

Single Index Models for Analysis of Mental Health Data with Functional Covariates

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Abstract: Single-index models are practical, useful tools for modeling and analyzing many clinical and psychological studies with complex non-linear covariate effects on the response. We propose frequentist and Bayesian methods for monotone single-index models where the monotonicity of the unknown link function renders a clinically interpretable index, along with the relative importance of the scalar and functional covariates on the index. To ease the computational complexity of the frequentist and Bayesian analysis, we also develop a novel and efficient algorithms. These methodologies and their advantages over existing methods are illustrated via simulation studies and analysis of a depression study of adolescent girls.