Spatio-Temporal Event Segmentation for Wildlife Extended Videos

by

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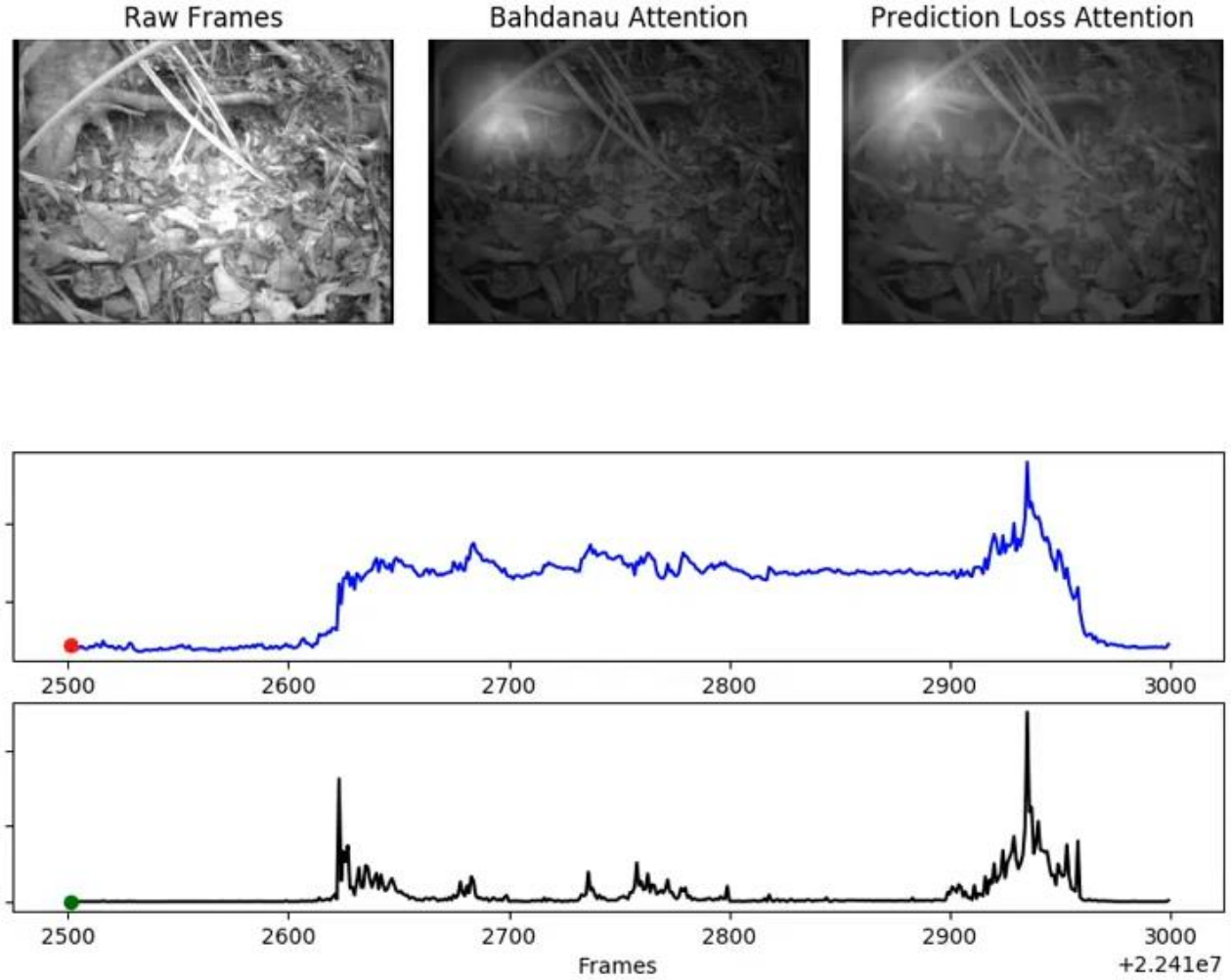
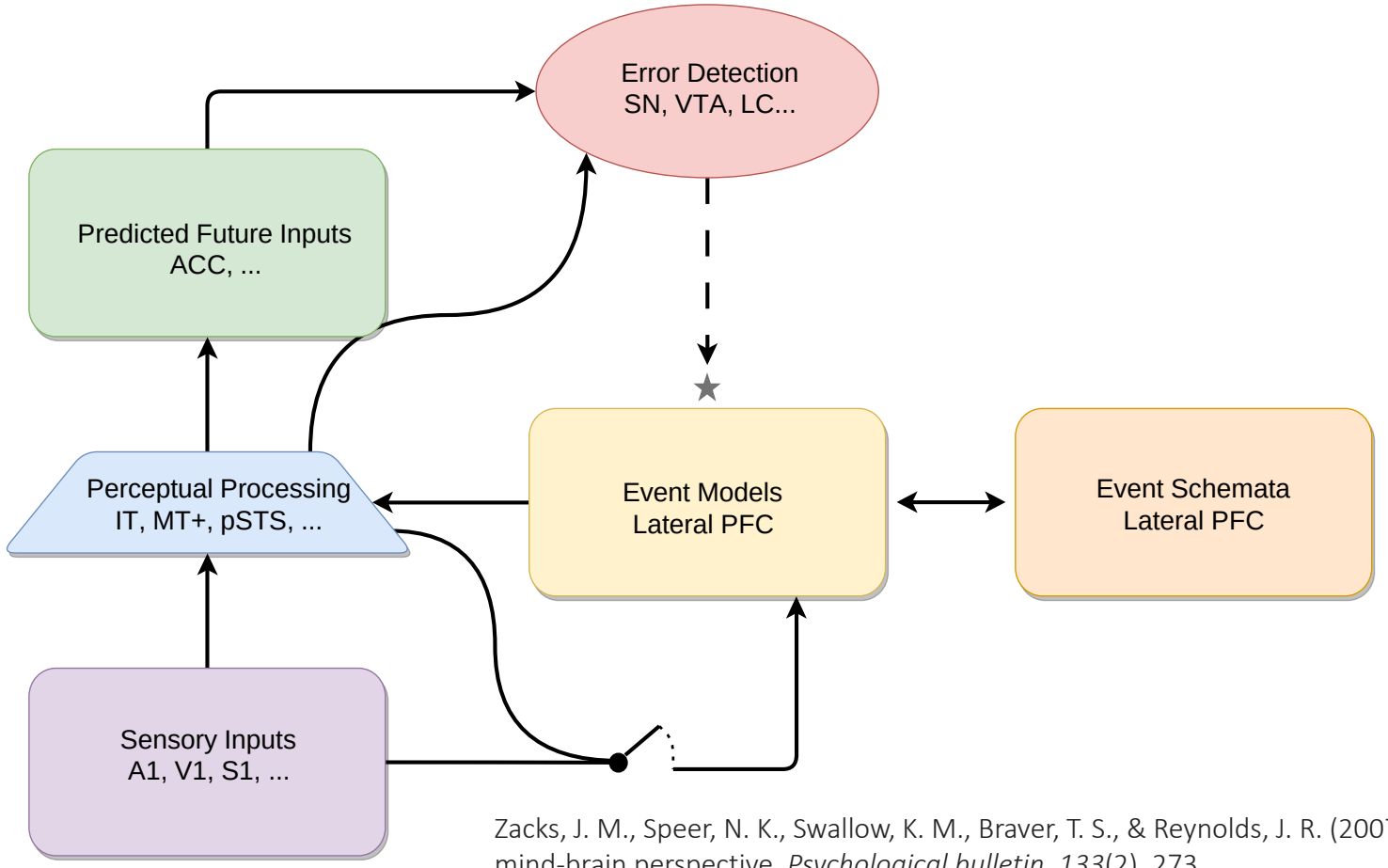
Intuition


Raw Frames
Bahdanau Attention
Prediction Loss Attention
Prediction Loss
0.4
0.2
2500
2600
2700
2800
2900
3000
Motion Weighted Loss
2
1
0
2500
2600
2700
2800
2900
3000
Frames
+2.241e7

Event Segmentation Theory

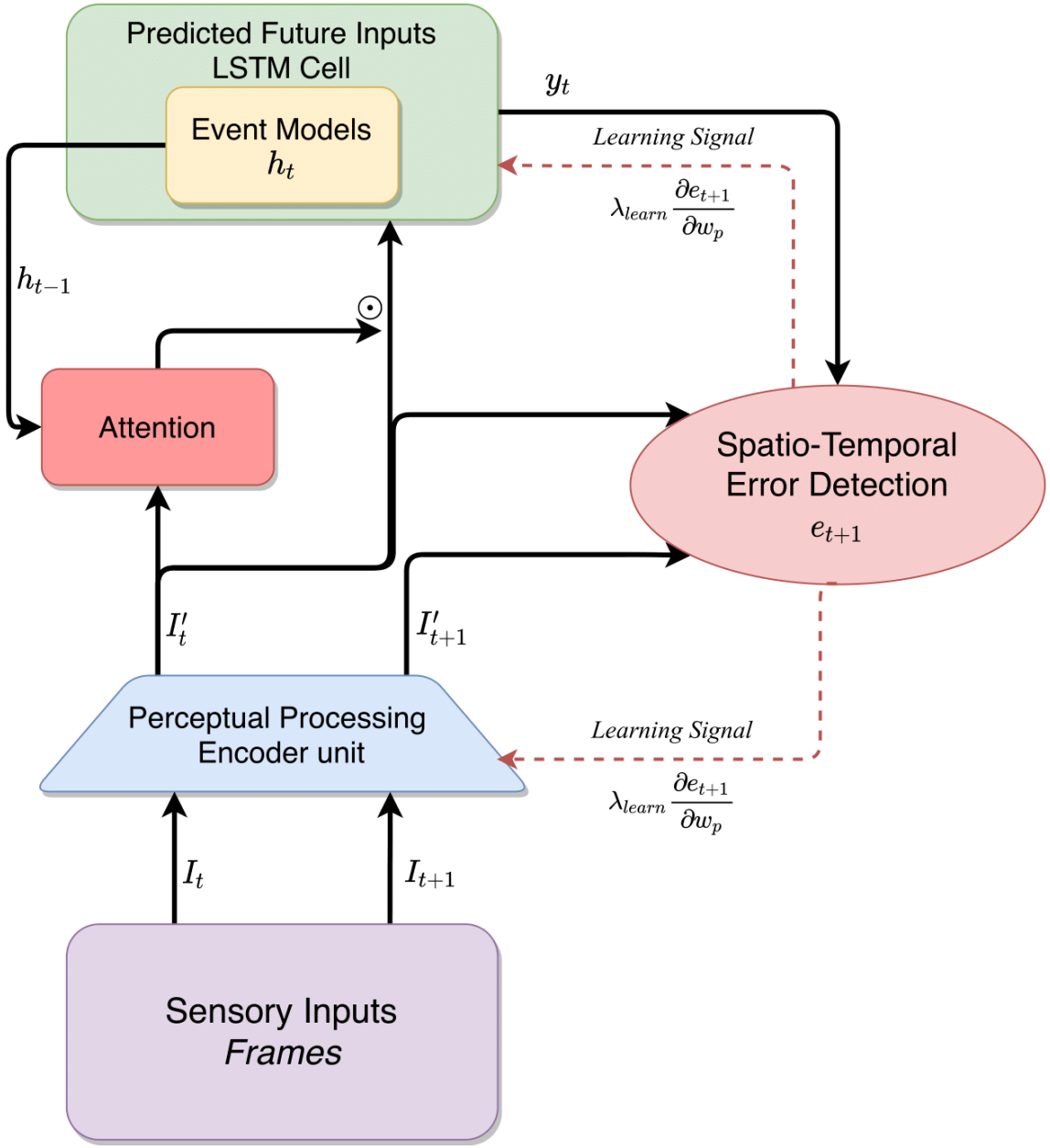


Zacks, J. M., Speer, N. K., Swallow, K. M., Braver, T. S., & Reynolds, J. R. (2007). Event perception: a mind-brain perspective. *Psychological bulletin*, *133*(2), 273.

Architecture

- Bahdanau attention is used to visualize the location of the bird.
- Motion-weighted loss is used instead of pure prediction loss.

$$e_t = ||\underbrace{(I'_{t+1} - y'_t)^{\odot 2}}_{\text{Prediction loss}} \odot \underbrace{(I'_{t+1} - I'_t)^{\odot 2}}_{\text{Motion loss}}||^2$$



Wildlife Monitoring Dataset – Kagu Bird

- Dataset consists of 10 days (254 hours @25FPS) of continuous monitoring of a nest of the Kagu bird, a flightless bird of New Caledonia.
- Annotations include “Feeding”, Nest Building while sitting”, “Nest Building Around the Nest”, “Walk in” and “Walk out” events.

Feeding the chick

Nest building while sitting

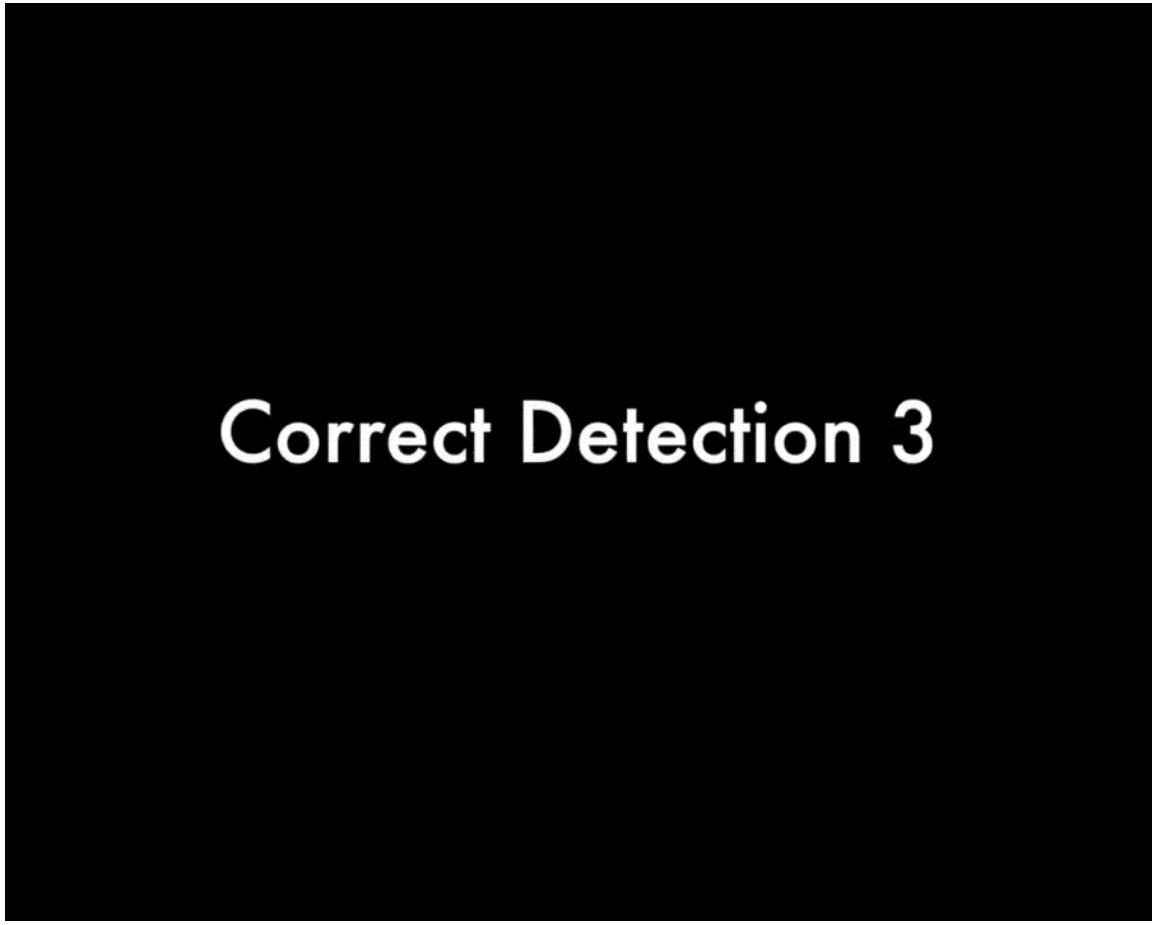
Nest building around the nest

Walk in the nest

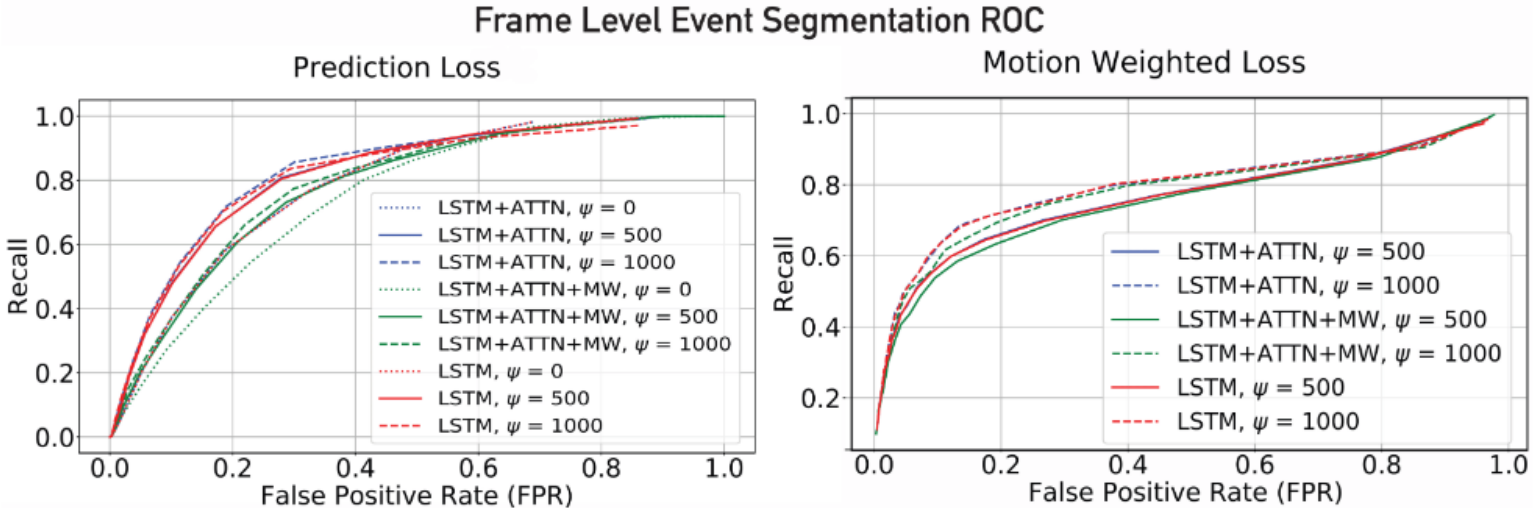
Walk out the nest

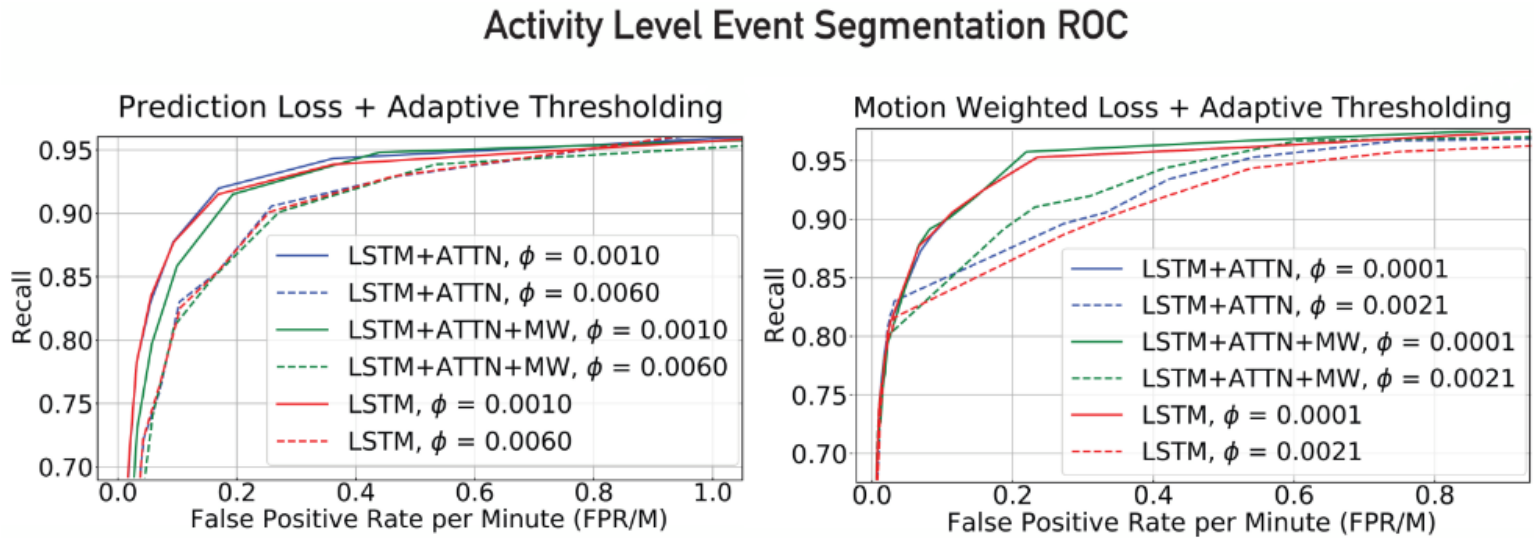
Qualitative results

Qualitative Results



Quantitative Results





Thank you!
Questions?

The Kagu birds are protected species.

This dataset was made possible through funding from the Polish National Science Centre (grant NCN 2011/01/M/NZ8/03344 and 2018/29/B/NZ8/02312). Province Sud (New Caledonia) issued all permits - from 2002 to 2020 - required for data collection.
This research was supported in part by the US National Science Foundation grant IIS 1956050.