Video Encoding and Quality Assessment
@ Netflix
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Netflix and Our Team

Netflix, a global video streaming service

Digital Supply Chain

Encoding Technologies

Server-side processing of video, audio, timed-text and images
Netflix Media Processing on the Cloud

- Highly robust and scalable
  - Support more titles, more customers
  - 100% cloud, thousands of instances
- High quality of experience for subscribers
Media Pipeline Overview

Video Algorithms

Parallel inspections and
Parallel encoding of video segments
Video Source Inspections

1) Is this a good source?
2) Generate metadata for encoding

No-Reference Quality Assessment
- Scaling artifacts
- Compression artifacts
- Corrupted frames
- Non-native frame rates
- Insertion of extra content
Video Encoding

1) Encode video at different bitrates (varying resolutions and quality levels) – VC1, H.263, H.264/AVC, H.265/HEVC
2) Validate correctness of encode and assess quality

Full reference and reduced-reference quality assessment

- Scaling artifacts
- Compression artifacts
- System Bugs
Encoding Quality Assessment

• Quality monitoring – Perceptual quality and not just signal fidelity
• Quality assurance
• Optimize encoding parameters
• Codec and processing technology evaluation
• Possibly, optimize client adaptive streaming algorithm
Our use case: High-end content
Our use case: Video over cellular

• For markets with developing broadband infrastructure

• Low bitrate VOD – around 200 kbps
Roadmap on Video Quality

• Open to collaborate with research institutes or industry partners on research related to our practical problems
• Starting involvement in standardization, especially on the next video codec standard
• Our goal: Best video quality for our customers

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