

Generate explanations for time-series classification by ChatGPT

Xue Zhechang

CHAIR FOR PERVASIVE COMPUTING SYSTEMS, INSTITUTE OF TELEMATICS, DEPARTMENT OF COMPUTER SCIENCE

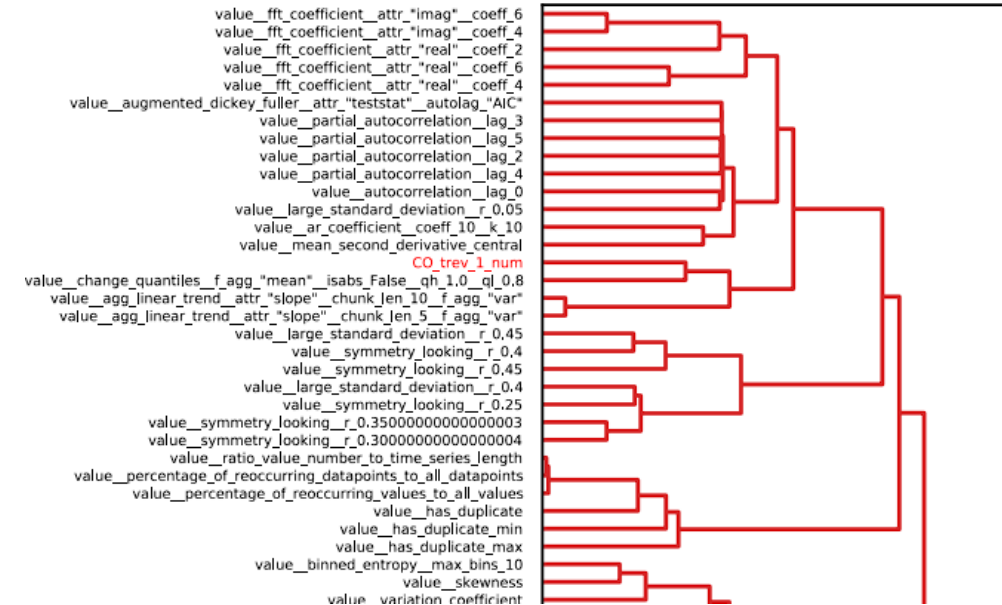


Outlines

- Motivation
- Reason of using ChatGPT
- A preliminary experiment
- Methodology
- Evaluation

Motivation

- Problem: Current methods to explain time series are **not user-friendly** for **non-researchers**.
- Idea: Use **ChatGPT** to explain why the feature can contribute to the classification
- Benefit:
 - User-friendly and easy-accessible.
 - Link features to knowledge in other fields.



Reason of using ChatGPT

Related Works

■ Forecasting via Prompt

- Prompt-based method > numerical-based in forecasting time-series data
- Big advantage in zero-shot (RMSE: 70 vs 7)



■ Casual inference

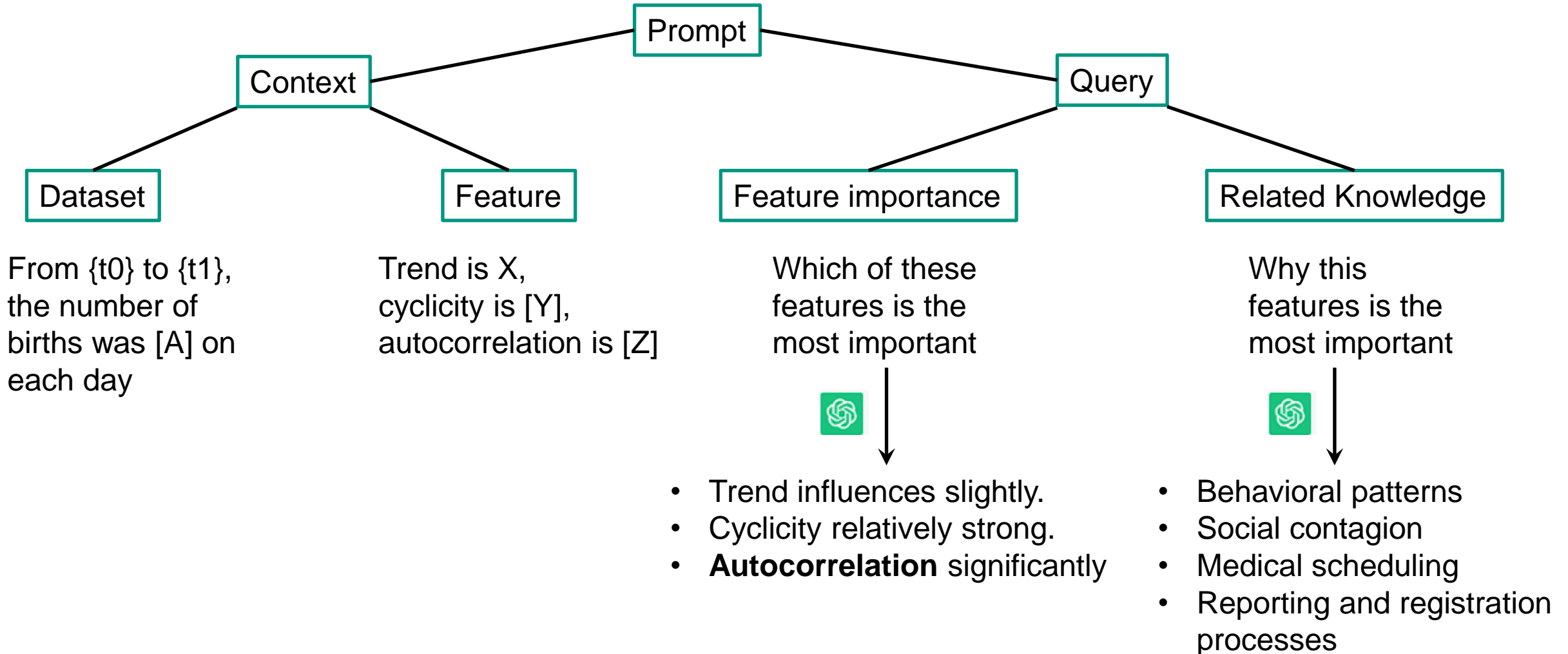
- GPT can generate causal graphs in a high accuracy (about 70%)
- Helpful in combining domain knowlegde to classification.



PROMPTCAST: A NEW PROMPT-BASED LEARNING PARADIGM FOR TIME SERIES FORECASTING, Hao Xue, Flora D. Salim, <https://arxiv.org/abs/2210.08964>
Can Large Language Models Build Causal Graphs?, Stephanie Long, Tibor Schuster, Alexandre Piché, <https://arxiv.org/abs/2303.05279>

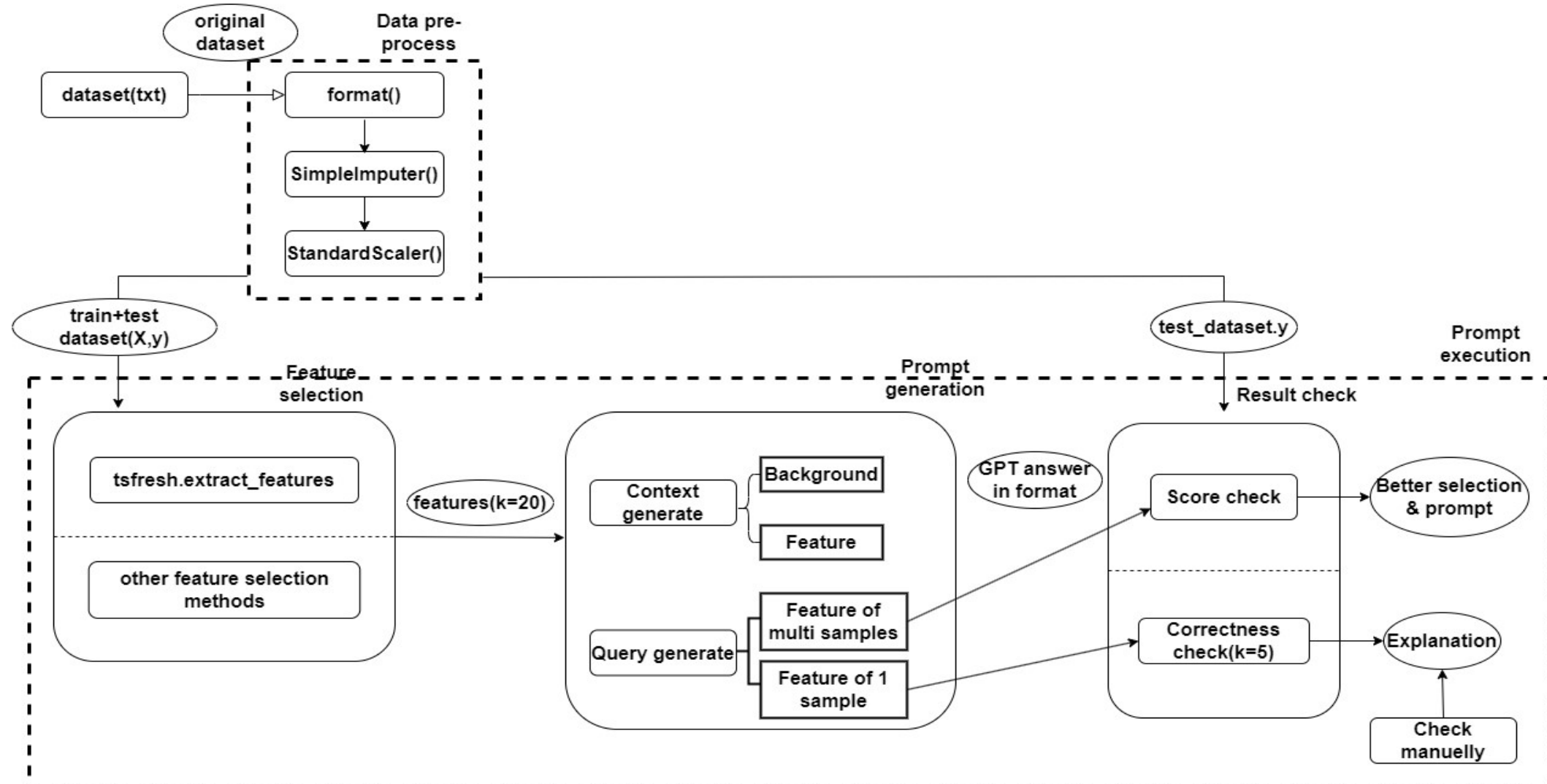
A preliminary experiment

Daily total female births in California in 1959



Methodology

General pipeline



Evaluation

- Research object: Time-series datasets about human activity recognition
 - 1 basic movement (pick up, shake...) & 2 advanced (basketball, brush teeth...)
 - Intuitively understandable explanation

- Target:
 - Stable desired answer
 - Better prompt, avoiding incorrect answer or unwished format

 - Prove to be reliable
 - Correct casual inference
 - Good consistency
 - Modify original data to strongly affect feature