ON THE CHALLENGES OF FULLY INCREMENTAL NEURAL DEPENDENCY PARSING

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Dialogue processing, simultaneous

translation, live ASR, etc. are some

applications that need incrementality.



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- Parsing is a core NLP task to extract syntactic structure.

Incremental parsing is more similar to

human language processing than

I prefer early -----

I prefer early morning flights



- SoTA parsers rely on bidirectional and non-incremental neural architectures. - However, human parsing is *incremental*.

prefer early morning flights -----

prefer early morning flights -----

prefer early morning flights -----



METHODOLOGY

bidirectional parsers.



Transition-Based (tb)

- Incremental system (state = buffer + stack).
- Actions create arcs between words in the buffer and stack and move items. - From word embeddings predict actions with a FFN!



Concatenation delay k=1

Sequence Labeling (sl)

- Code each word dependency with a label (>/<). - Simple FFN to project word embeddings to label predictions! - Forward looking (fl) vs non-forward looking (non-fl).
- W_1 W_2 W_3 Non-forward looking // >< >//< >\ W_4 -



FFN Unidirectional

RESULTS

