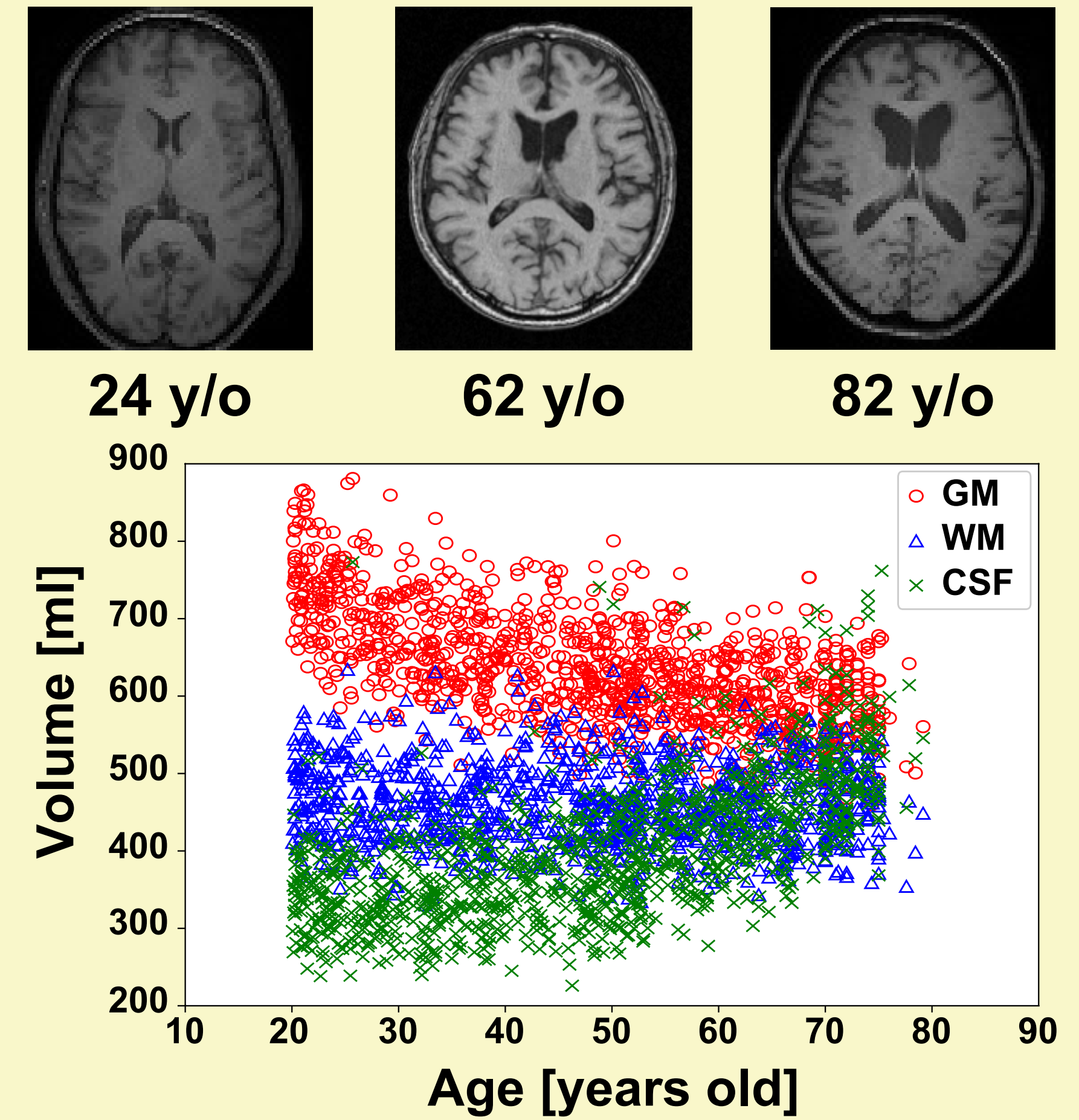


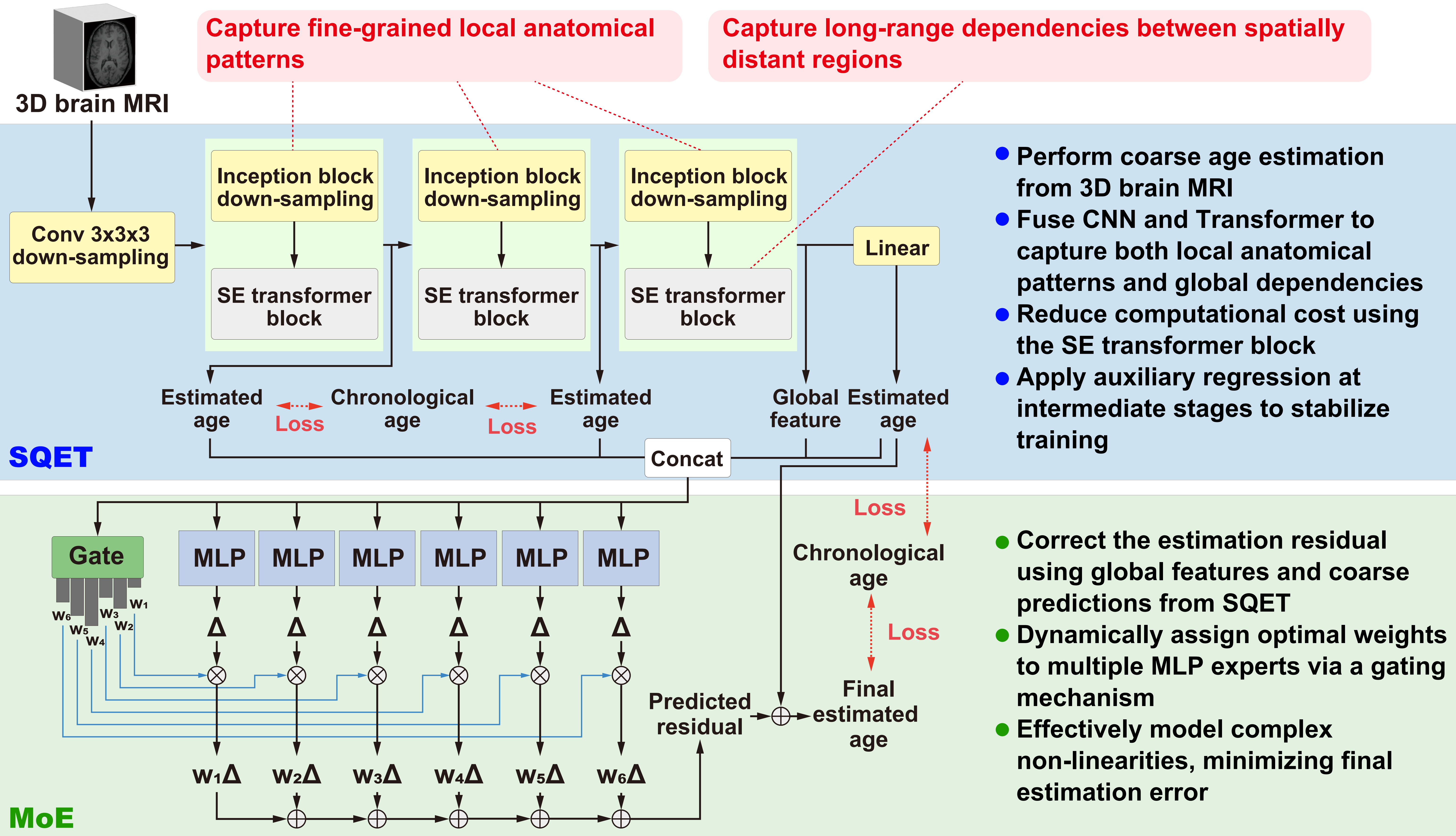
Summary

- Brain Age Estimation from MR Images
 - Brain age can be estimated from morphological changes in the brain
 - Evaluating the age gap between estimated and chronological age helps detect brain disorders early
- Conventional methods for age estimation from MRI
 - Squeeze-and-Excitation Transformer (SQET) [1] effectively captures both local features and global relationships
 - Its final linear mapping makes it difficult to correct systematic errors and model complex non-linear trends
- Proposed method: **SQET-MoE**
 - We utilize a **two-stage framework**, inspired by TSAN [2]
 - SQET performs **coarse age estimation**, while a Mixture-of-Experts (MoE) module estimates the **residual** to minimize final error



Volume changes in brain tissue with aging

Proposed Method: SQET-MoE



Experimental Results

- Evaluation using two datasets of healthy subjects
 - IXI / ADNI [3] : Age-imbalanced dataset
 - Aoba-1 / Tsurugaya-1 [4] : Age-balanced dataset

[1] Y. Hu et al., "SQET: Squeeze and Excitation Transformer for high accuracy brain age estimation," IEEE T-MI, 2022.

[2] S. He et al., "Global-local transformer for brain age estimation," IEEE T-MI, 2022.

[3] C. R. Jack et al., "The alzheimer's disease neuroimaging initiative (ADNI): MRI methods," JMIR, 2008.

[4] K. Sato et al., "Neuroanatomical database of normal Japanese brains," Neural Networks, 2003.

[5] M. Ueda et al., "An age estimation method using 3D-CNN from brain MRI images," ISBI, 2019.

[6] J. Cheng et al., "Brain age estimation from MRI using cascade networks with ranking loss," IEEE T-MI, 2021.

Method	IXI / ADNI		Aoba-1 / Tsurugaya-1	
	MAE [yrs] ↓	Corr. ↑	MAE [yrs] ↓	Corr. ↑
Ueda3DNet [5]	3.62	0.941	3.35	0.941
TSAN [2]	3.42	0.938	3.21	0.953
GLT [6]	5.45	0.920	4.83	0.929
SQET [1]	4.32	0.939	3.86	0.965
SQET-MoE	3.11	0.979	3.17	0.988