A Hierarchical Bayesian Approach for Modeling Infant-Mortality and Wearout Failure Modes

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Abstract

The text of your abstract. 100 or fewer words.

Keywords: 3 to 6 keywords, (don't reuse words appearing in title)

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1 Introduction

1.1 Background

This section will follow last paper.

1.2 Motivation

This section will follow last paper.

1.3 Overview

This section will follow last paper.

2 Lifetime Model

2.1 GFLP Model

I think we introduce the general GFLP model much like in Meeker and Chan.

2.2 Weibull Lifetime Distribution

We introduce the specific Weibull lifetime distribution and write out the pdf, cdf, and interpretation of the parameters.

2.3 Censoring and Truncation

Similar to last paper, review the issues due to left truncation and write truncation.

2.4 Data

Introduce the data and show some summary statistics, but NOT box plots. Perhaps show an adjusted Kaplan Meier plot to show a Weibull lifetime distribution could be reasonable.

3 Weibull Model

3.1 Likelihood

Write out the likelihood for the single Weibull with censoring and right truncation. This can come from the previous paper. Also mention why MLE model alone by brand has its limitations.

3.2 Hierarchical Model

Write out the model, priors, etc for the single Weibull Distribution model.

3.3 Comparison of Approaches

Compare MLE estimates to Weibull and show improved precision due to pooling of information. This can follow the last paper in terms of the plots. I think this section should be shorter, however, since we are just warming up for the GFLP Model.

4 GFLP Model

4.1 Motivation

Point out limitation of single failure mode model (perhaps show a drive model with a kink in the distribution) and then present the GFLP Model. Could also discuss the bathtub hazard. Mention Wayne Nelson.

4.2 Model

Write out the full Bayes hierarchical model for the GFLP model

4.3 Goodness of Fit

Show some of the fits of the GFLP Model. Mention some convergence statistics for the MCMC.

4.4 Brand Comparisons

How can we use this model to compare brands? Present comparisons of Quantiles, other parameters. Highlight how this model could be used in an applied sense.

5 Concluding Remarks and Extensions

Review the advantages of fitting the GFLP model and offer future ideas.

SUPPLEMENTARY MATERIAL

Put R Stan code here

References