Many real-world engineering problems rely on human preferences to guide their design and optimization. We present PrefOpt, an open source package built on Edward, to simplify sequential optimization tasks that incorporate human preference feedback. Our approach extends an existing latent variable model for binary preferences to allow for observations of equivalent preference from users.

We are motivated by the problem of tuning the behavior of a motion planning system configurations as either more, less or equivalently comfortable. The pairwise comparisons are used to refine the search for the optimal configuration.

To determine the next point ($x^*$) to be presented to the user as a comparison point, we adopt a strategy that searches for where the expected improvement of the latent function is highest relative to the current, most preferred point ($x^a$). The preference observations were simulated as follows: $\Phi(\cdot)$ and $\phi(\cdot)$ denote the CDF and PDF of the standard normal distribution, respectively. The value $f_{\text{best}}$ is the latent function value associated with the currently most preferred configuration ($x^a$). The goal of the PrefOpt software package is to provide a simple interface for conducting human-in-the-loop, preference-based optimization tasks. The open source PrefOpt package will be hosted at https://github.com/prefopt/prefopt.