Time Series Forecasting Based on Chained Correlated Gaussian Procesees

An Stochastic Approach

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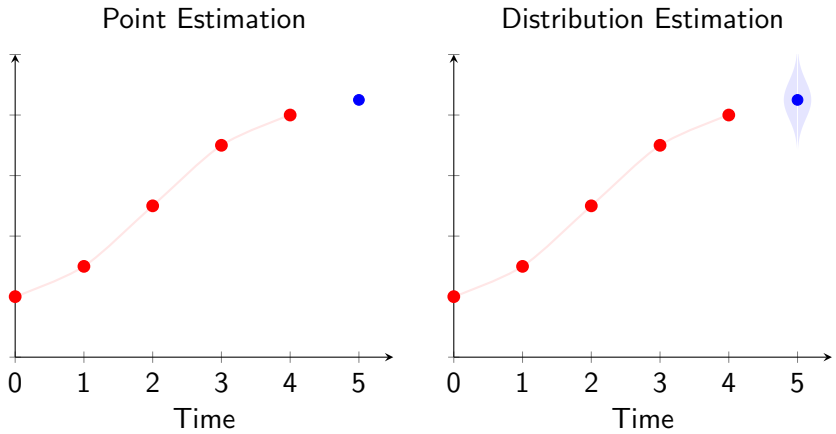
Motivation

(a) Energy Generation

(b) Stock Prices

(c) Weather Data

Point Estimation vs. Distribution Estimation



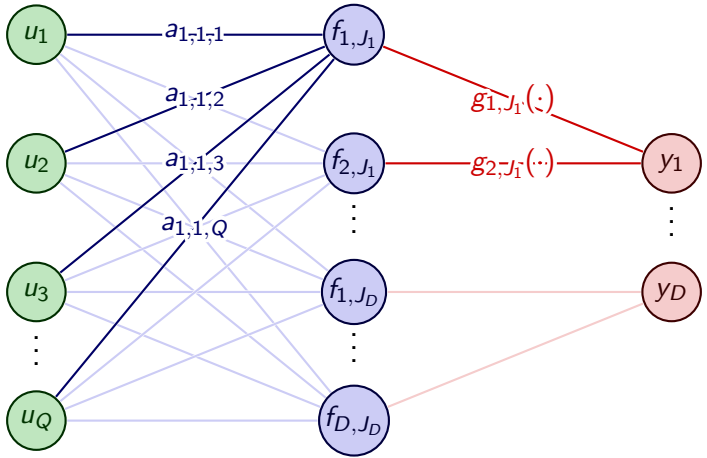
Sometimes, a single point prediction is not enough. How confident is the model in its prediction?

The Chained Correlated Gaussian Process Model

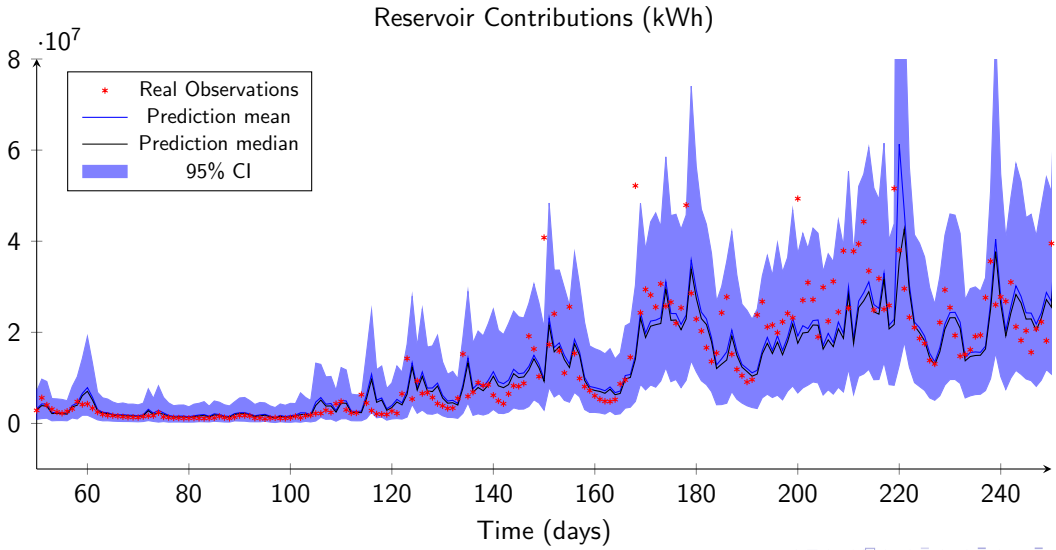
The Model is designed to:

- Deliver a posterior predictive distribution that quantifies uncertainty.
- Incorporate prior knowledge via a Bayesian inference framework.
- Capture complex nonlinear interactions and intricate patterns within the data.
- Exploit temporal dependencies.
- Maintain strong performance even in scenarios with limited or noisy data.
- Address data constraints.
- Use support multi-output scenarios.

Graphical Represenatation



Real World Scenario



Conclusion

This model provides predictive distributions that empower informed decision-making in uncertain environments.
For example:

- Energy management: Forecasting load variability.
- Weather prediction: Quantifying forecast uncertainty.
- Financial risk assessment: Generating reliable confidence intervals.