Mechanisms For Resilient Video Transmission in Wireless Networks

ADAPTIVE FEC MECHANISM WITH RANDOM NEURAL NETWORK CLASSIFICATION AND ANT COLONY OPTIMIZATION

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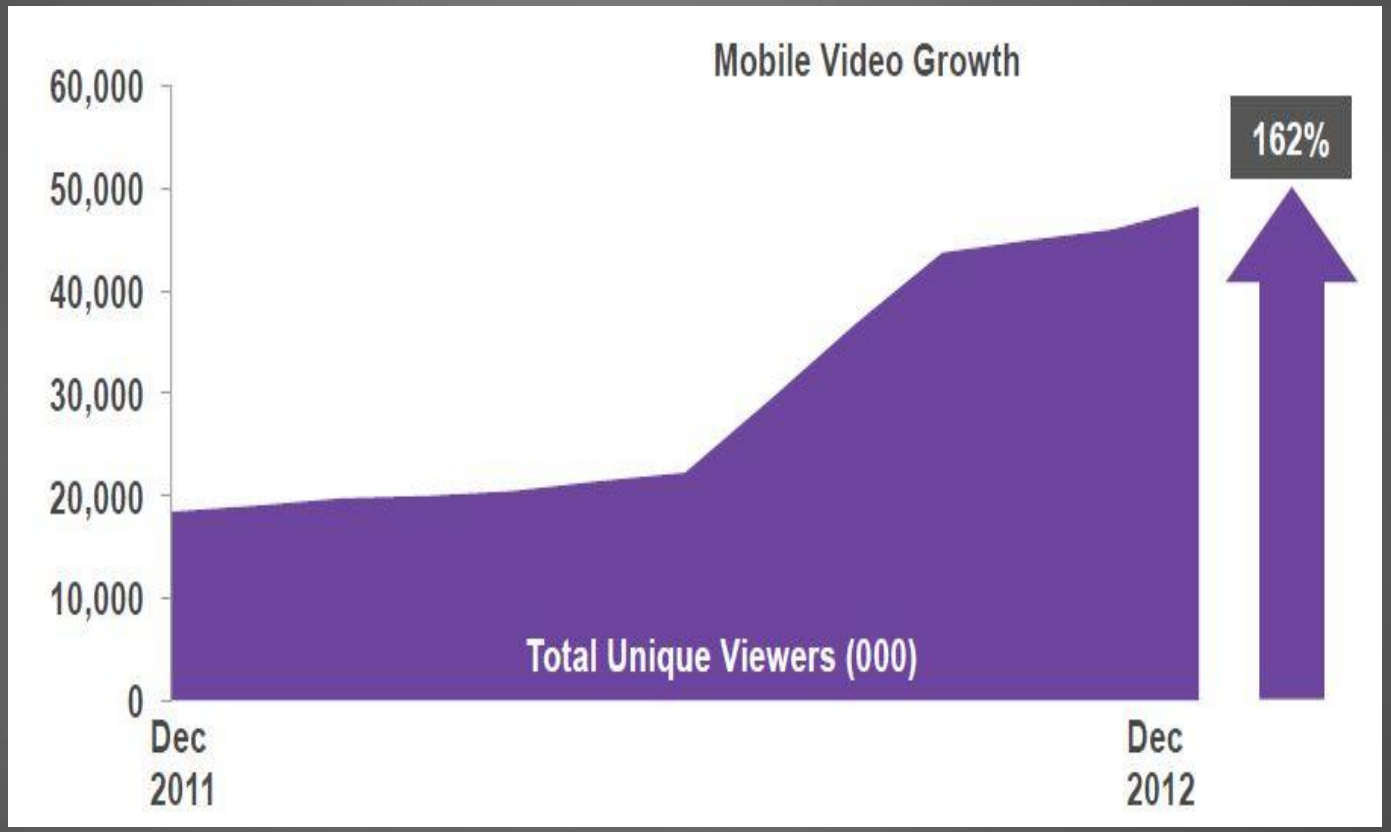
Summary

- Motivation
- Objectives
- Adaptive Motion-Aware FEC-based Mechanism to Ensure Video Transmission
  - Random Neural Network for Video Motion Intensity Classification
  - Ant Colony Optimization for Dynamic FEC Adjustment
- Results

Motivation

- Growth of Video streaming on mobile devices



Source: comScore Europe digital future in focus

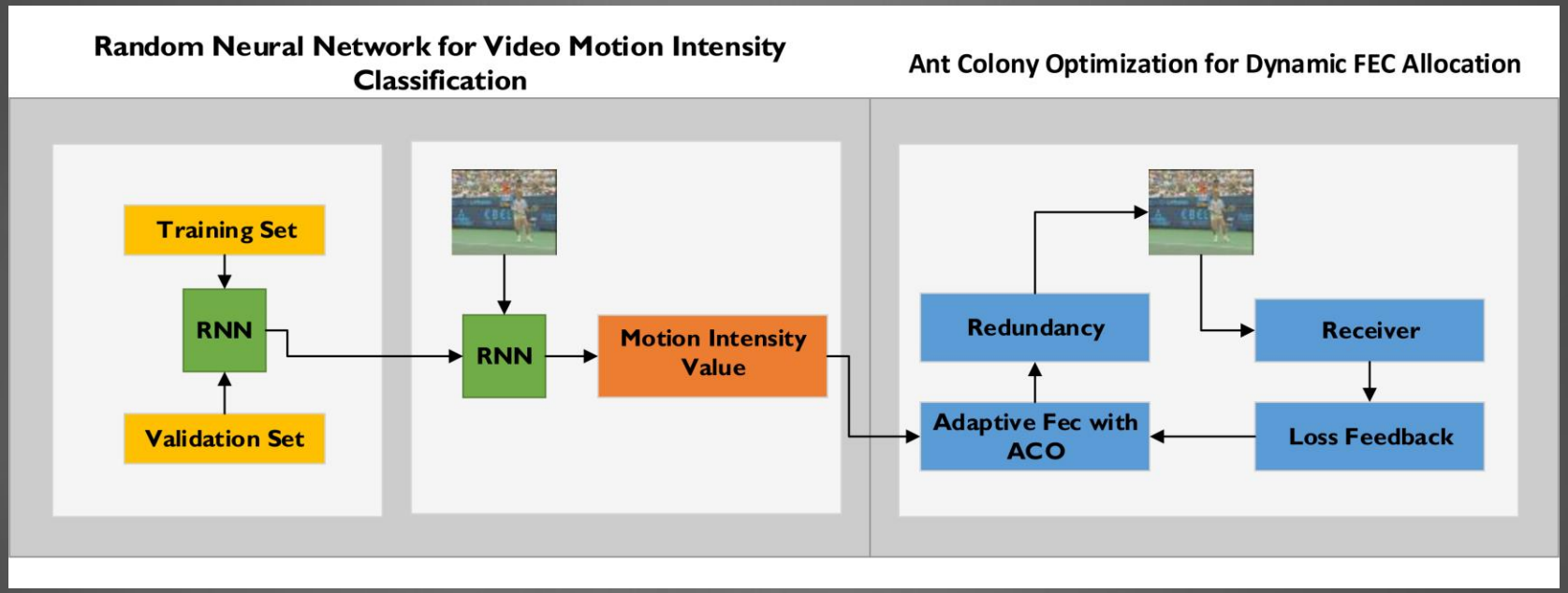
Motivation

- Wireless Networks Error Rate
- Error Correction
- Finite Network Resources
- Quality of Experience

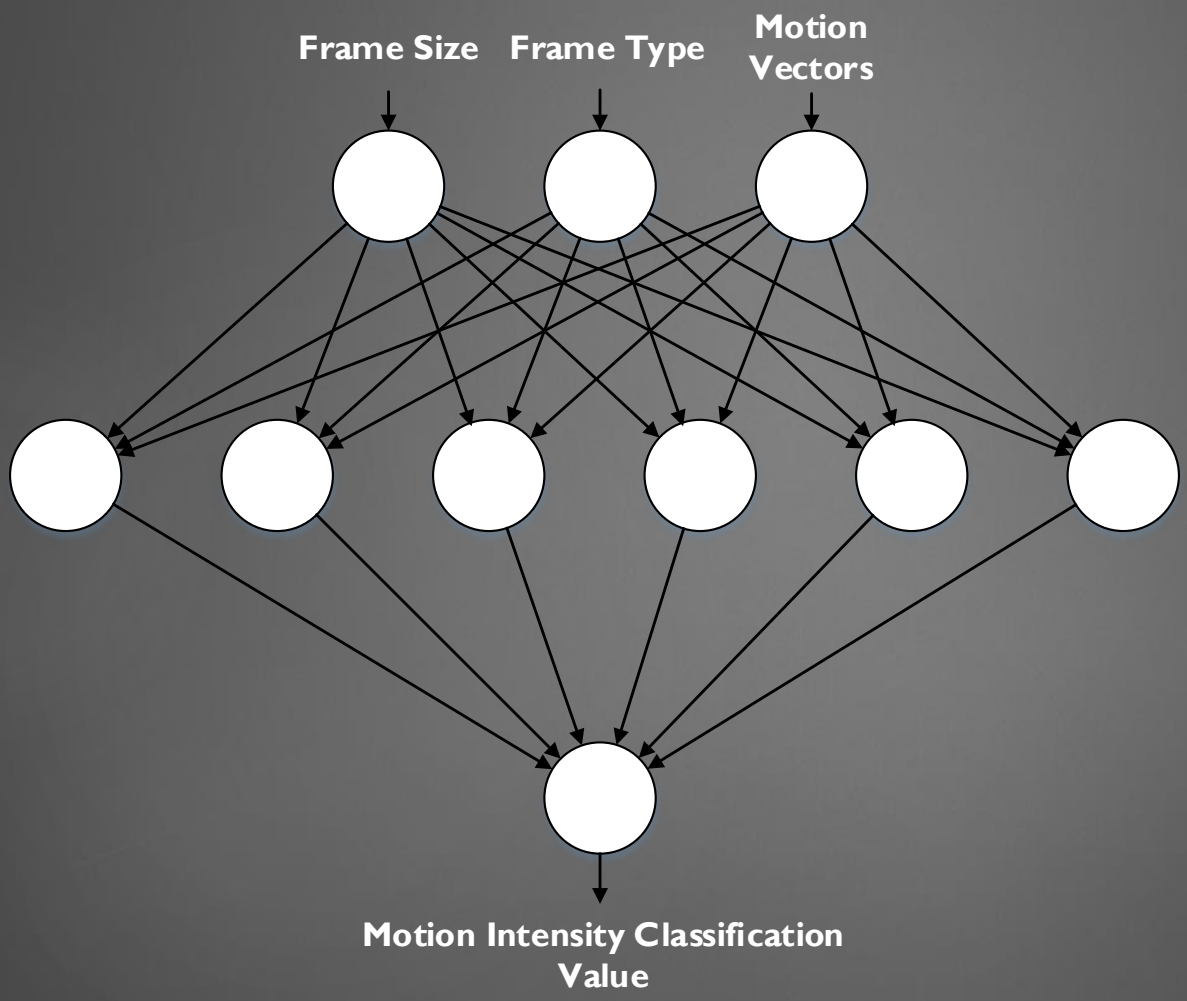
Objectives

- Video Motion Intensity Classification
- Forward Error Correction
- Adapt to video Characteristics and Network Loss Conditions
- Improve Quality of Experience of the user

Adaptive FEC mechanism with Random Neural Network classification and Ant Colony Optimization



Random Neural Network For Video Motion Intensity Classifcation



Ant Colony Optimization For Dynamic FEC Adjustement

- Reed-Solomon
  - Arbitrary Frame Sizes
  - Low Overhead
- Ant Colony Optimization
  - Change Search Conditions in Real Time
  - Adaptive Solution

Preliminary Results

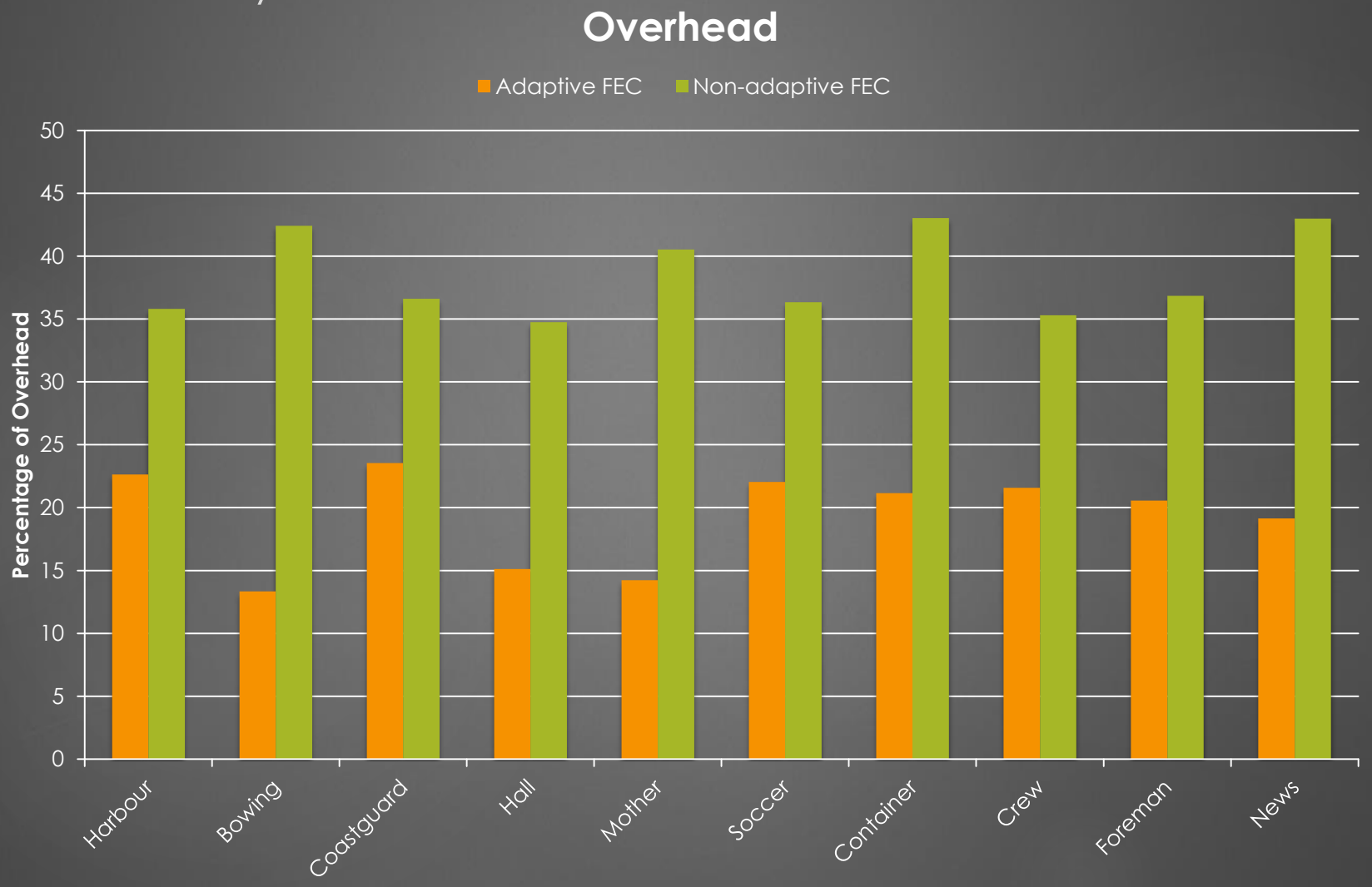
NS-3 Simulation Scenario

- Wireless Grid
  - 5x5
  - 50 meters apart
  - OLSR
  - Gilbert-Elliot Error Model
  - 20% Average loss

Preliminary Results

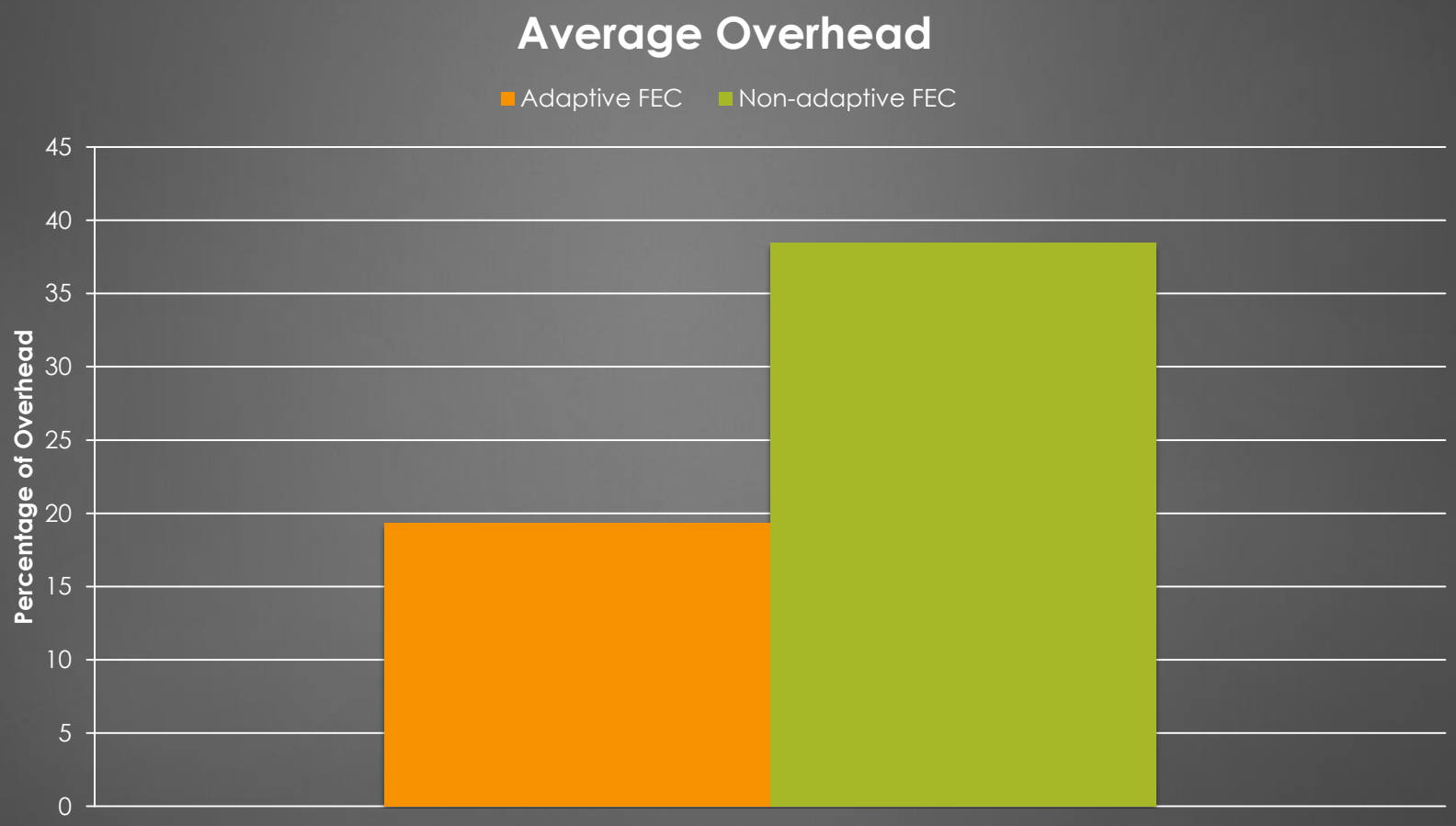
Using Stage 2 of the mechanism with adaptive FEC

Redundancy Overhead



Preliminary Results

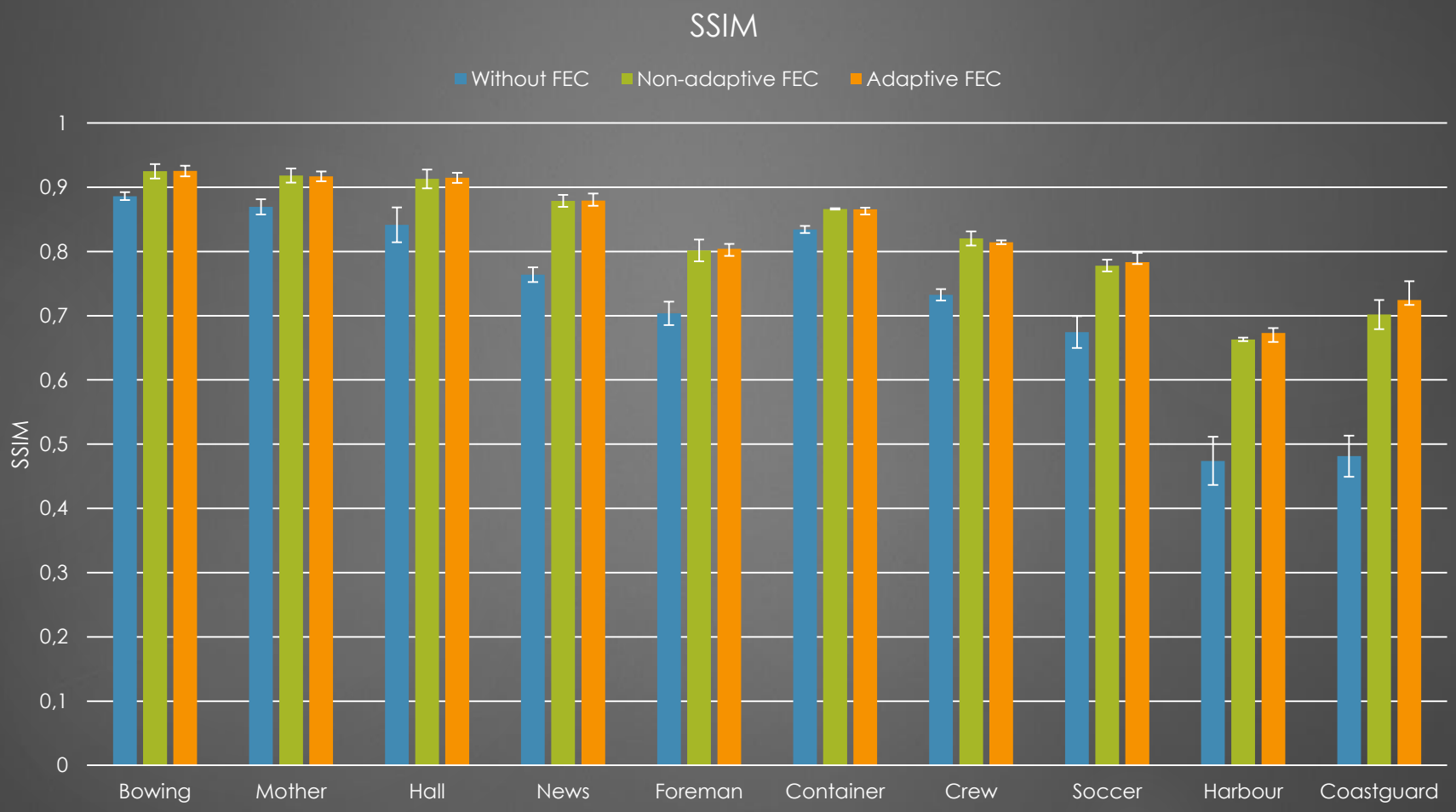
Using Stage 2 of the mechanism with adaptive FEC
Average Redundancy Overhead



Preliminary Results

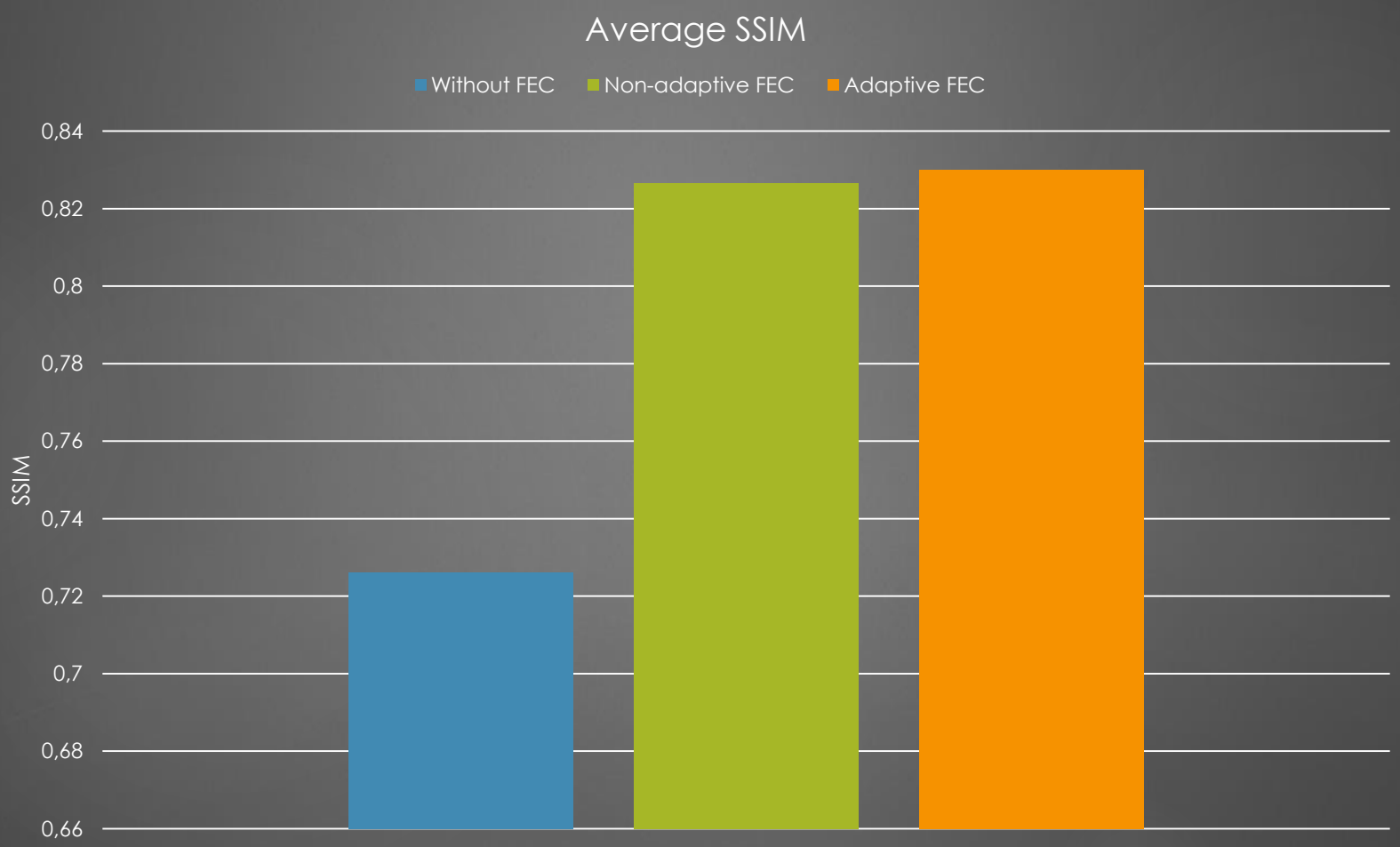
Using Stage 2 of the mechanism with adaptive FEC

SSIM



Preliminary Results

Using Stage 2 of the mechanism with adaptive FEC
Average SSIM



Final Considerations

- Forward Error Correction
- Quality of Experience
- Video Motion Intensity Classification
- Dynamic Forward Error Correction Allocation

Thank you.

- Questions?

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