Biophysics-based data assimilation of longitudinal tau and amyloid-β PET scans: Supplementary Materials

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Table 1: Clinical inversion for five patients. We run our four algorithm variants to the ADNI dataset. Five patients with largest global tau are taken as examples. Among the patients, the first is a CN subject, followed by two MCI and two AD subjects. We take $e_{\mathbf{d}}$ and R^2 as two criterion. TauAβ-1S and TauAβ-MS perform the best among all algorithms for these five patients.

PID	Tau-only Single Scan		Tau-only Multiple Scans		Tau-Aβ Single Scan		Tau-Aβ Multiple Scans	
	$e_{\mathbf{d}}$	R^2	$e_{\mathbf{d}}$	R^2	$e_{\mathbf{d}}$	R^2	$e_{\mathbf{d}}$	R^2
032_S_4277	5.83×10^{-1}	3.05×10^{-1}	6.06×10^{-1}	-1.06×10^{-1}	5.44×10^{-1}	$\mathbf{3.96 \times 10^{-1}}$	$\mathbf{4.95 \times 10^{-1}}$	2.59×10^{-1}
012_S_6073	4.47×10^{-1}	3.45×10^{-1}	4.92×10^{-1}	1.22×10^{-1}	$\mathbf{4.11 \times 10^{-1}}$	$\mathbf{4.47 \times 10^{-1}}$	4.17×10^{-1}	3.71×10^{-1}
153_S_6679	4.65×10^{-1}	4.33×10^{-1}	4.37×10^{-1}	2.11×10^{-1}	4.38×10^{-1}	$\mathbf{4.96 \times 10^{-1}}$	$\mathbf{4.05 \times 10^{-1}}$	3.22×10^{-1}
305_S_6810	5.49×10^{-1}	4.42×10^{-1}	5.05×10^{-1}	4.45×10^{-1}	5.06×10^{-1}	5.25×10^{-1}	$\mathbf{3.97 \times 10^{-1}}$	$\mathbf{6.58 \times 10^{-1}}$
032_S_6600	$\mathbf{4.03 \times 10^{-1}}$	2.04×10^{-1}	5.00×10^{-1}	6.26×10^{-2}	4.51×10^{-1}	1.51×10^{-3}	4.56×10^{-1}	$\mathbf{2.23 \times 10^{-1}}$

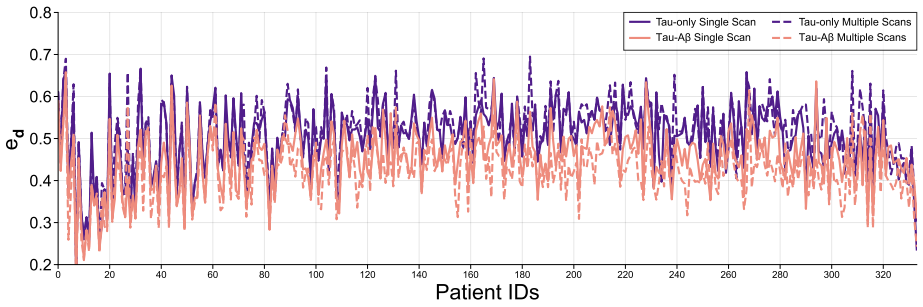

Fig. 1: Clinical inversion ℓ_2 relative error for all patients and four algorithmic variants. For each patient, we compute the relative error between fitting result and observation. Patients are sorted by global tau from low to high. Tau-Aβ Multiple Scans performs the best in clinical dataset.

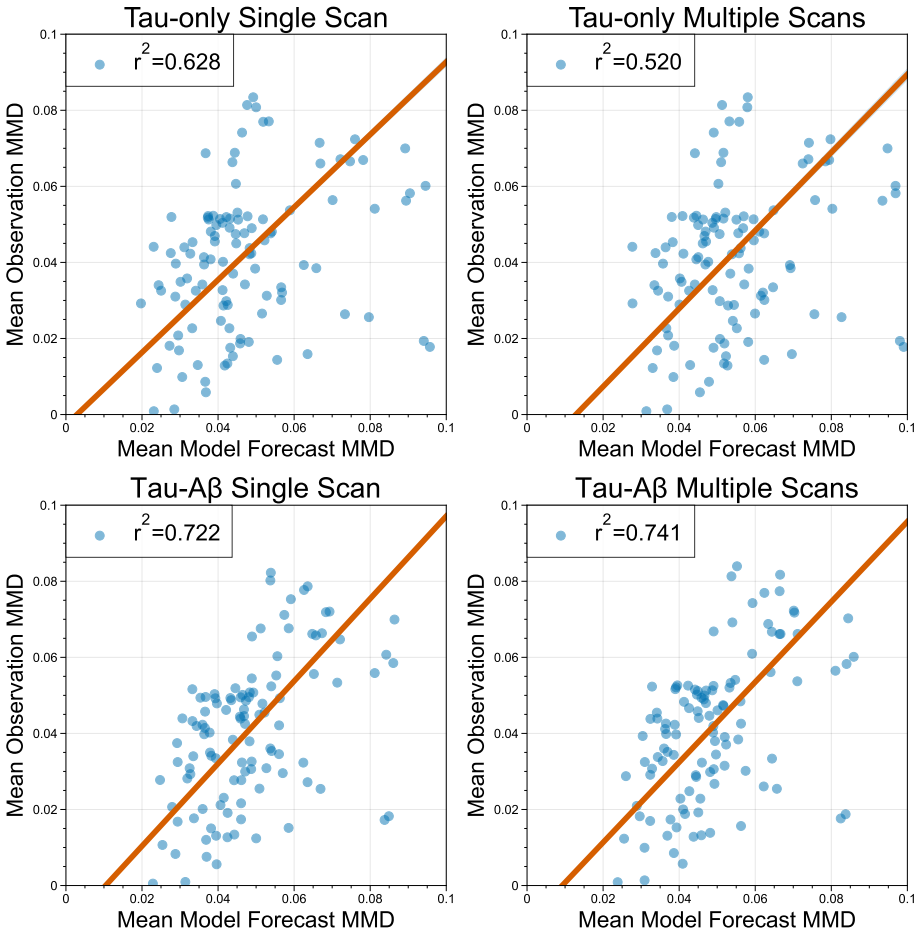

Fig. 2: Clinical forecast prediction R^2 for four algorithmic variants. We subselect 143 patients with more than one Tau-PET scans and Aβ-PET scans in this experiment. The last tau scan will be taken as the forecast ground truth which is not visible to the inversion algorithm. Four algorithms fit the available datas and extend the ODE to longer time horizon. We present the R^2 for four algorithms. TauAβ-MS performs best.