SDMA: Saliency-Driven Mutual Cross Attention for Multi-Variate Time Series

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1 INTRODUCTION

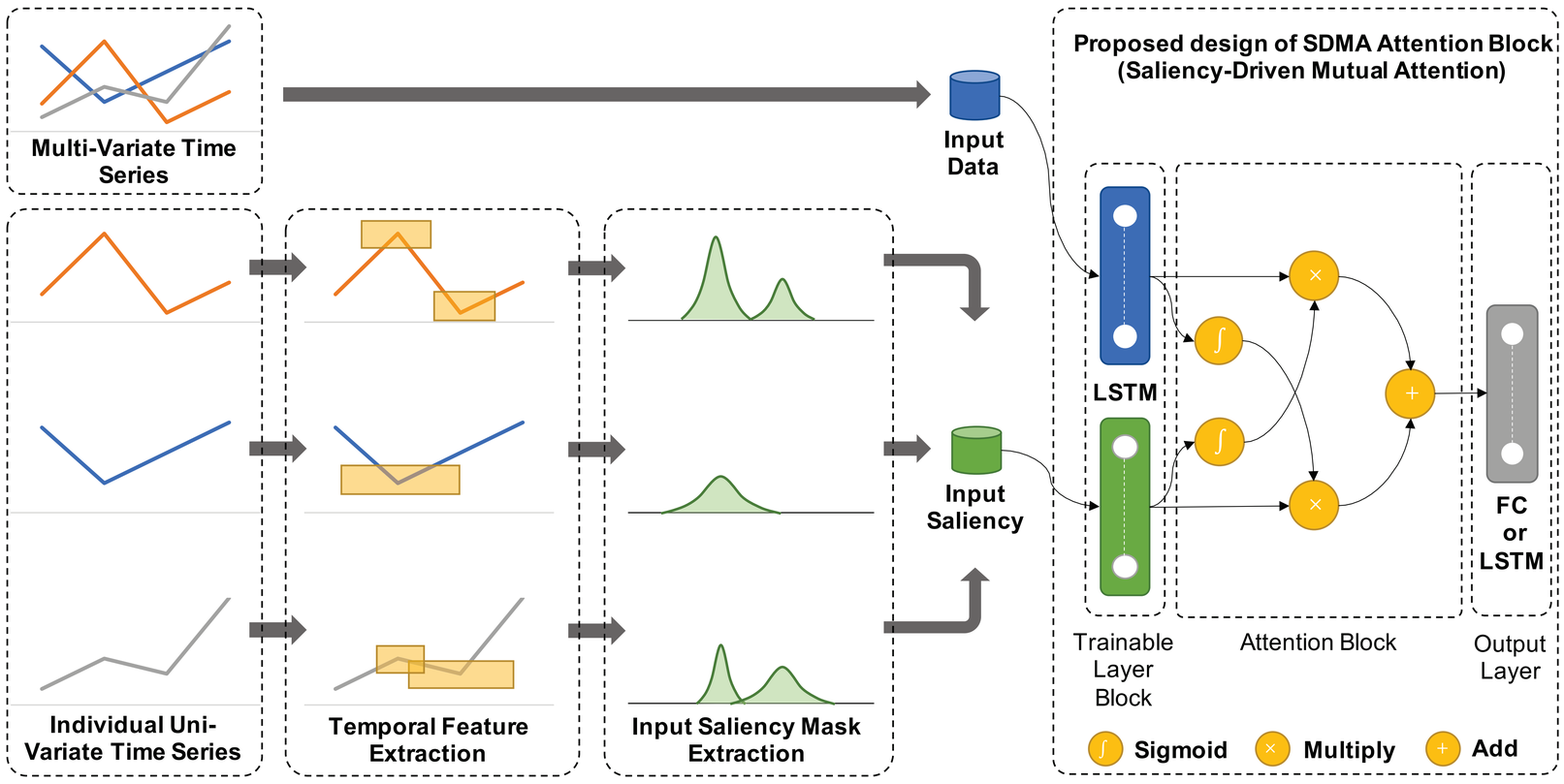
MOTIVATION

- Multi-variate time series (MVTS) records *multiple* **attributes** simultaneously
- Recorded series maybe *contaminated* with **noisy** in information

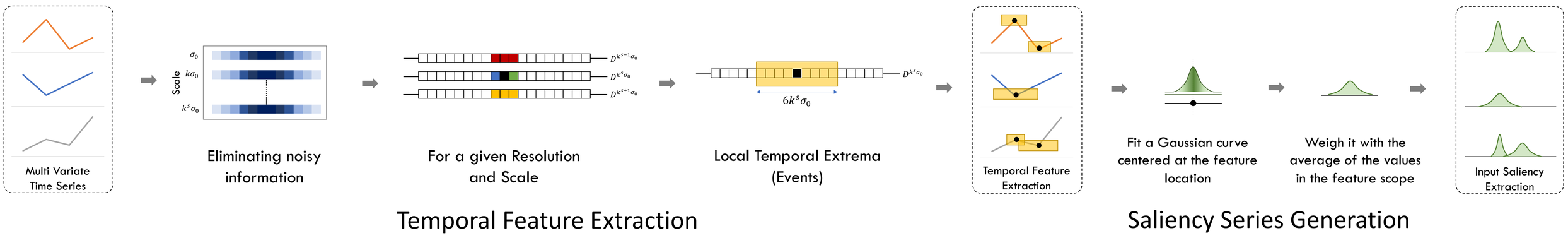
CHALLENGES

- **Separating** noise is a *difficult* process
- Can we **generate** a *noise-free input* modality
- How can network **leverage** *both inputs*: original input and noise-free?

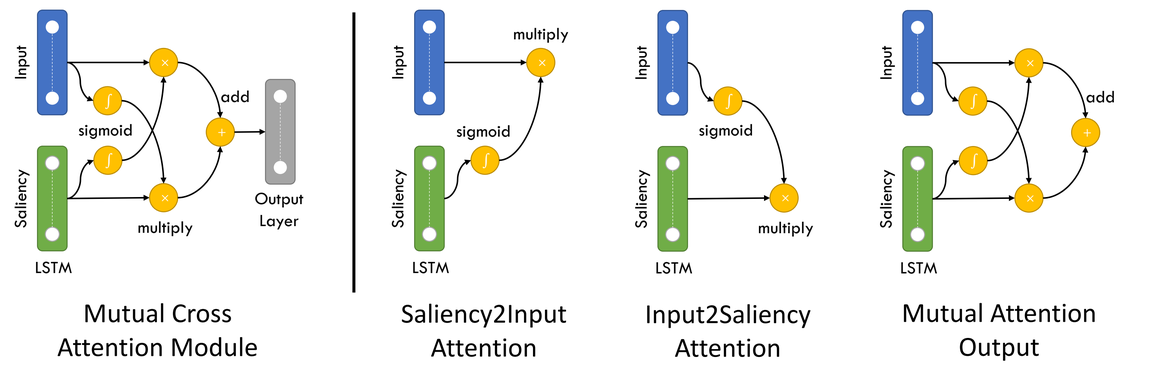
2 OVERVIEW OF FRAMEWORK



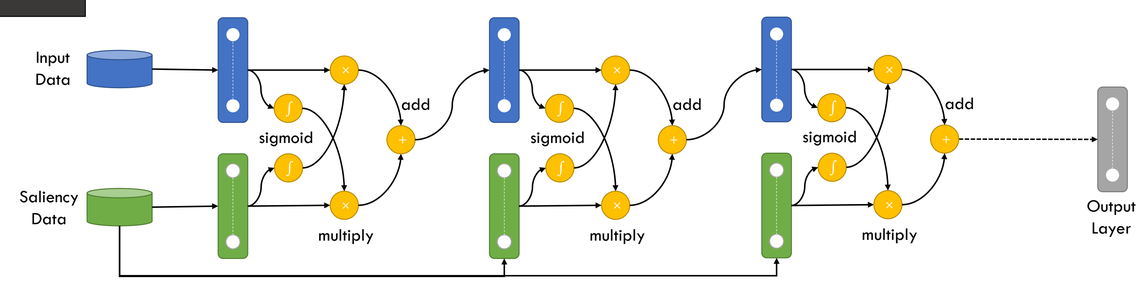
3 Temporal Features Extraction and Saliency Series Generation



4 MUTUAL CROSS ATTENTION



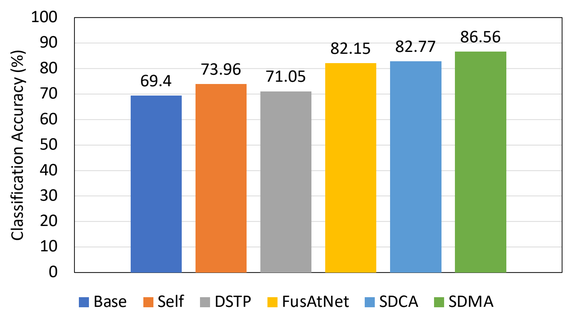
5 MULTI-LAYER CONFIGURATIONS



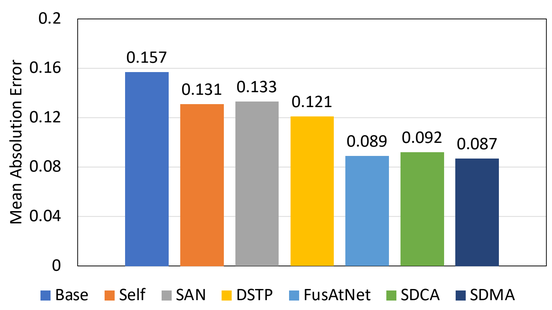
- Saliency series is rough approximation of key information of interest
- Skip connections prevent vanishing gradient is sparse saliency series

6 PERFORMANCE EVALUATION

- Architecture: Multi-Layer Type 2
- Saliency Type: Without-Cut



AUSLAN Dataset
Classification Task



SML Dataset
Regression Task

7 CONCLUSION AND FUTURE WORK

CONCLUSION

- Intelligently extracts saliency series to highlight relevant information
- Novel mutually attention combines input and saliency series

FUTURE WORK

- Explore feature density and overlaps

8 REFERENCES

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- [DSTP] Liu et al., "A Dual-Stage Two-phase Attention-based Recurrent Neural Network for Long-Term and Multi-Variate Time Series Prediction", Expert Systems and Applications2020
- [FusAtNet] Mohla et al., "Dual Attention based Multi-Model Fusion Network" CVPR Workshops 2020.
- [SDCA] Self Implementation of Naïve Cross Attention

"Can we highlight the relevant and suppress the irrelevant information?"
International Conference on Pattern Recognition, Jan 11-15, 2020, Milan, Italy

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