



Explanable model for time-series via ChatGPT

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Outlines

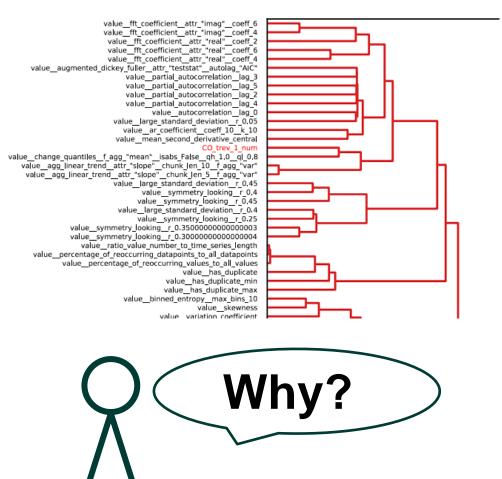


- Motivation
- Reason of using ChatGPT
- A preliminary experiment
- Methodology
- Evaluation

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.



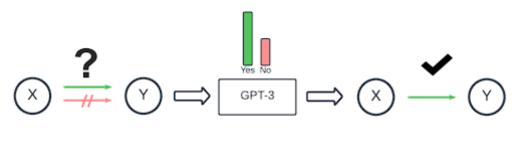


Reason of using ChatGPT

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 knowlegge to classification.



 a) Possible directed arrow between X and Y. b) Evaluate the possibility of an arrow with GPT-3. c) Compare the GPT-3 prediction with the true structure.

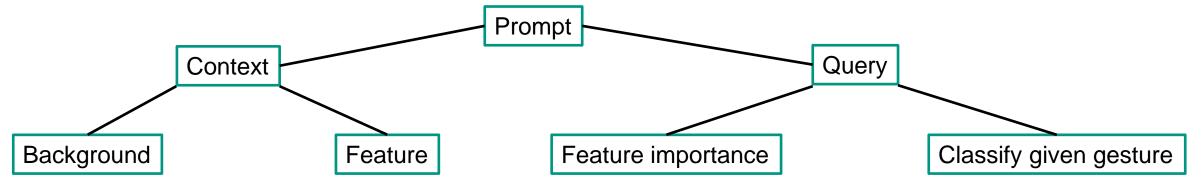
PROMPTCAST: A NEW PROMPT-BASED LEARNING PARADIGM FOR TIME SERIES FORECASTING, Hao Xue, Flora D. Salim, https://arxiv.org/abs/2210.08964 Can Large Language Models Build Causal Graphs?, Stephanie Long, Tibor Schuster, Alexandre Piché, https://arxiv.org/abs/2303.05279



A preliminary experiment

Accelerometer in x-axis with different gestures





The given features are about Accelerometer in x-axis with different gestures

Trend,
Directional change,
Periodic fluctuation...

Which of these features is the most important



- Trend influences slightly.
- Directional change relatively strong.
- **Periodic fluctuation** significantly.

A. Pick up;B. shake hand;C. Move to left;D. move to right.



- Answer: Shake hand
- Periodic fluctuation means periodic move
- Directional change means the move has 2 directions.

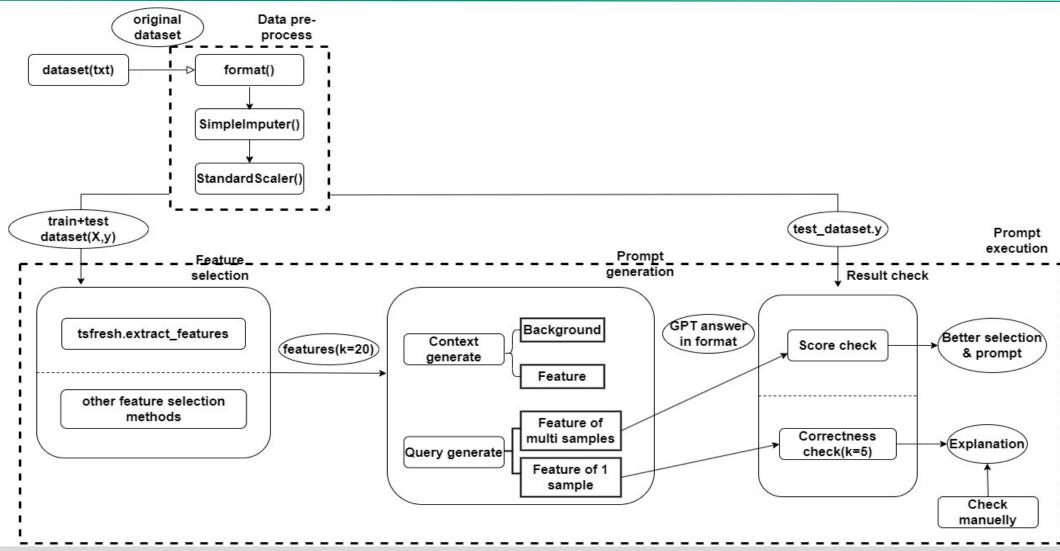


Explanable model for time-series via ChatGPT

Methodology

General pipeline





Evaluation



- Research object: Time-series datasets about human activity recognition
 - basic movement (pick up, shake...)
 - 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 result