24VI59IITJ

Weekly Project Report

Worklet/Project Title: Selective Encryption for H.264/AVC Video Streams

Institution: IIT, Jammu

Review Stage: Mid-Review

Github Repository: To be updated (pending link verification)

Reporting Period: 27/03 - 03/04

Report Submitted By: Hitesh Choudhary, Arjun Verma, Sahil, Krishna

Date: 03/04/25

1. Executive Summary

This week, we implemented selective encryption for H.264/AVC video streams, focusing on encrypting specific portions of frames. Initial results show encrypted streams are visually unrecognisable, but challenges remain in optimising encryption time and file size.

2. Objectives for the Previous Week

- Implement selective encryption for video streams.

- Analyse encryption impact on file size and processing time.

- Compare decrypted video quality using PSNR and SSIM metrics.

3. Work Completed Details

Task Description	Area (AI/ML, CV, IoT)	Tools/Tech Used/Models	Status	Remarks
PSNR and SSIM analysis	CV	Python	Completed	PSNR: 28.20 dB, SSIM: 0.47
Selective encryption implementation	CV	H.264/AVC, OpenCV	Ongoing	Encrypted streams generated

4. Key Learnings / Discoveries

- Encryption significantly degrades visual recognition but increases processing time and storage.

- Existing schemes (1 and 2) do not alter file size as expected.

- Decrypted video quality metrics (PSNR, SSIM) confirm encryption robustness but highlight quality trade-offs.

5. Checklists

- Is the bi-weekly meeting scheduled with the mentor?

Will be scheduled around Mid-April

- Is the code updated to Github?

Will be uploaded after Ecode issues are resolved.

- Are the interim/final model checkpoints uploaded to Github/Drive?

NA

- Is the inference script/app/binary etc. pushed to the Github and working? If applicable.

NA

- Are the datasets used uploaded to Github/Drive?

NA

- In case of self-collected data, are the "Consent Forms" required? If yes then are they collected and uploaded?

NA

- Interim/Final demo video available? If applicable.

NA

- Paper publication plan and status. Is draft pushed to Github? If applicable.

NA

- GPU Usage Details (If Any)

       GPU Type: A100/Google Colab (Mention the GPU type T4 etc)

       Number of GPU's:

       Number of hours consumed Last Week:

       Number of hours consumed Overall:

6. Issues & Challenges

Issue	Impact	Proposed Solution	Status
Unable to parse bitstream correctly for macro blocks for cohesive encryption	High	Further Research	In progress

7. Next Week Plan

- Implement selective encryption for audio streams and integrate with video encryption.

- Fix bugs in Scheme 2 implementation and test additional schemes.

- Conduct security analysis and validate playback compatibility.

8. Support Required / Dependencies

NA

9. References (if any)

NA