

# QUANTIFICATION OF PERIVASCULAR SPACES WITH 3D REGRESSION NETWORKS

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## Abstract

- Enlarged Perivascular Spaces (PVS) are brain lesions related to small vessel diseases
- We present a thorough evaluation of a simple CNN to quantify PVS

## Dataset

- Rotterdam Scan Study, GE 1.5T scanner
- 2000 PD-w MRI scans visually-scored with PVS by a specialist (PVS counts in 4 brain regions)

## Method and Results

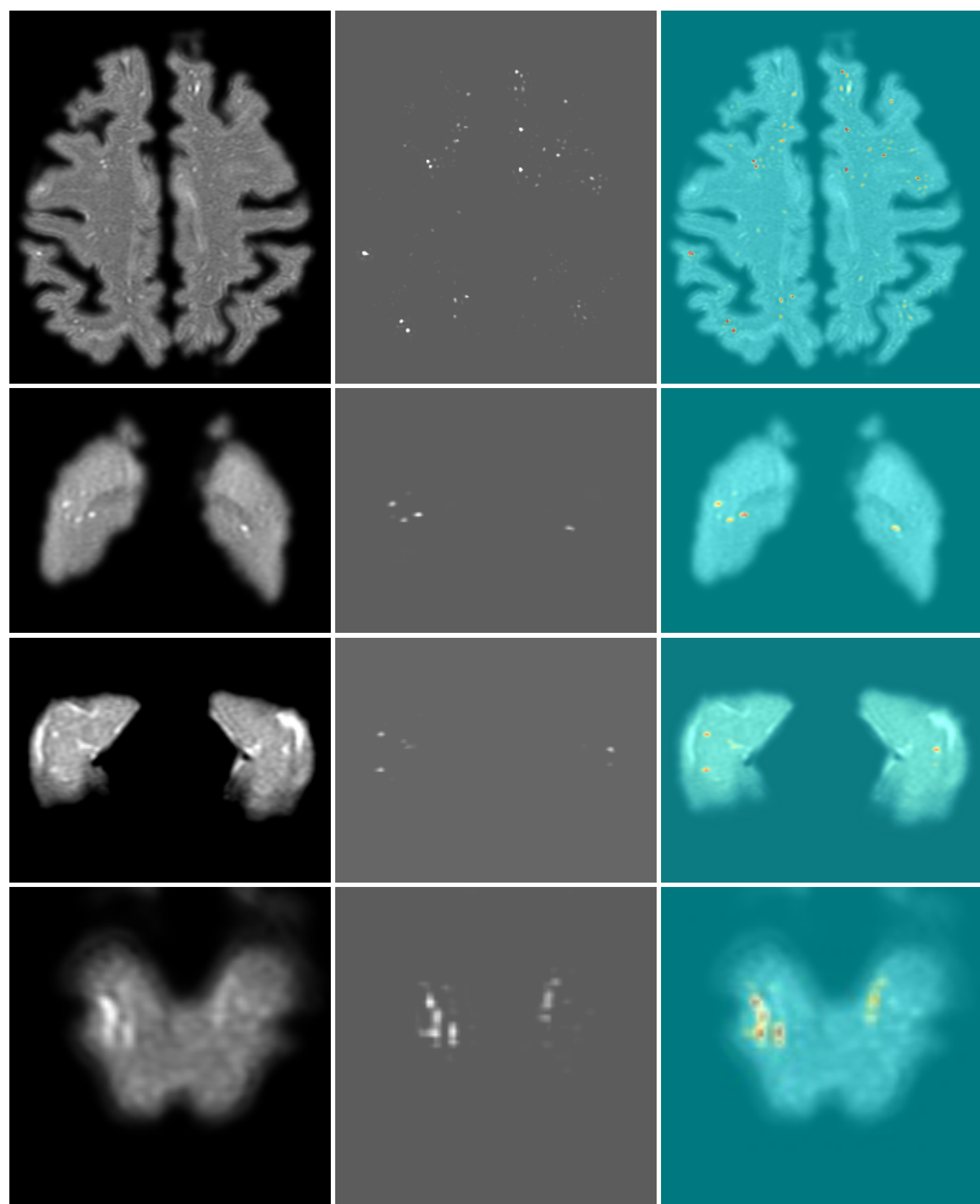


Figure 1: **Saliency Maps.** From top to bottom: centrum semiovale, basal ganglia, hippocampi, and midbrain. From left to right: scan, saliency map, and overlay.

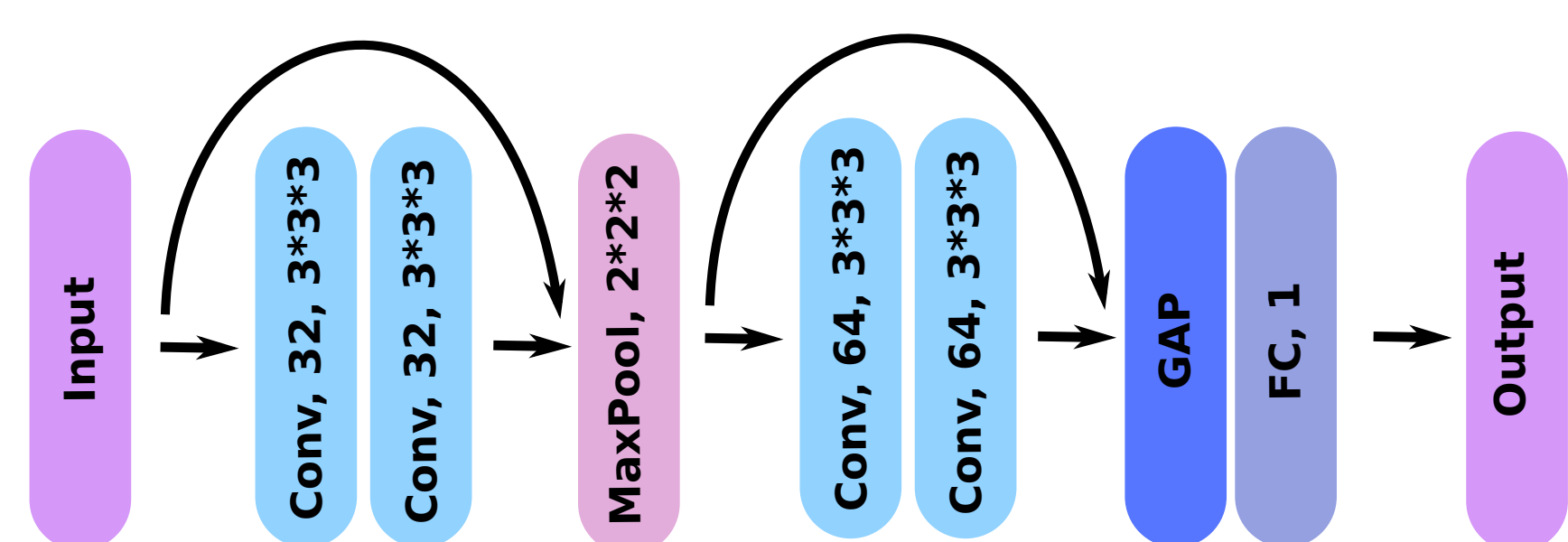


Figure 2: **Regression network architecture.** GAP: global average pooling, FC: fully connected layer.

Table 1: **ICCs between automated and visual PVS scores.**

Region	CNN	Interrater	Intrater
Midbrain	0.75	0.75	0.82
Hippocampi	0.88	0.82	0.85
Basal Ganglia	0.82	0.62	0.80
Centrum Semiovale	0.86	0.80	0.88

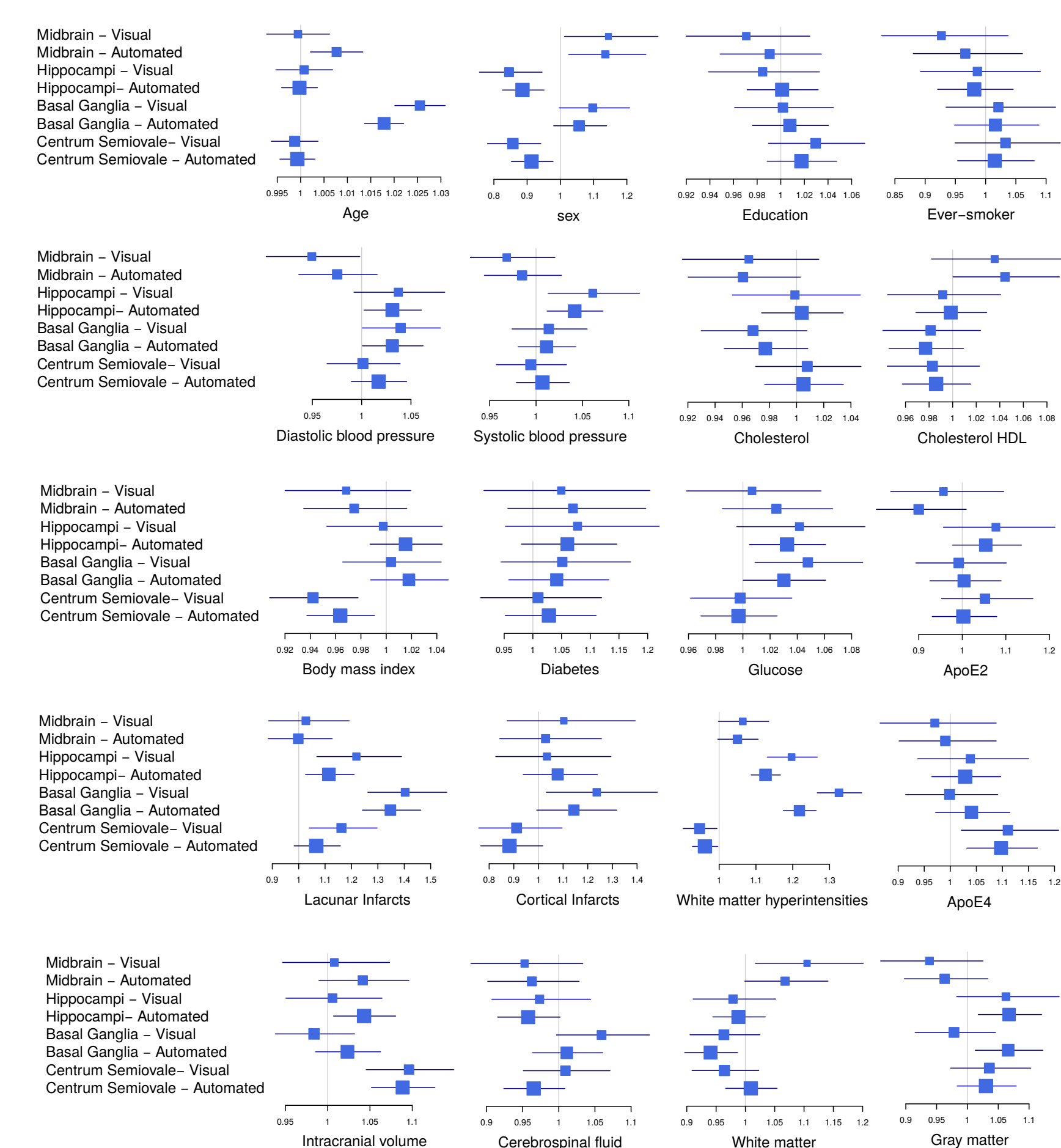


Figure 3: **Association between determinants of PVS and PVS.**

## Conclusion

1. Saliency maps highlight PVS
2. Correlation between automated and visual scores: similar to intrater agreement
3. Automated scores: same association power than visual scores

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