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@Shyam_Vis

Time-Series Aware Metrics for the Evaluation of Intraoperative EEG-Based Ischemia Detection

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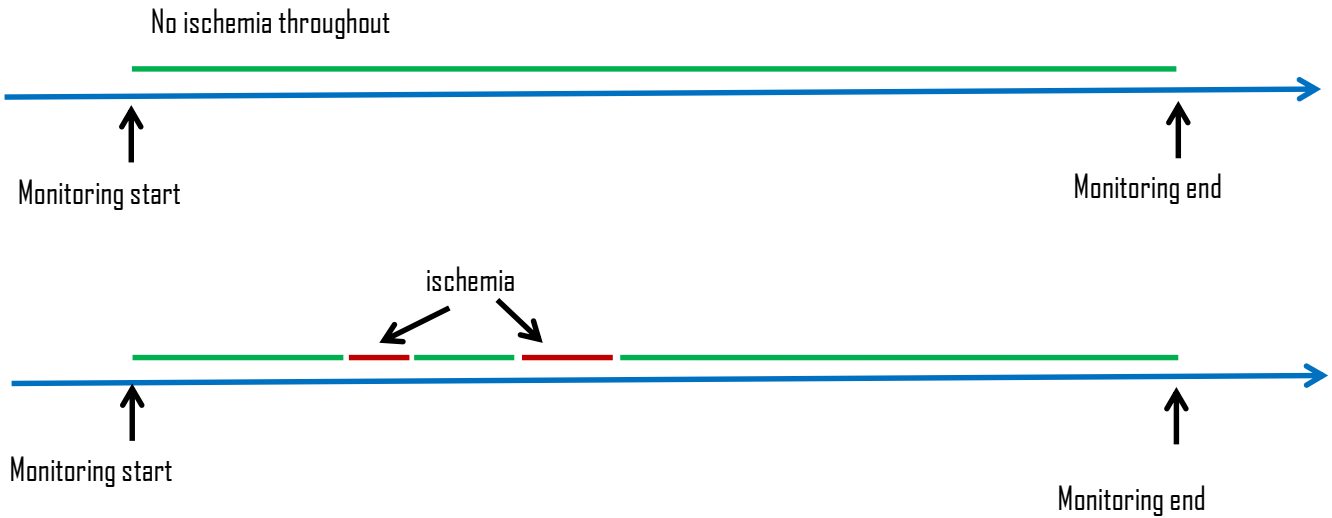
AIDH IMIA

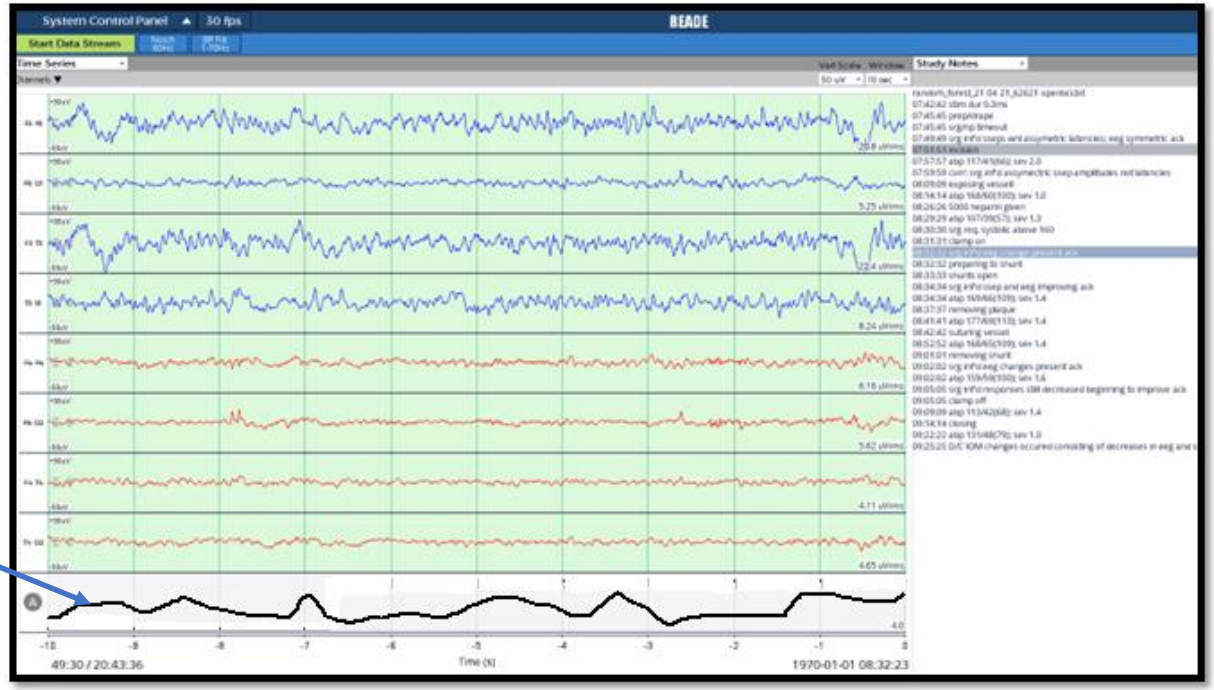
Intraoperative EEG-Based Ischemia Detection

Annotated Data

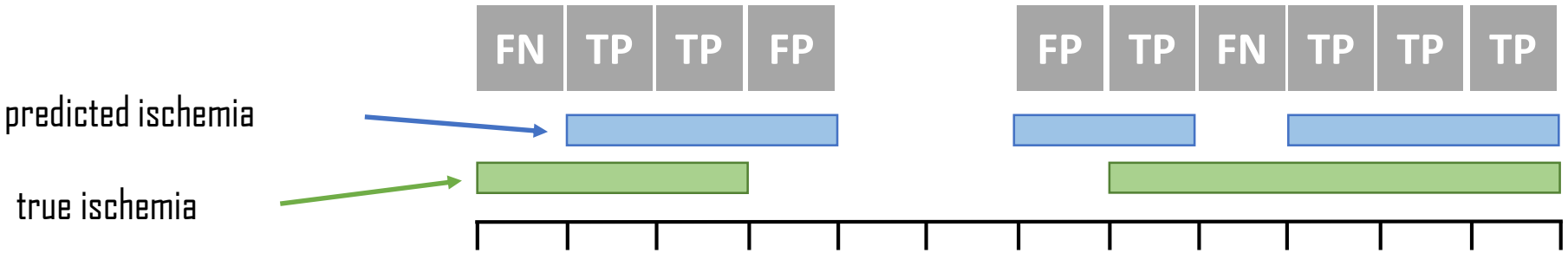


Machine Learning-Based Alerting

probability of ischemia

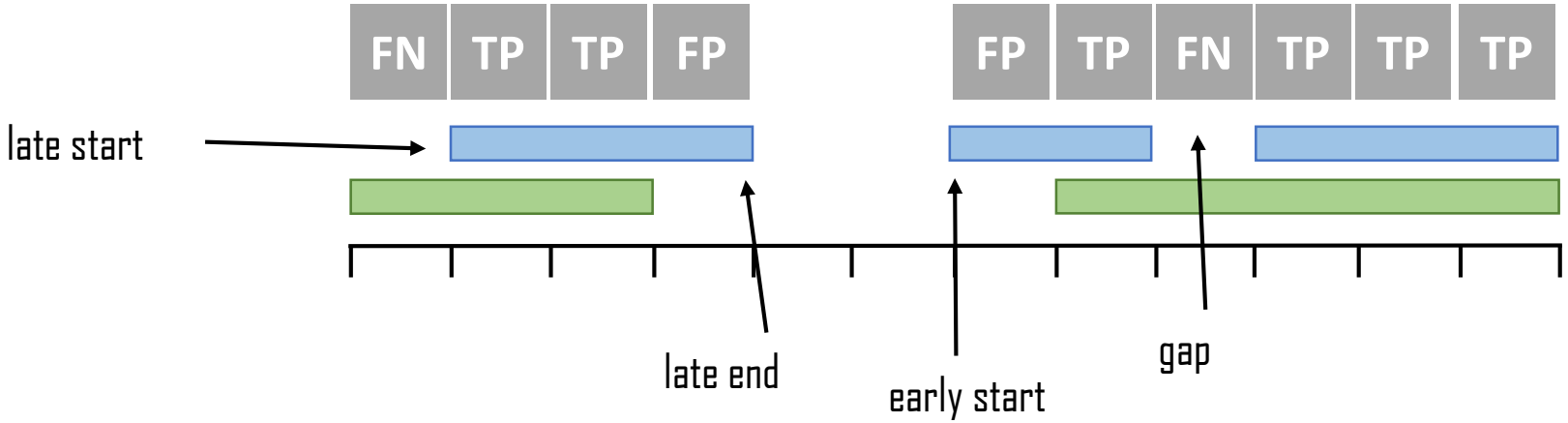


Classical Precision and Recall



- Precision = 0.75 (TPs = 6 and FPs = 2)
- Recall = 0.75 (TPs = 6 and FNs = 2)

Limitations of Classical Precision and Recall



Time-Series Aware Precision and Recall

- Range-based recall and precision (RPR)[1]
- Time-series aware precision and recall (TaPR)[2]

[1]Tatbul N, Lee TJ, Zdonik S, Alam M, Gottschlich J. Precision and recall for time series. In: Advances in neural information processing systems. 2018;31.
[2]Hwang WS, Yun JH, Kim J, Kim HC. Time-series aware precision and recall for anomaly detection: considering variety of detection result and addressing ambiguous labeling. In Proceedings of the 28th ACM International Conference on Information and Knowledge Management 2019 Nov 3 (pp. 2241-2244).

Results

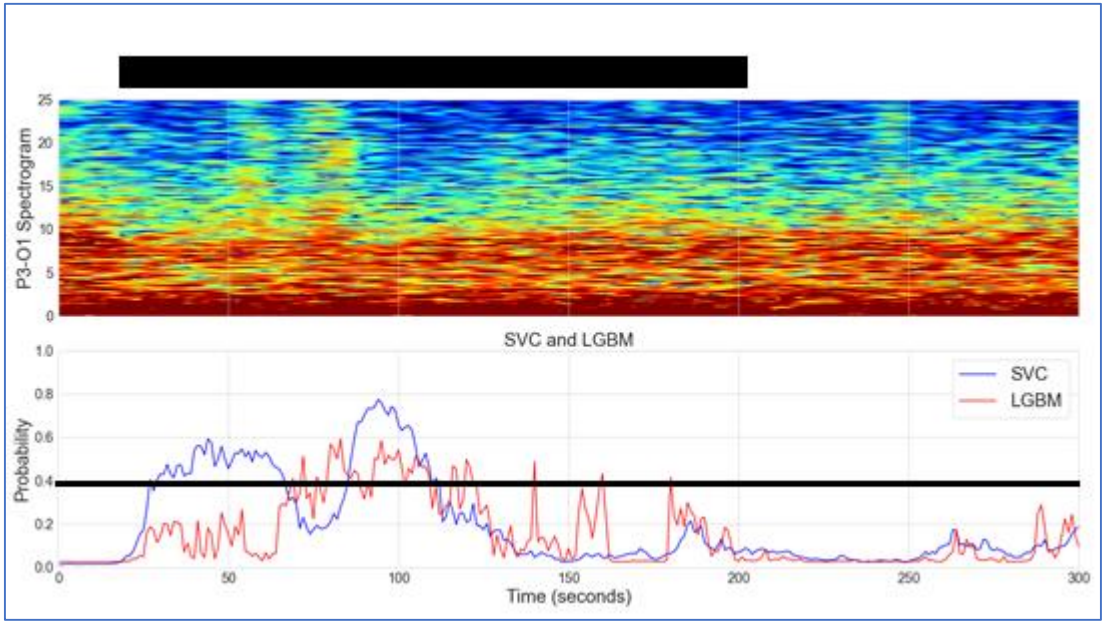
AUPRC = Area under the precision recall curve

AUPRC	Most frequently first-ranked model	Percent iterations
Classical	LGBM	64.1
RPR (front)		
TaPR		

Results

AUPRC = Area under the precision recall curve

AUPRC	Most frequently first-ranked model	Percent iterations
Classical	LGBM	64.1
RPR (front)	SVC	95.5
TaPR	SVC	83.5



Conclusions

- Clinical monitoring systems may produce alerts that are temporal in nature (start, end, duration) – e.g., continuous EEG or heart rate monitoring
- Classical evaluation metrics are likely be inadequate for evaluating such alerts and time-series aware metrics may be better suited
- In our application, the model that had highest AUPRC differed between classical metrics and time-series aware metrics

Authors & Funding

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