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The search for a method for calibration of complex machines

CQM is a consultancy company that has been performing projects in industrial R&D for over four decades. In recent years, we have encountered several problems of the same type: calibration or fine-tuning of a complex machine for use in a production process as soon as possible. Several aspects make that the standard Response Surface Methodology (i.e., design and perform an experiment, build a model, and optimize) is not the primary method of choice for these problems. Possible reasons for this are 1) the controllable variables are typically moved in small steps only; or 2) modelling does not start from scratch as there is historic knowledge about the model from earlier machines of the same type, or the same machine in earlier instances; or 3) important physical variables cannot be observed directly, but do occur as latent variables in a causal model . Lastly, the customer or project context may already have a preferred method in place. In the talk, we share some approaches that combine several techniques and areas to address these issues, including Bayesian optimization a.k.a. surrogate assisted optimization, causal modelling, and Bayesian models.

Special/ Invited session

Classification

Mainly application

Keywords

DoE, Causal model, Bayesian optimization

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