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VICRYPT: Real-time, Fine-grained Prediction of Video Quality from Encrypted Streaming Traffic

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**QoE-BASED NETMON (QoE-MON)**

- **Video stream-based analysis**, using multiple sliding windows, capturing different temporal phenomena (current time, short-term trend, session-aggregated).
- **Analysis is done in real-time** for every video session and for every new time slot of 1 second, we consider the following set of 207 features:
  - Features extracted from current time slot (C) – 69 features
  - Short-memory (trend) based features, extracted from last T (3) slots (CT) – 69 features
  - Cumulative based features, extracted from all past traffic for this video session (CS) – 69 features
- **Feature computation** is done continually, in constant-memory boundaries, using sketches.

**ONLINE PREDICTION OF VIDEO BITRATE**

- Training multiple ML models over more than 4.6M individual, 1 sec. slots (5-fold cross validation) – here using all 207 inputs
- **Classification task**: per second video resolution, 6-classes: 144p, 240p, 360p, 480p, 720p, 1080p
- **Regression task**: estimation of per second average video bitrate

**STABLE-CONDITIONS**

- **Video stream-based analysis**, using multiple sliding windows, capturing different temporal phenomena (current time, short-term trend, session-aggregated).
- **Analysis is done in real-time** for every video session and for every new time slot of 1 second, we consider the following set of 207 features:
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