Industrial & Systems Engineering

Seminar Announcement

An I-frame Methodology for Approximating Nonlinear Least Squares

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Abstract: The classic approach for estimating parameters of a model using historical data is to solve a nonlinear least squares optimization problem using numerical methods. We develop an I-frame methodology using a modified fast marching method to solve the nonlinear least squares problem quickly which can be applied to both offline and online (where data is streamed in real time) parameter estimation. Using the concept of I-frames from imaging and animation, we approximate a solution to the nonlinear least squares problem via a two-step process, an I-frame optimization and an incremental optimization. The I-frame optimization solves for the parameters using a subset of data points and the incremental optimization adjusts the parameters in between the I-frames. We show that the criterion of generating I-frames can affect the average squared error of the final solution. Our methodology benefits from being scalable as the number of parameters and amount of data increases with an appropriate I-frame generation criterion.

Bio: *Philip C. Placek* is a Ph.D. candidate in Industrial and Systems Engineering at the University of Washington. His research interests include discrete optimization, nonlinear optimization, optimal control, forecasting and cloud computing.

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