Dynamic Security-Level Maximization for Stabilized Parallel Deep Learning Architectures in Surveillance Applications
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Introduction

- CCTV Surveillance Applications for Target Network Monitoring
  → Monitoring target network fields with CCTV cameras
  → Utilizing learning-based face-recognition algorithms in CCTV camera systems can realize automated surveillance systems.

- Deep Learning (DL) based CCTV Security Systems
  → With many hidden layers (HL) in DL, it improves accuracy, but it is slow.
  → With less hidden layers in DL, it is fast but achieves less accuracy.
  → This paper proposes adaptive queueing-delay control for time-average recognition accuracy maximization subject to stability (slow computation leads to queueing delays in the CCTV real-time systems).

Deep Learning Framework Selection for Queue-Stable Recognition-Accuracy Maximization

Tradeoffs: Increased Accuracy, Stabilized Queues, Tradeoffs

Queueing Model

Queue Backlog Size, \( Q(t) \)

Arrival Process: CCTV Video Streams
Departure Process (Control Decision): Processing with DL Framework

Performance Evaluation

Tradeoffs between Stability and Time-Avg. Max Security

- Most Stable
- Min-Security
- Less-Stable
- Max-Security

Concluding Remarks

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  → Dynamic DL selection for time-average security max subject to stability
  → Jointly optimization of security-level maximization and queue-stability depending on queue-backlog sizes.

- Future Work
  → Real-world implementation with OpenFace library
  → Arrival process control algorithm design

- References