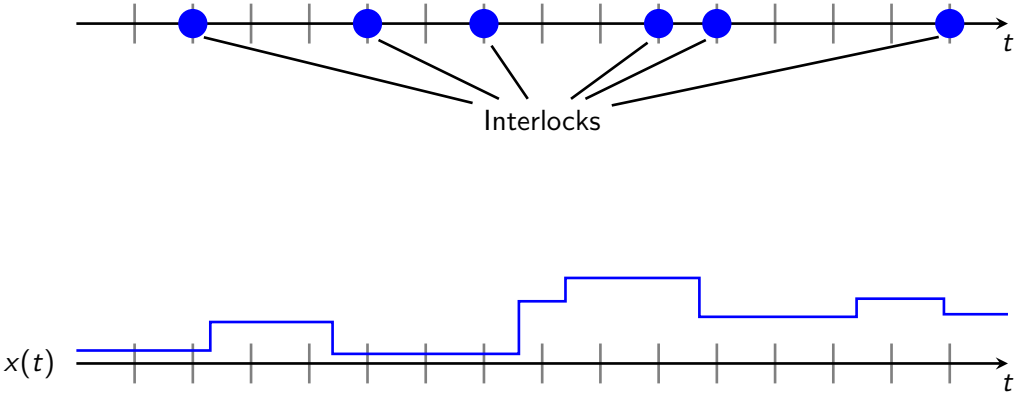
S. Li, M. Zacharias, A. Pentina, J. Coello, D. Reggiani, J. Snuverink, A. Adelmann :: LSM :: Paul Scherrer Institut

HIPAInterlock Survival Modelling Overview

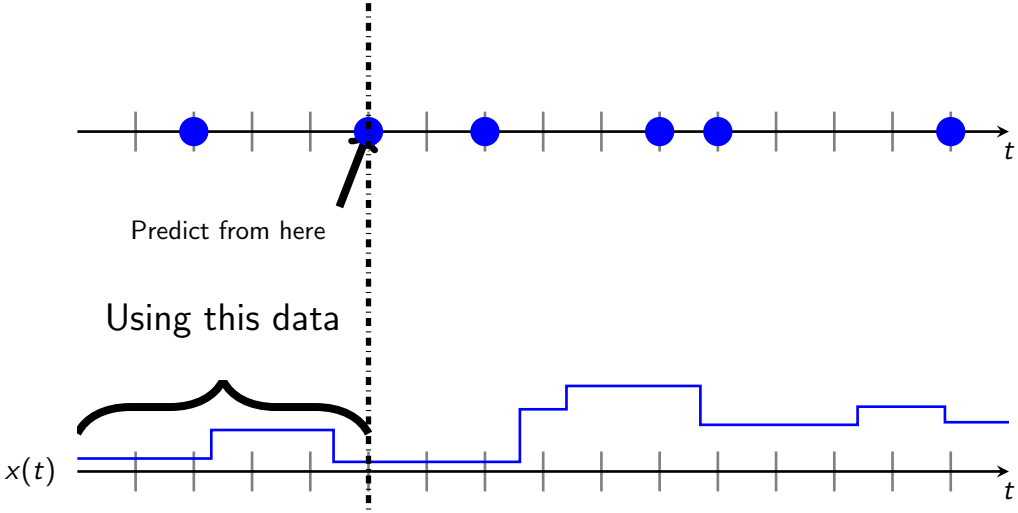
December 2, 2019

Problem



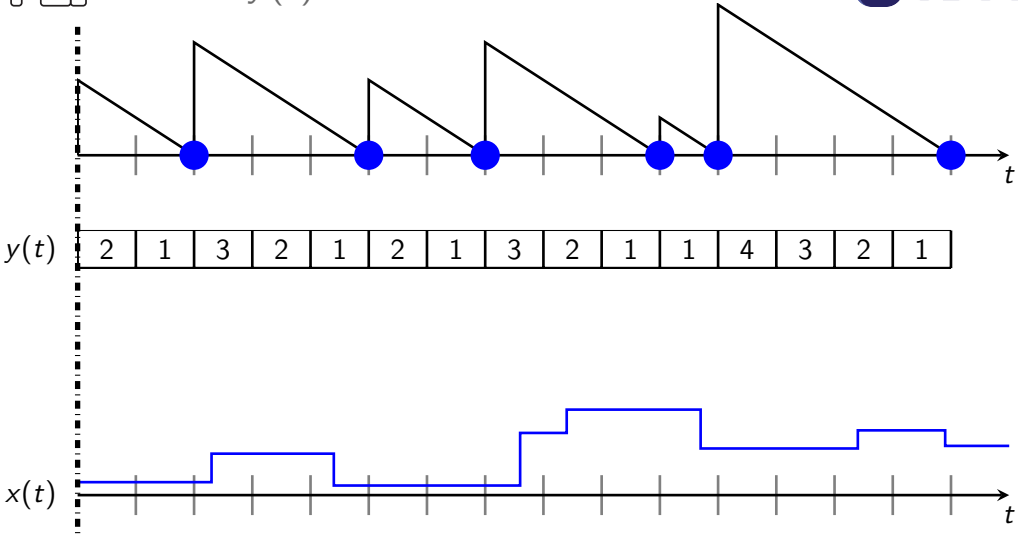
An example channel (total 450)

Problem



An example channel (total 450)

Define $y(t)$ to be "Time To Interlock"



An example channel (total 450)

Predict a distribution over the future: Weibull distribution

$$f(y;\alpha,\beta) = \frac{\beta}{\alpha}\left(\frac{y}{\alpha}\right)^{\beta-1} e^{-(y/\alpha)^{\beta}}, y \geq 0 \tag{1}$$

- $\alpha > 0$ is the scale parameter: larger $\rightarrow$ distribution more spread out
- $\beta > 0$ is the shape parameter: affect shape, not simple shifting or stretching

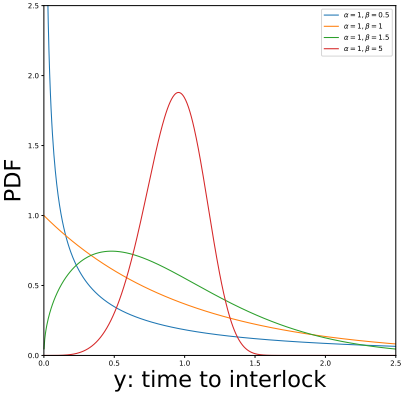
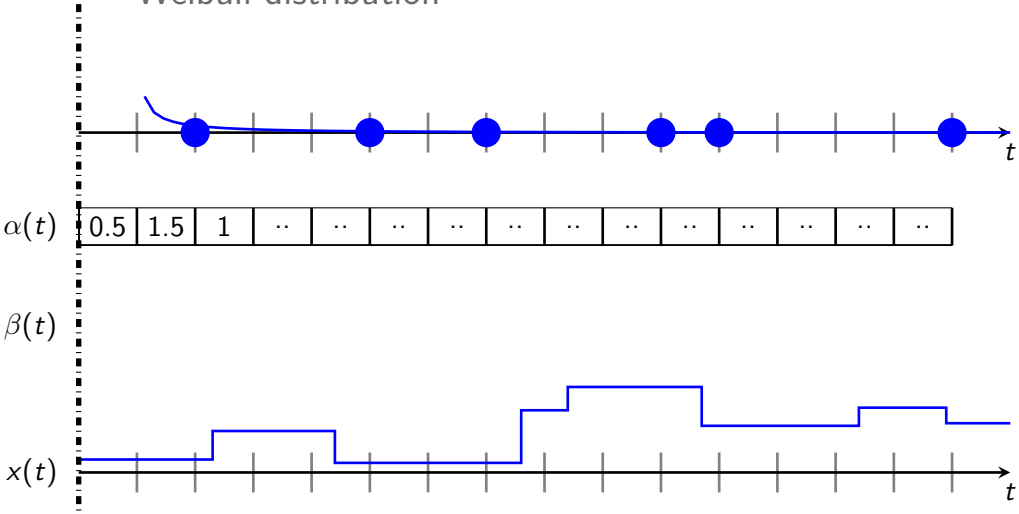


Figure: Weibull distribution PDF

Predict a distribution over the future: Weibull distribution



An example channel (total 450)

Network

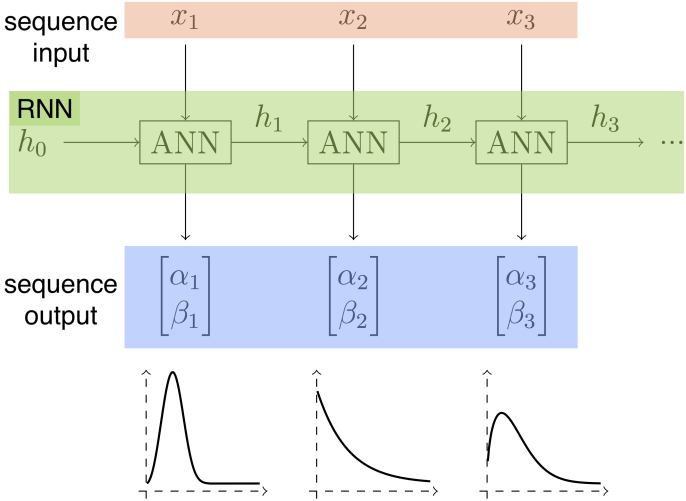


Figure: Network sketch from WTTE-RNN package

Loss

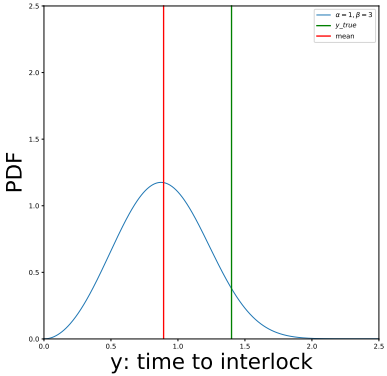
- Max likelihood: all data are observed in the past

$$\max_{\alpha,\beta} f(y|\alpha,\beta) \tag{2}$$

- Loss = -log likelihood

Performance

- Distance between obtained "mean/mode-time-to-interlock" and y_{true}



References

- WTTE-RNN package: `https://github.com/ragulpr/wtte-rnn`

Thanks to

Andreas Adelmann
Jaime Coello
Anastasia Pentina
Davide Reggiani
Jochem Snuverink
Mélissa Zacharias