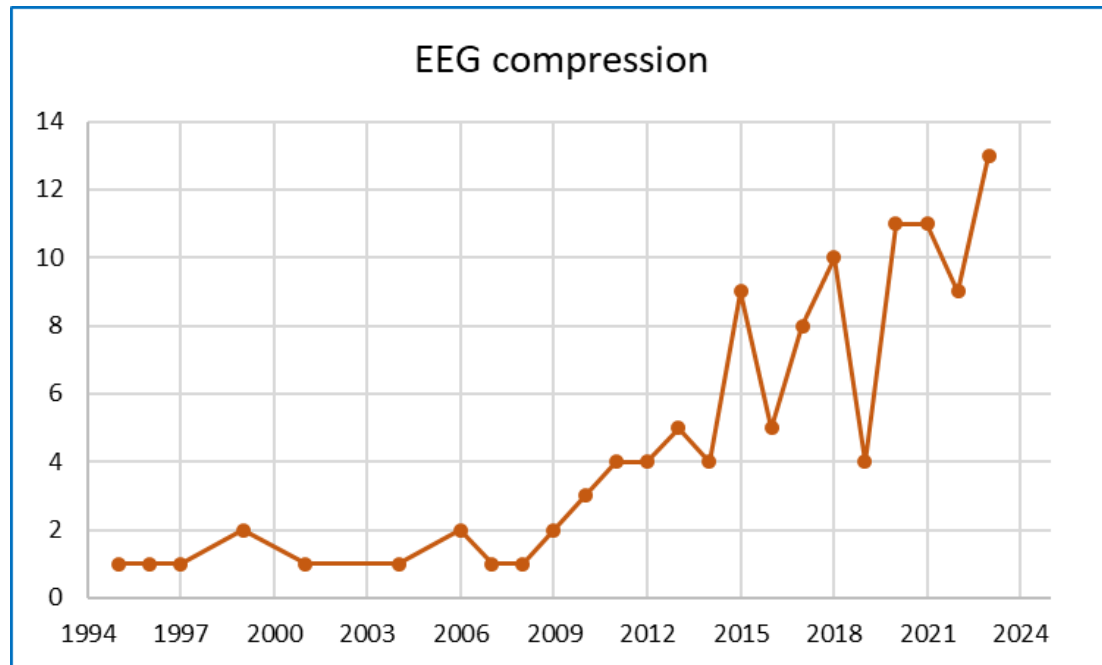


# EEG compression review

**Searching method:** Google scholar with keywords: "EEG", "compression", "lossless/lossy/near-lossless"



Total: 113 papers

## Selection criteria

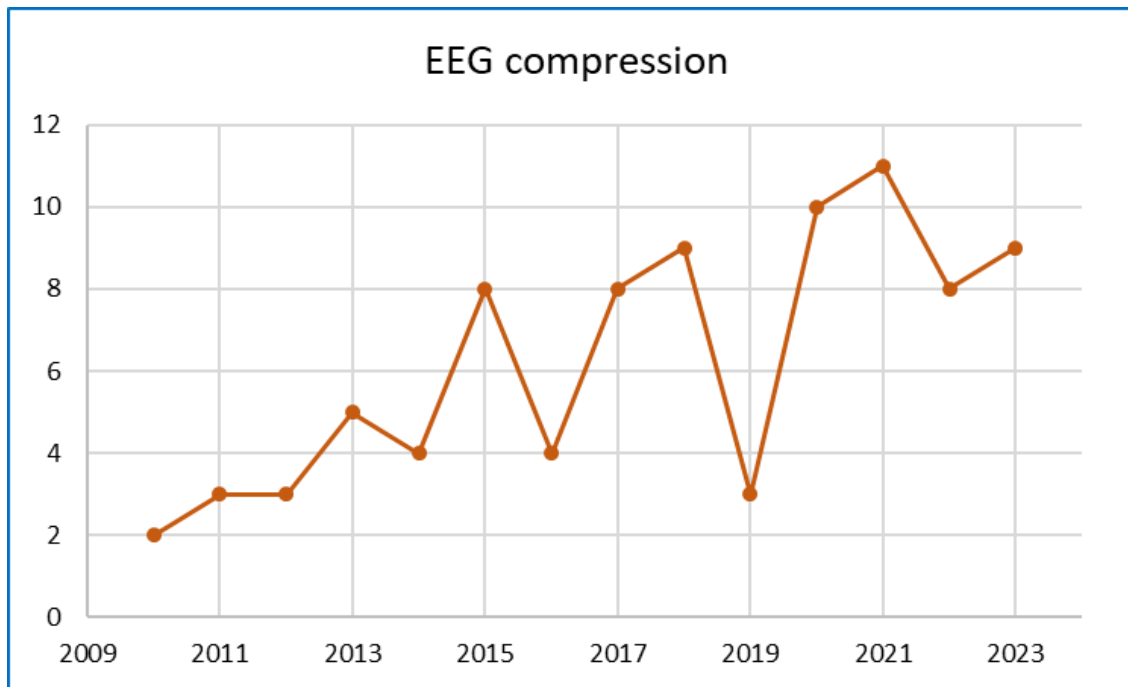
- In the past 13 years (from 2010-2023)
- Lossless/lossy/near-lossless technique
- Included in the Scopus, WoS index

## Exclusion criteria

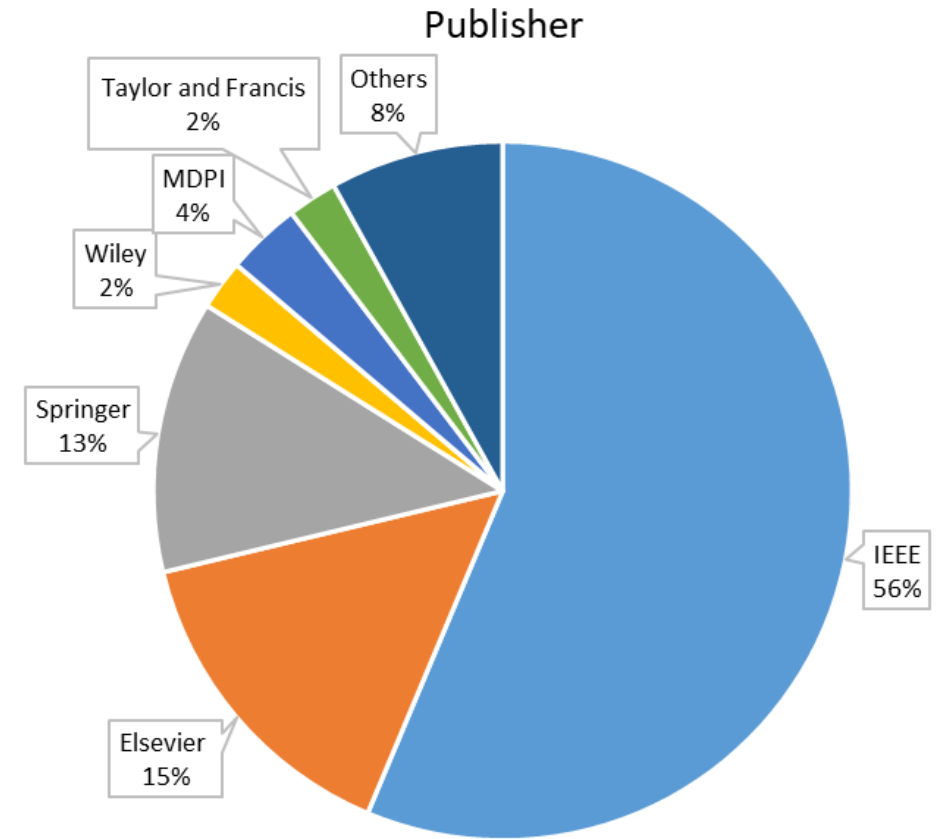
- From 2009 and earlier
- Review papers
- Not included in the Scopus, WoS index and journals like Hindawi, ...

# EEG compression review

## Results after applying criteria



Total: 87 papers



# EEG compression review

Used in part for article with Martin

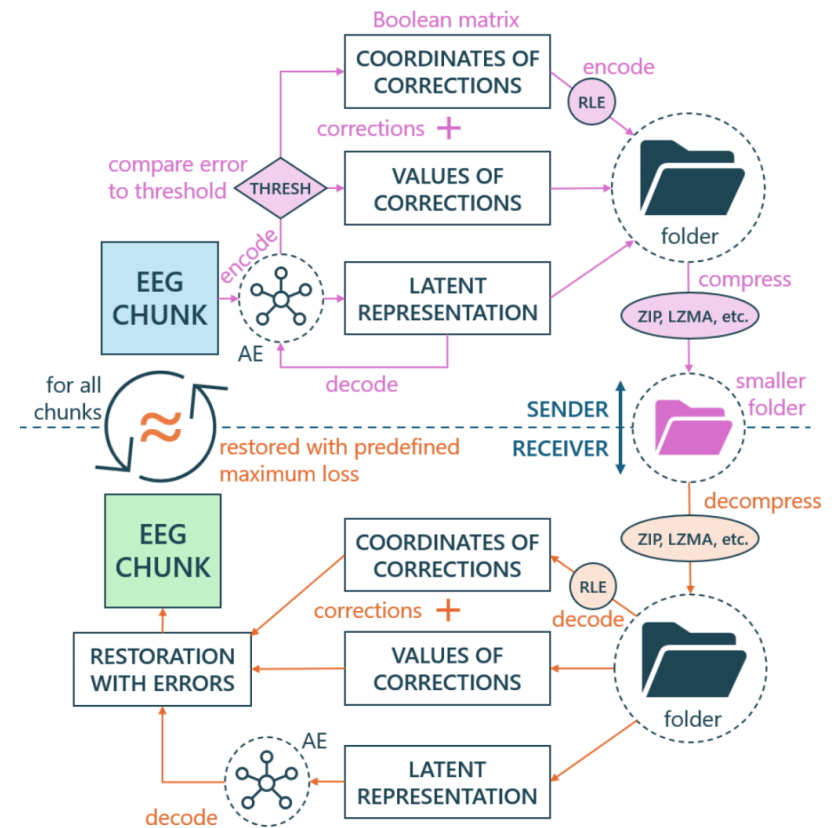
Year	Lossless	Lossy/near-lossless	Technique	CR	Reconstruction performance
2017		✓	SPC	3.16	PRD = 2.72
2019		✓	PVBSC	1.437	PRD = 8.873
2020	✓	✓	n-SPC	4.61	PRD = 5.33
2020	✓		K-means clustering, AE, HE	4.54	N/A
2021	✓	✓	DCT and DWT	94%	RMSE = 0.188
2021		✓	OTT	4 - 12	PRD: 38.29% - 48.91%
2021		✓	RSVD	20 - 80	PRD: 75.47, 49.51
2022	✓		KCHE	85.89% - 90.74%	N/A
2023		✓	DeepDTW	8 - 32	RMSE = 0.51 - 1.05
2023		✓	HWT and COVIDOA	12.67	PRD = 0.4
2024	✓	✓	2D-DWT and SPIHT	≥1.95	N/A
2024		✓	LSTM-autoencoder	2 - 200	PRD: 1.09 - 13.04

# Updates since last presentation

## 1. RLE of pixel coordinates where the errors exceeds the threshold

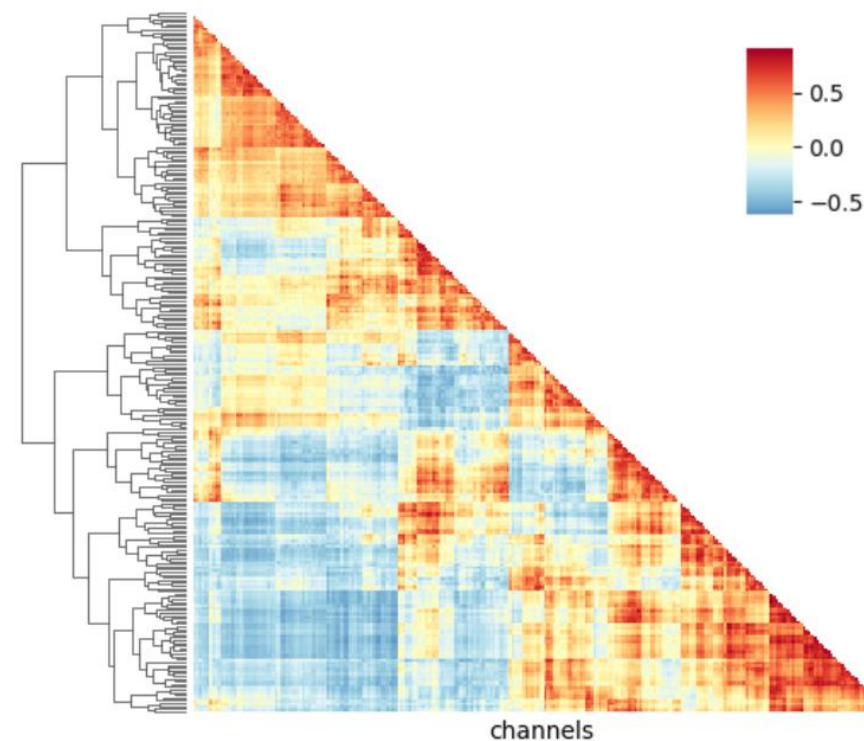
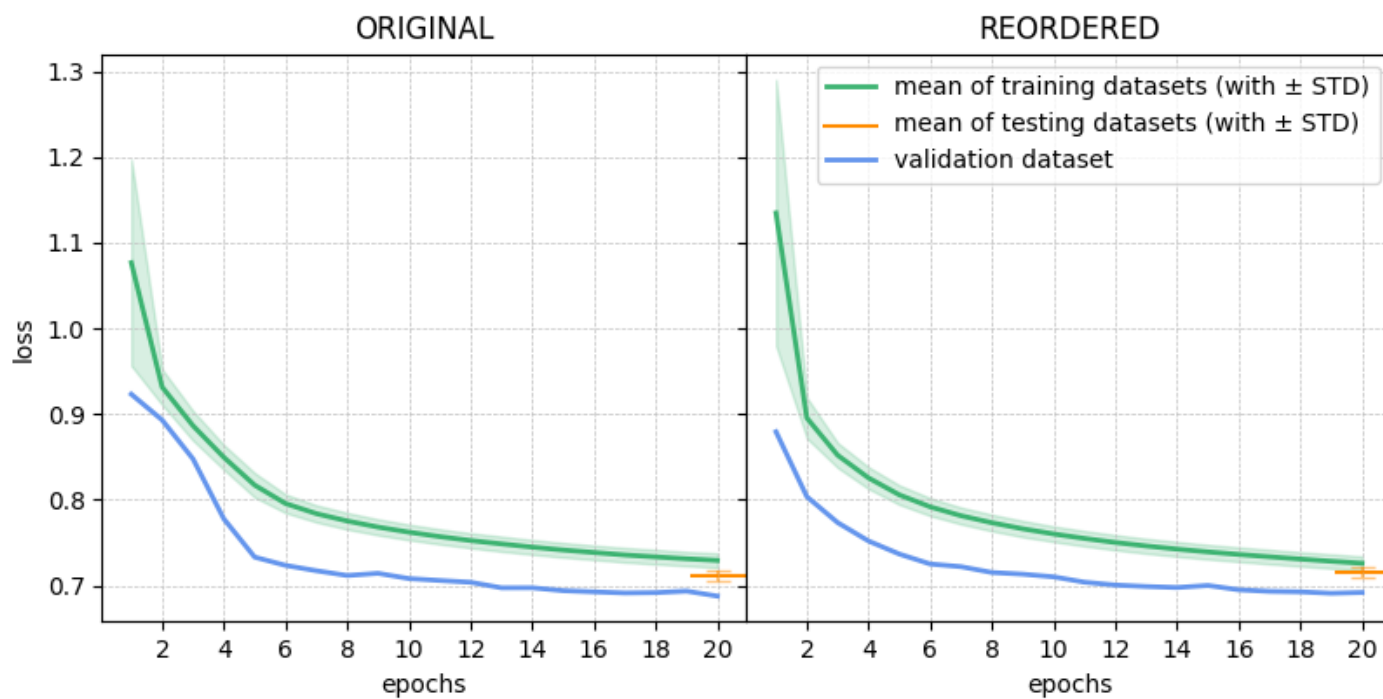
- Results much better (before 481 MB, with RLE 115 MB)
- Compression slow (35–40 min), decompression fast (around 10 s)

	0	1	2	3	4	5	6	
0	F	F	T	T	T	F	F	[0, 2, 4]
1	F	F	T	T	F	F	F	[1, 2, 3]
2	T	T	T	F	F	T	T	[2, 0, 2, 5, 6]
3	F	F	F	F	F	F	F	∅
4	F	F	F	F	T	F	F	[4, 4, 4]



# Updates since last presentation

## 2. Model retrained with the channels reordered using UPGMA



# Updates since last presentation

## 3. Results for multiple thresholds

Table 2

Results of the compression with the original order of channels (top) and reordered channels (bottom).

Threshold [ $\mu V$ ]	Compressed [MB]	+Deflate	+LZMA	+BZip2	CR float64	CR float32
10	27.1	22.4	<b>20</b>	22.8	95	47.5
8	44	36.3	<b>32.4</b>	36.5	58.642	29.321
5	115	96.9	<b>87.3</b>	94.6	21.764	10.882
2	423	353	<b>318</b>	351	5.975	2.987
1	694	596	<b>550</b>	587	3.455	1.727
10	27.5	22.8	<b>20.4</b>	23.2	93.137	46.567
8	44.3	36.6	<b>32.6</b>	36.8	58.282	29.141
5	115	97.1	<b>87.6</b>	94.8	21.689	10.845
2	427	357	<b>321</b>	355	5.919	2.96
1	698	601	<b>554</b>	592	3.43	1.715

CR is calculated from the best achieved compression (in boldface).

$$CR = \frac{\text{original size}}{\text{compressed size}}$$

