions. (For example: public transports users will move rapidly between different quality and type of coverage.)

- For the last 10 years, the Multi-Media (MM) team of IDS/LTCI has developed **GPAC**[1], an open-source software dedicated to rich-media and broadcast technologies. This video streaming suite is recognized for its quality by leaders of the industry (received a Technology & Engineering **Emmy® Awards** in 2021, soon to be adopted by Netflix…)

- MILES builds on the team expertise in adaptive data transfer to integrate **Machine Learning based bitrate adaptation into video streaming.**

[1] https://gpac.wp.imt.fr

TECHNOLOGY

- The MILES algorithm relies on a constrained online convex optimization approach for bitrate selection (reinforcement/online learning approach)

- MILES was first evaluated offline on a Wi-Fi testbed (preliminary throwaway prototype) and is now being live tested by users.

COMPETITIVE ADVANTAGES

- MILES was fully integrated into the **video streaming suite GPAC** permitting its rapid deployment to the large user base.

- This Machine Learning toolbox is expected to give GPAC a strong competitive advantage especially in video streaming to mobile terminals.

- The teams developed a **Python plugin backend** to help the ML-application development. This was positively received by the community who exploited this new feature for unexpected new use-cases.

APPLICATION

- MILES adaptation algorithm successfully integrated into GPAC (covering DASH and HLS protocols)

DEVELOPMENT STATUS

- TRL 8-9: Implemented, integrated and validated with success into the GPAC streaming suite

INTELLECTUAL PROPERTY

- MILES is opensource and distributed under GNU Lesser General Public License

INVENTORS & CONTACTS

- Jean Le Feuvre, Professor at Telecom Paris, jean.lefeuvre@telecom-paris.fr

- Attilio Fiandrotti, Assistant professor at Università degli Studi di Torino and associate researcher at LTCI. attilio.fiandrotti@telecom-paris.fr

- TTO: valorisation.transfert@telecom-paris.fr

PUBLICATIONS

- Draft of journal paper almost ready for submission (confidential draft available on request).