

TIME SERIES WATERMARKING USING DWT

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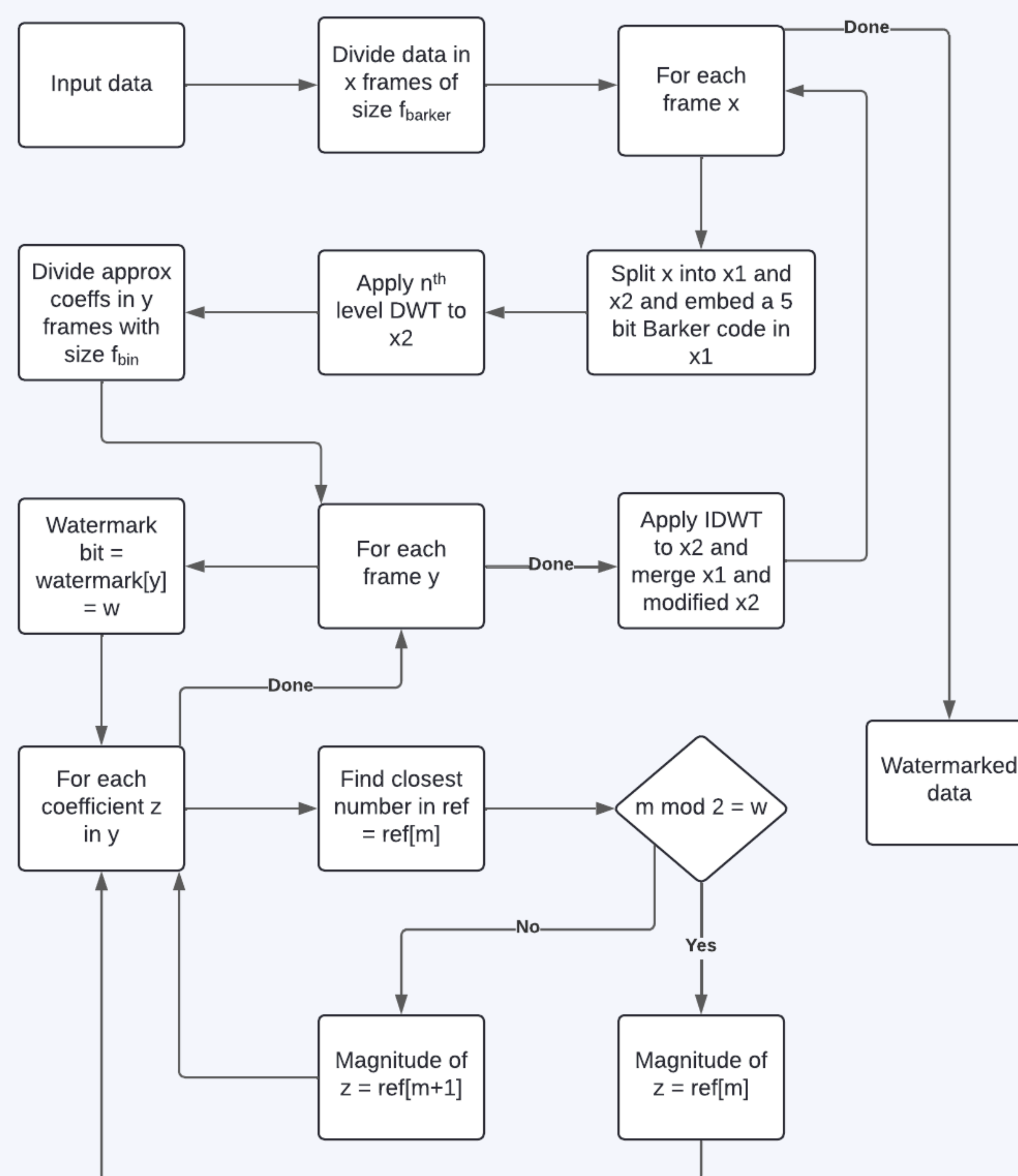
INTRODUCTION

- Watermarking
 - Prove ownership
 - Embedding and extraction
 - Visibility and robustness

OBJECTIVE

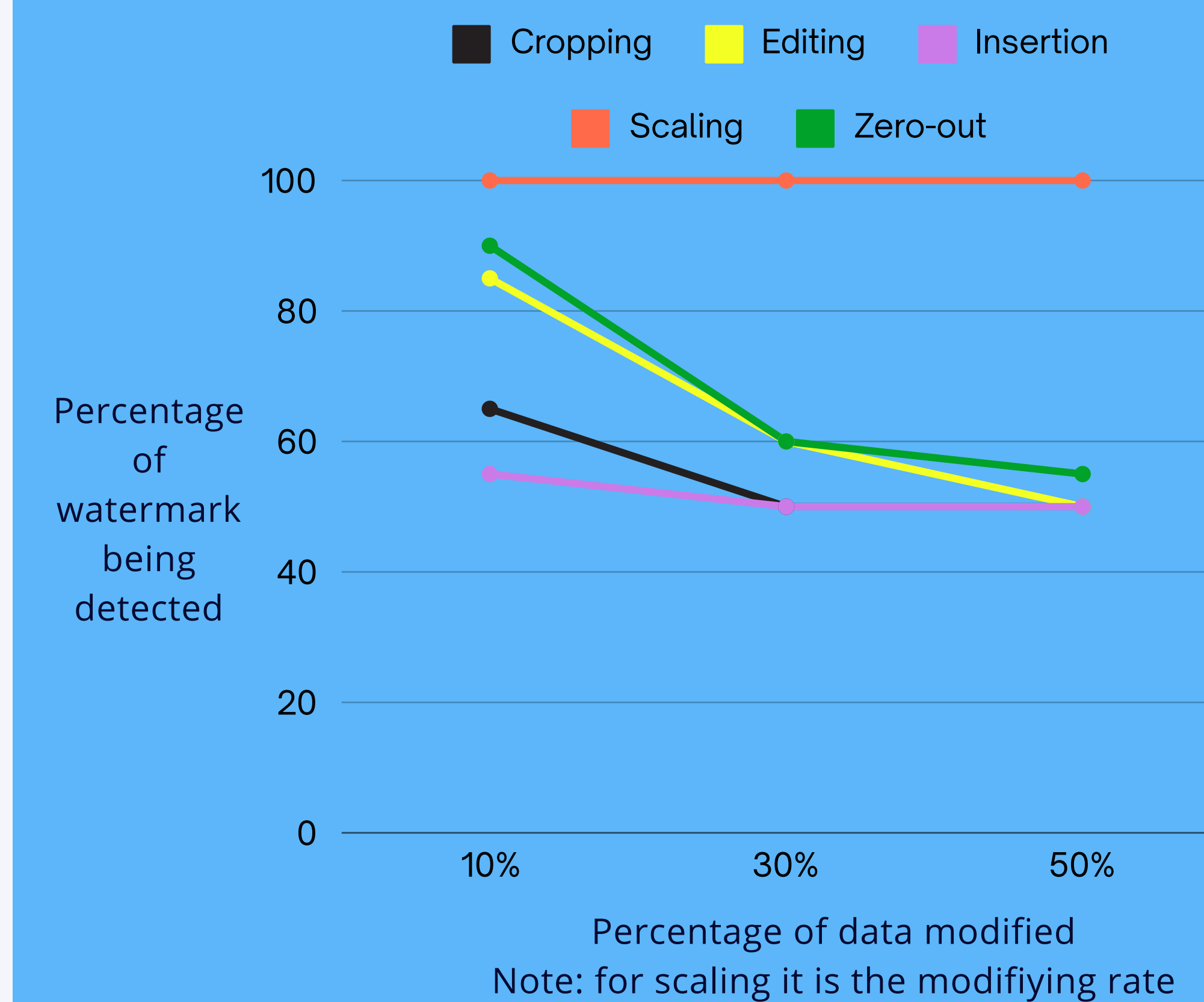
- Introduce novel algorithm as adaptation of audio watermarking algorithm developed by Attari and Shirazi [1] for non-medical time series
- Provide general usability and robustness

ALGORITHM



- Input: data, reference set, frame size and the watermark bit stream
- Embedding process:
 - Discrete Wavelet Transform (DWT)
 - Modifies magnitude of DWT coefficients
- Extraction process:
 - Similar steps to embedding
 - Majority voting
- Parameters can be tweaked to suit application

ANALYSIS



Results of visibility tests:

- Average of the dataset changes about 0.5%
- Different values of input did give similar results
- Other values of input performed better than the ones found in the original algorithm of [1].

Results of experiments with different data modification attacks (random samples)

RESULTS/ FINDINGS

- Cropping attack: when only 1 range of values is deleted, the algorithm is robust to 65% deletion.
 - Barker code
- Scaling attack: robust till 1.5, while [1] only shows robustness till 1.1
- Audio watermarking algorithm can be used with time series

CONCLUSION

- Shows robustness against small scale attacks
- Shows decent watermark invisibility
- Requires more research to be more practical