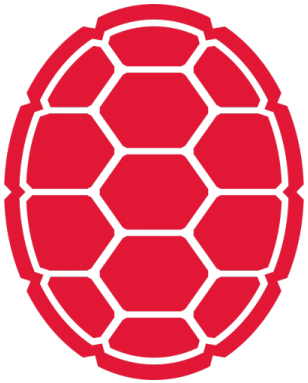

Machine Translation

Computational Linguistics: Jordan Boyd-Graber
University of Maryland

NEURAL MODELS

Adapted from material by Thang Luong

What makes neural models different?

- Sequence-to-sequence: train directly on sentence pairs
- No intermediate steps (e.g., alignment): generalizable
- Fluent!

What makes neural models different?

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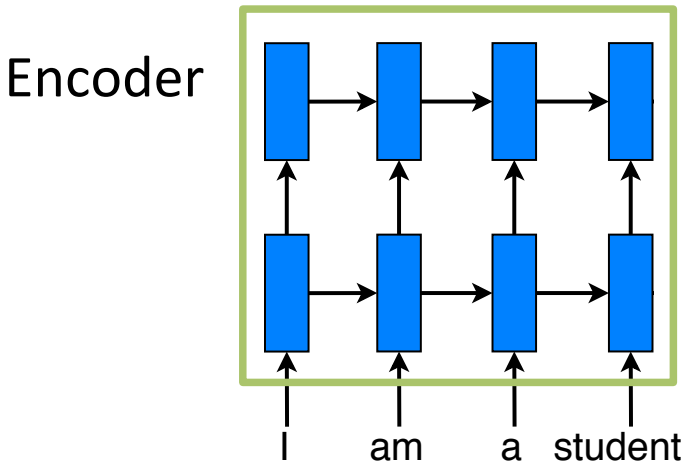
What makes neural models different?

- Sequence-to-sequence: train directly on sentence pairs
- No intermediate steps (e.g., alignment): generalizable
- Fluent! (Looks better, hard to diagnose errors)
- More popular, seems to work better (with enough data)

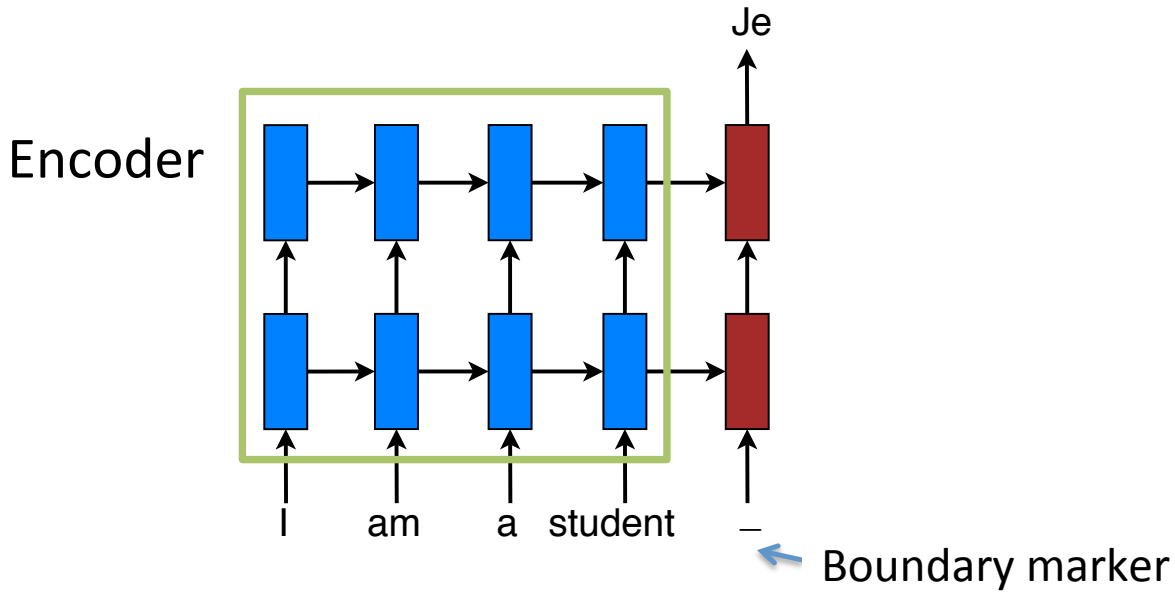
RNNs to the rescue

I am a student Je suis étudiant

RNNs to the rescue



RNNs to the rescue



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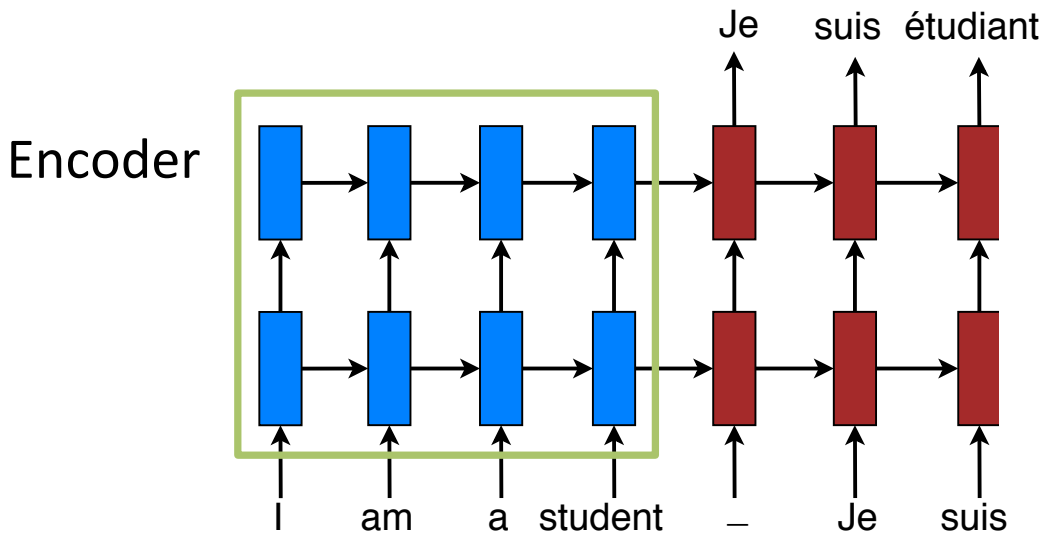
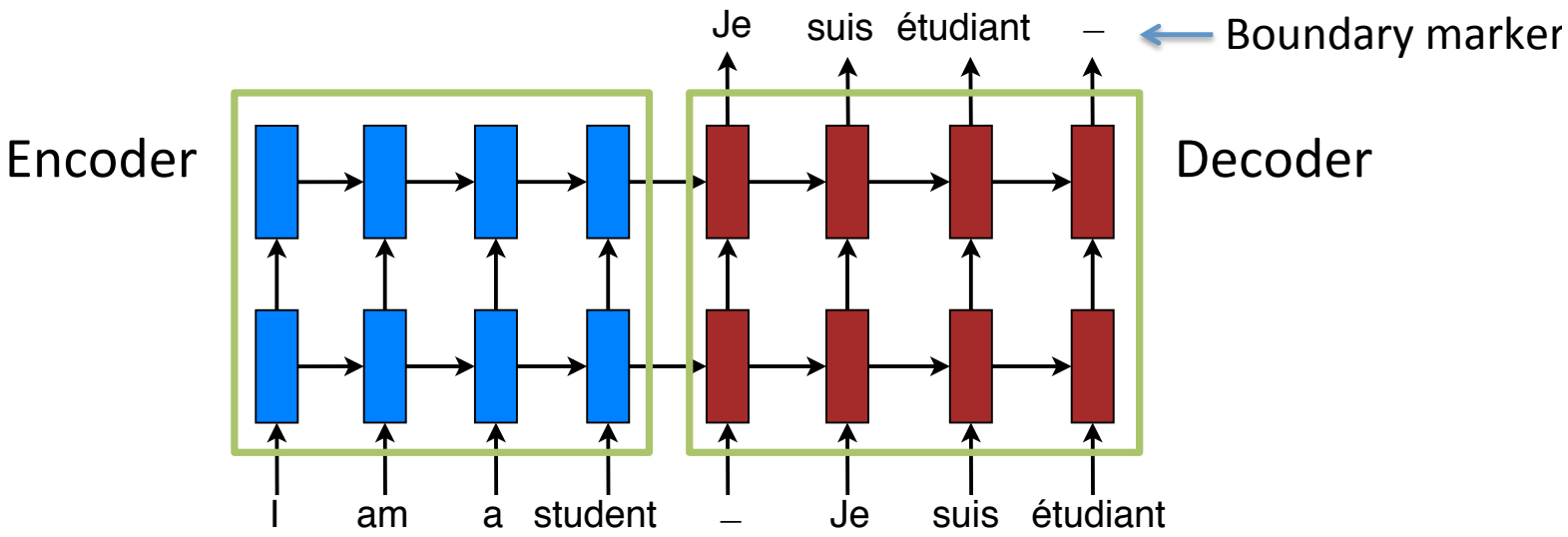
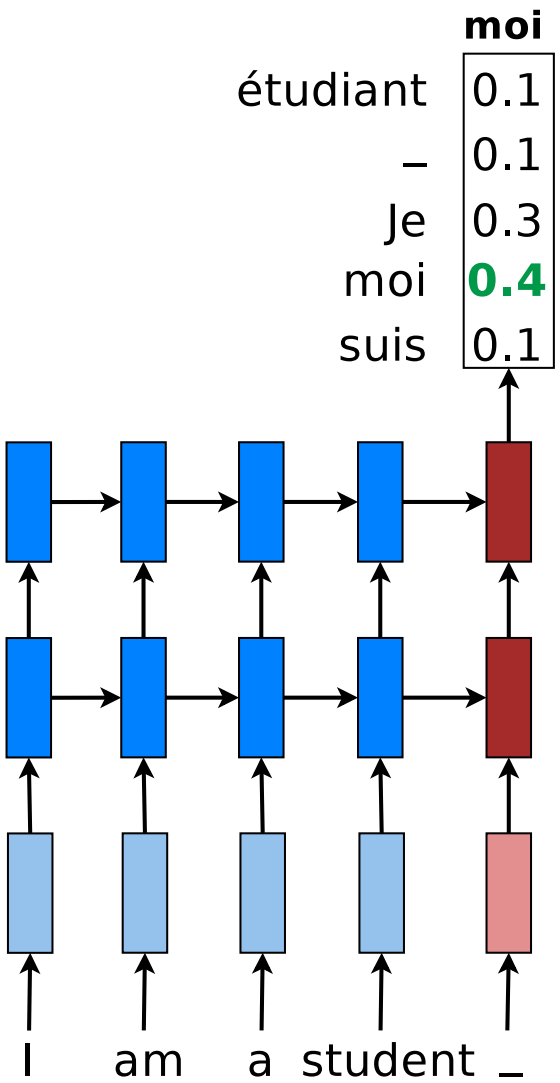


RNNs to the rescue



Test time . . .



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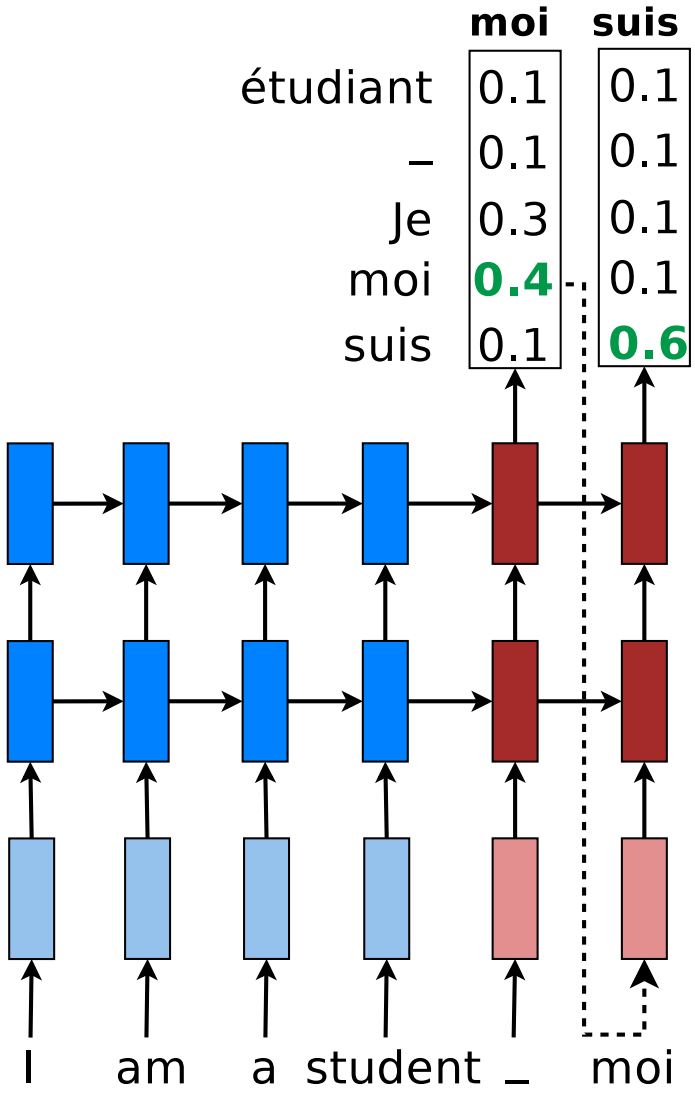
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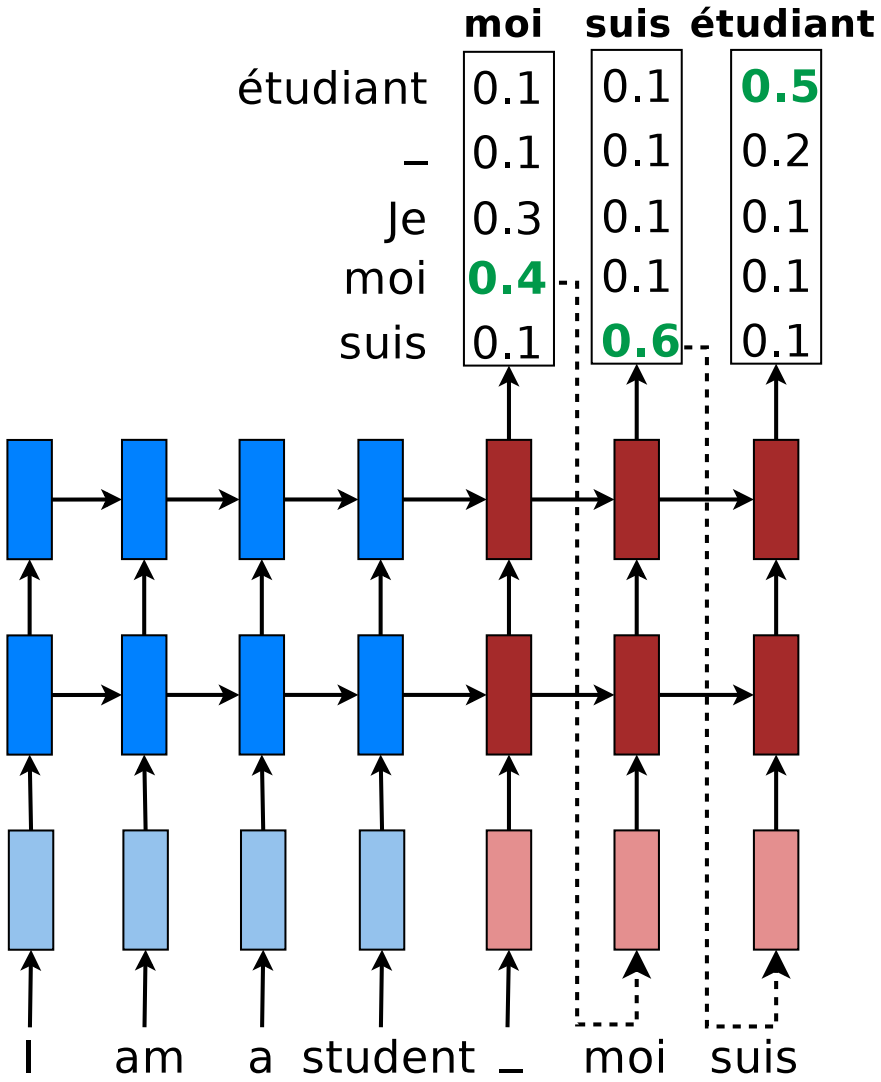
Test time . . .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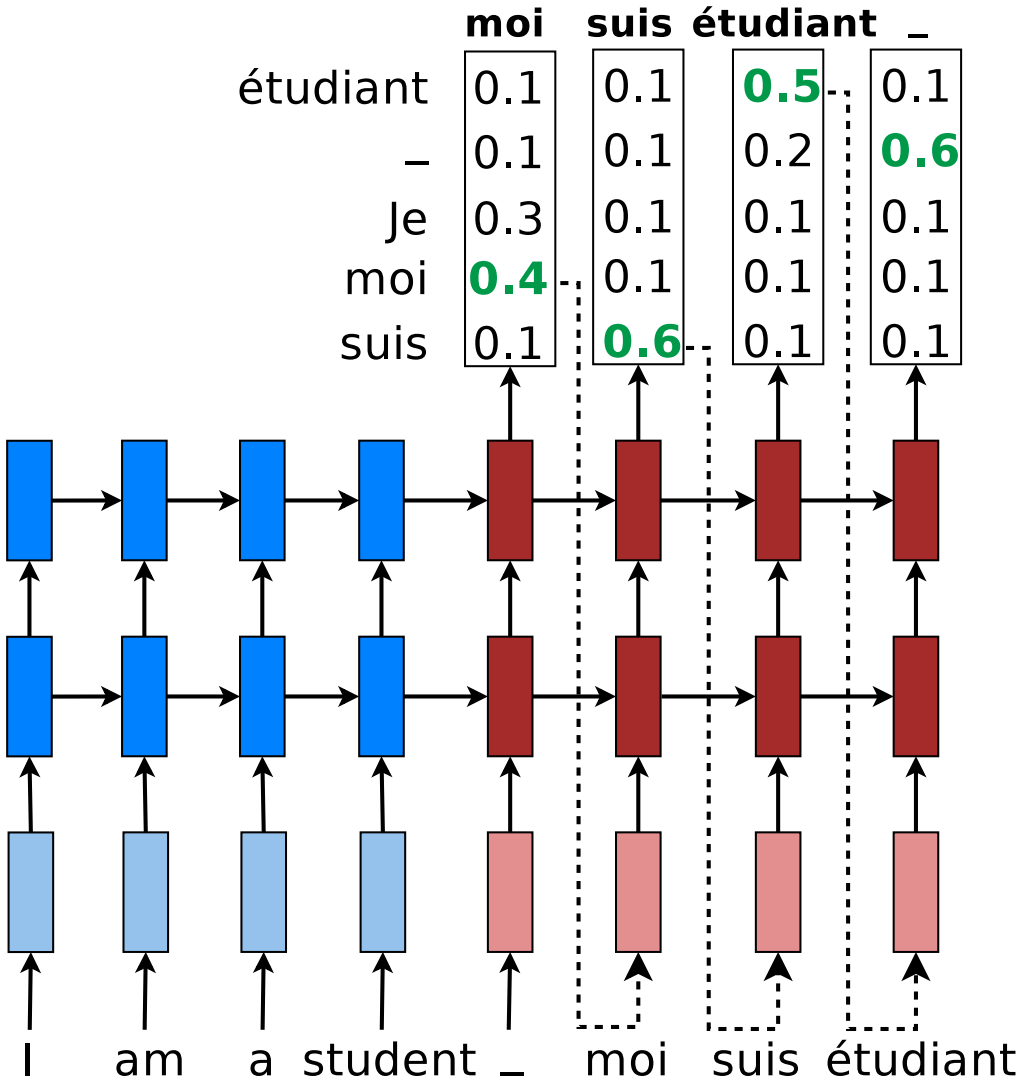
I am a student _ moi suis

Test time . . .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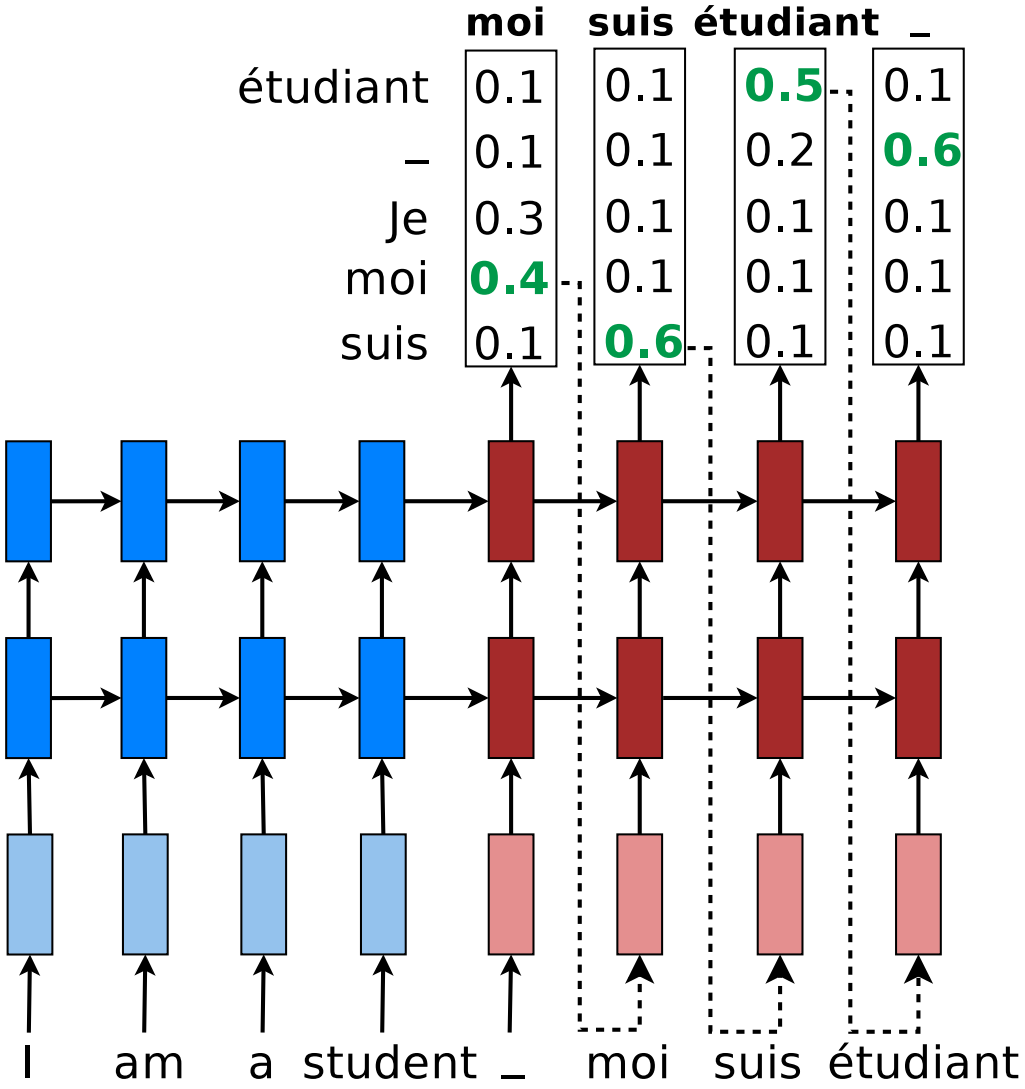
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Problems

- Out of vocabulary words
- Complicated morphology
- Long sentences

Problems

- Out of vocabulary words: copying/transliteration
- Complicated morphology
- Long sentences

Problems

- Out of vocabulary words: copying/transliteration
- Complicated morphology: character-level models
- Long sentences

Problems

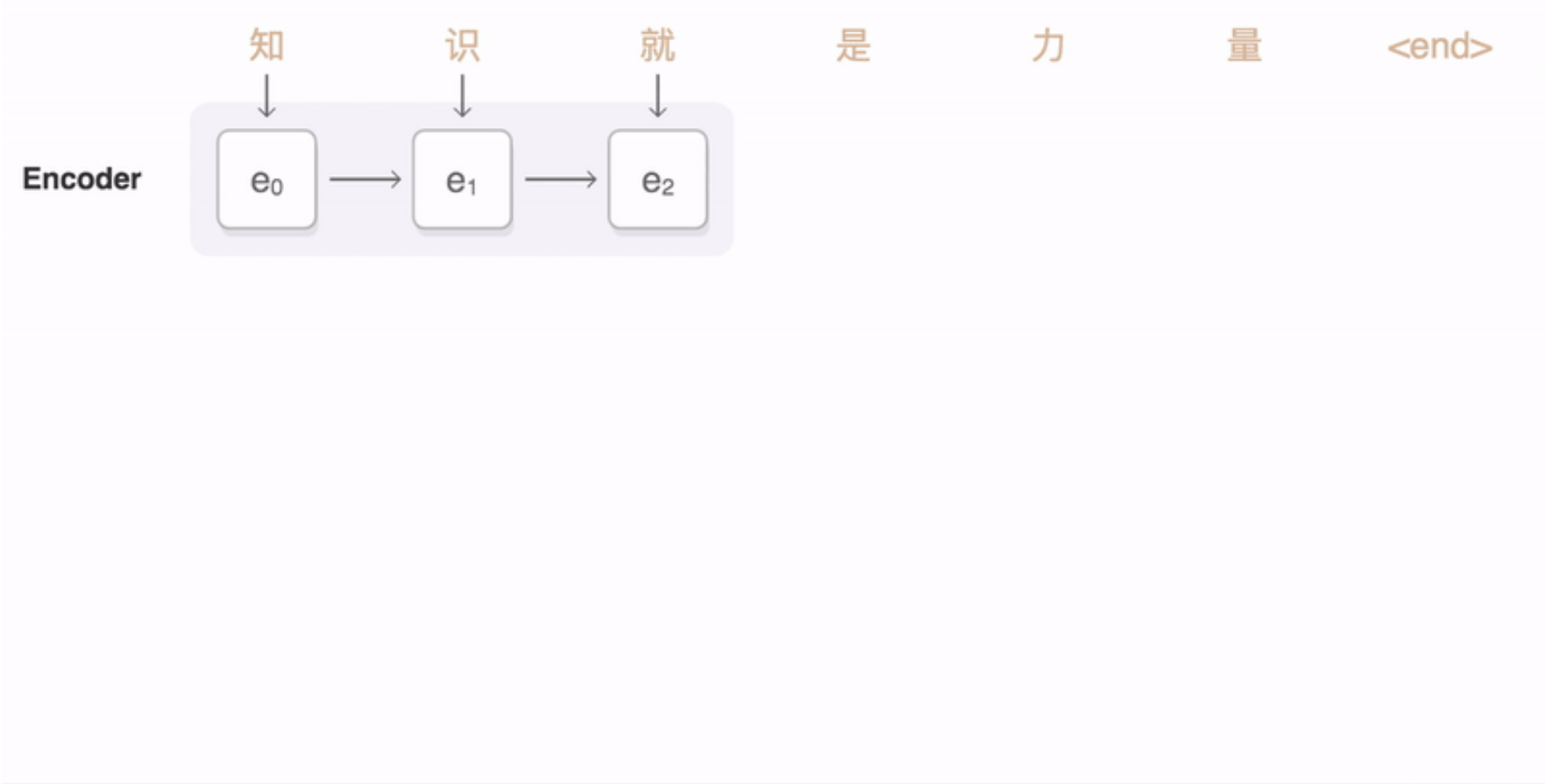
- Out of vocabulary words: copying/transliteration
- Complicated morphology: character-level models
- Long sentences: attention

Attention

Attention

Attention

Attention



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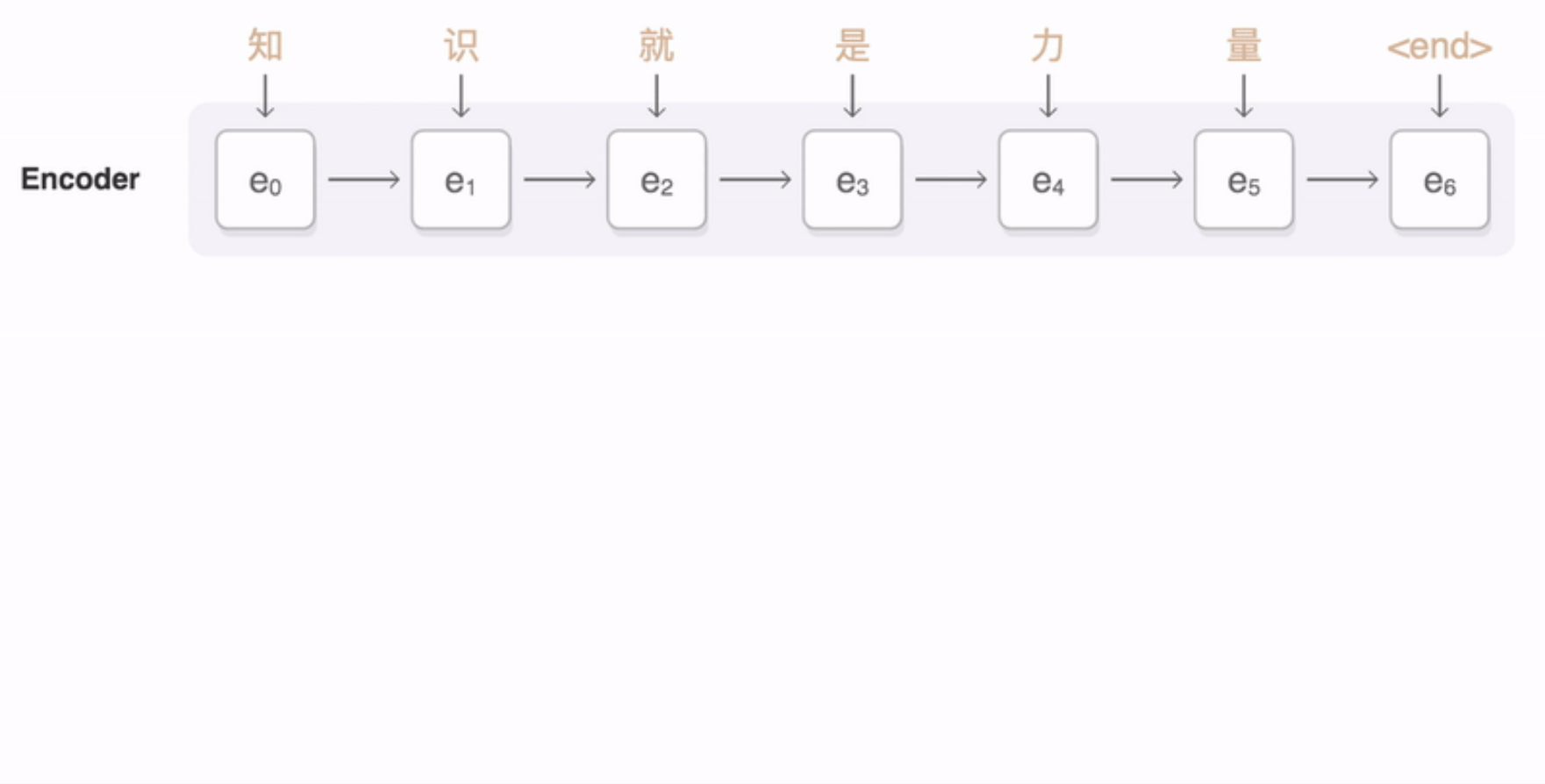

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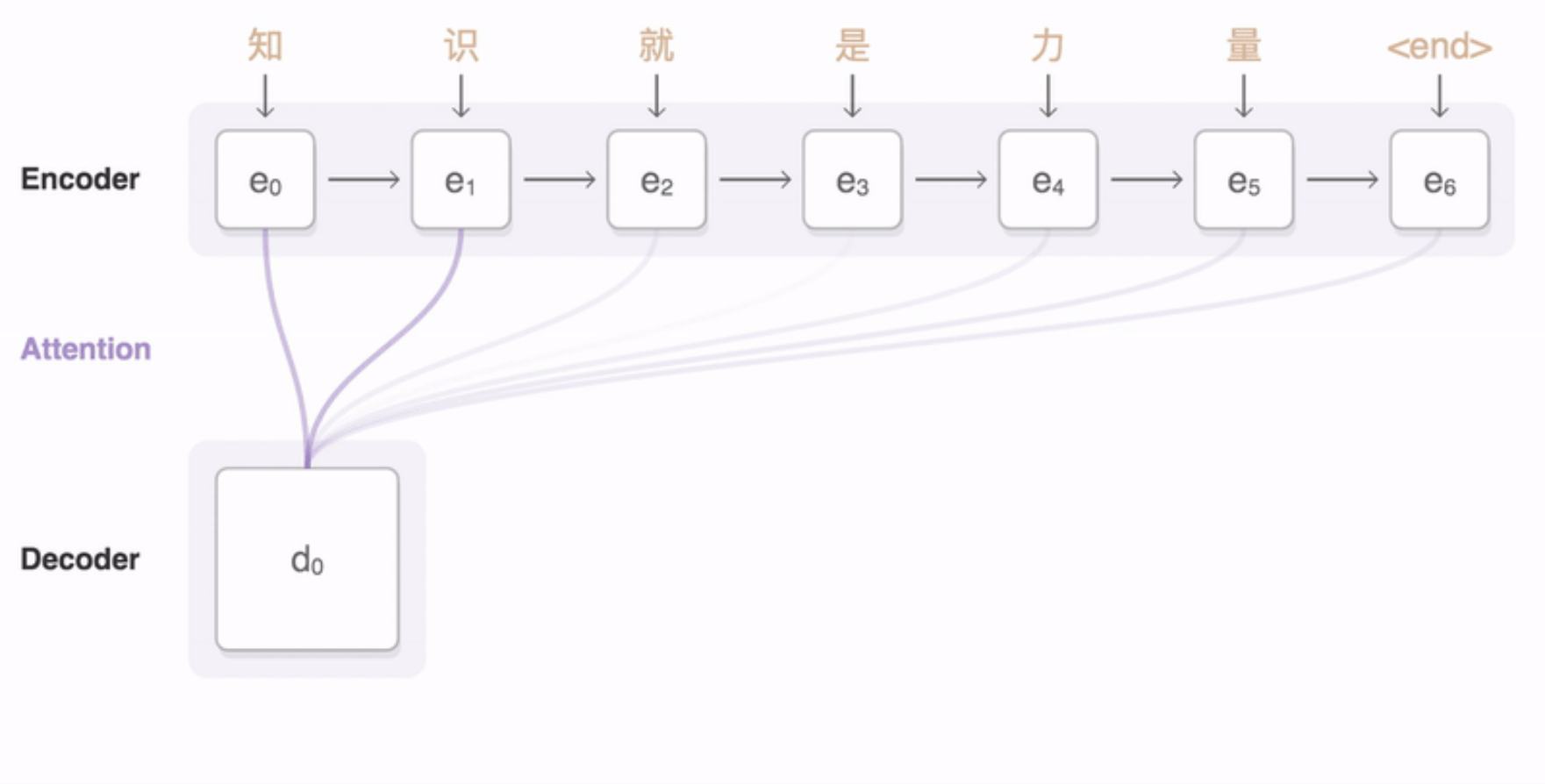

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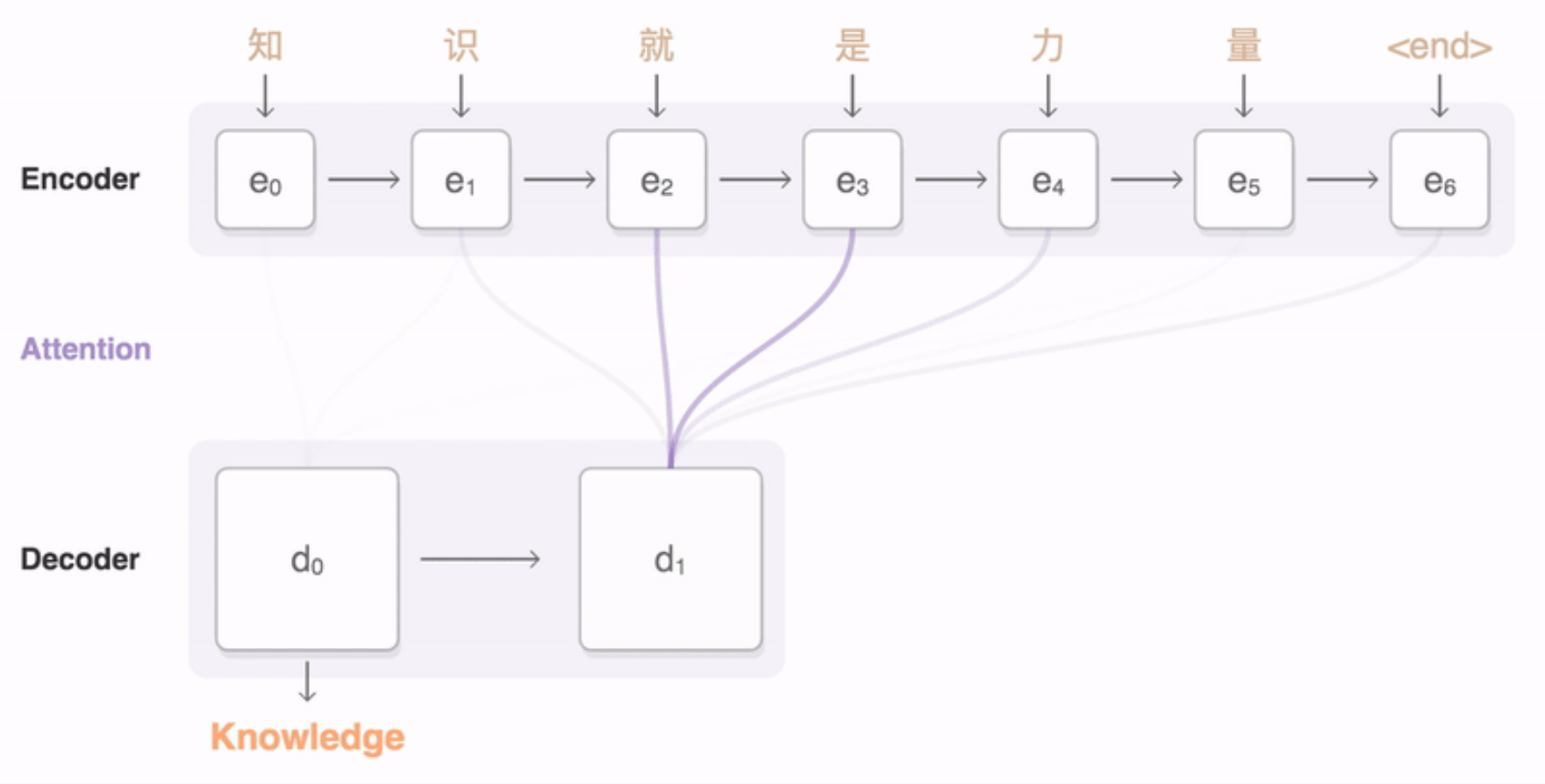
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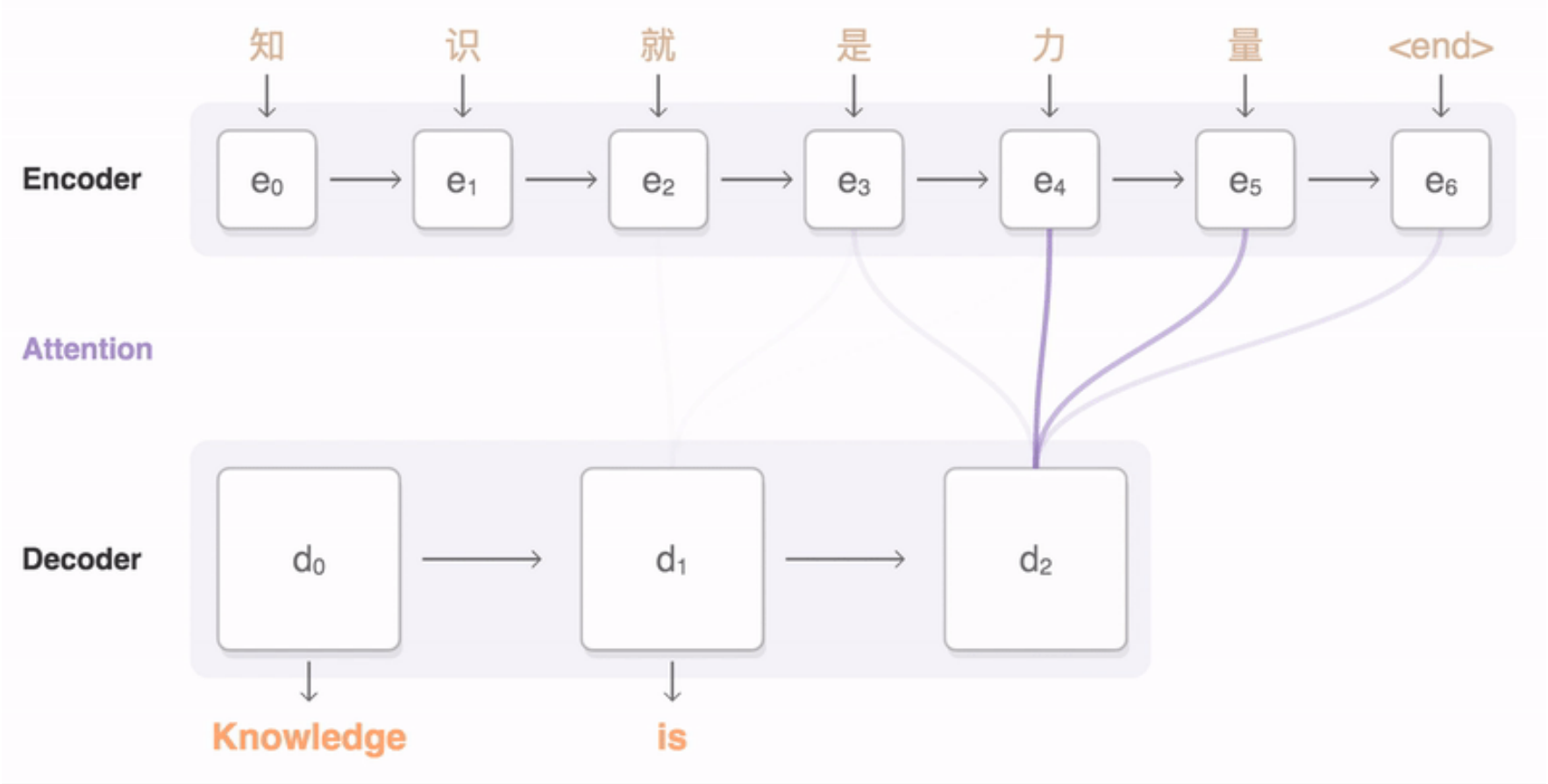
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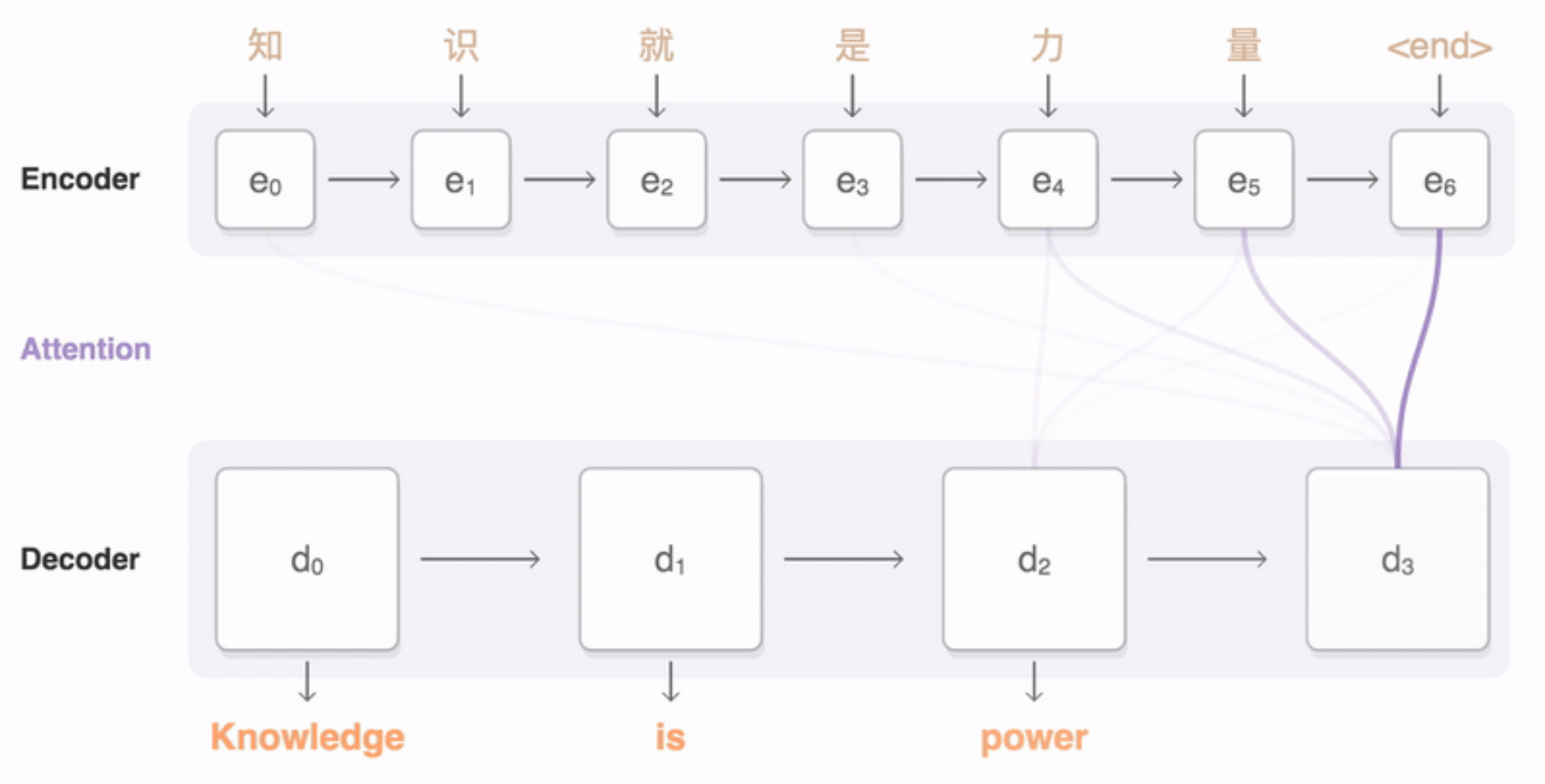
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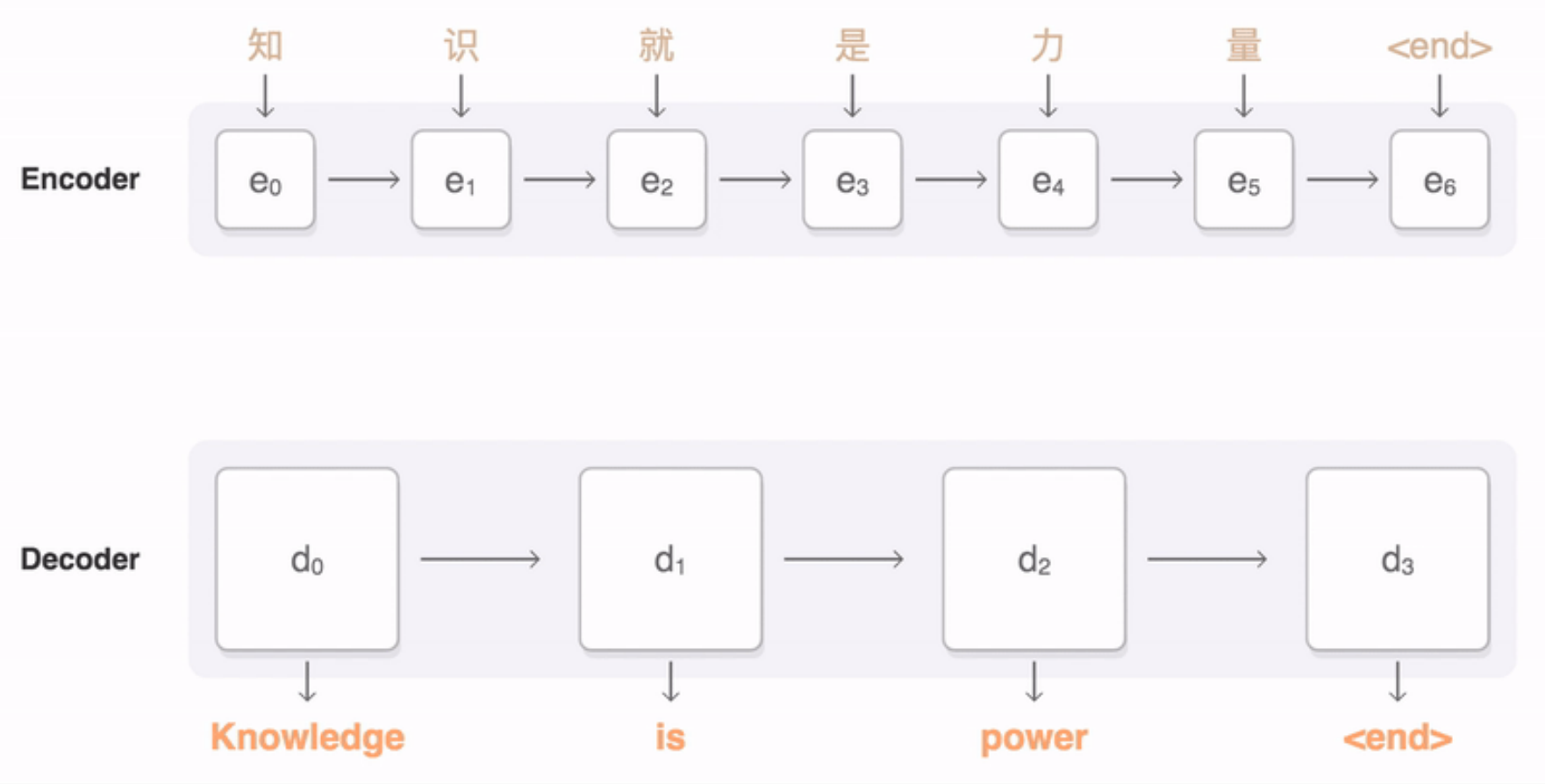
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Beyond simple models

- Active area of research
- Implementations in all frameworks
- Reinforcement learning is huge component
- Low data