Multipass Decoding

in Moses

with Continuous Space LM (CSLM)

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git clone git@github.com:moses-smt/mosesdecoder.git
git checkout mtm13_multipass
CSLM

Score contiguous phrases

Issues
  First users outside of Le Mans/LIMSI
  Problems compiling
  Dependent on Intel MKL
  30 evaluation license
  Change all weights in each pass
Hypothesis recombination

- System AR/EN, dev nist-nw09
- baseline : with recombination (default) : 52.41
- without-recombination (SS=200) : 51.73
- without-recombination (SS=300) : 51.74
- without-recombination (SS=400) : 51.99
- without-recombination (SS=1000) : 52.07
- without-recombination (SS=2000) : 52.12
- without-recombination (SS=3000) : 52.26
- without-recombination (SS=6000) : 52.47
Multipass Decoding

Rescoring hypothesis
  - Look in hypothesis stack
New feature function

Issues:
  Asynchronous calculation
  State Splitting
Lattice Rescoring

*Input: le chat*

```
the
cat
a
the cat
dog
```
Lattice Rescoring

*Input: le chat*

```
the

the cat
da

cat

the

a
```
Lattice Rescoring

Input: le chat

The diagram illustrates the lattice rescoreing process for the input phrase "le chat".
Tasks

Jacob
  Created search graph
  Allow state splitting
Hieu
  Multipass decoding in Moses
  Asynchronous feature functions
Loic
  CSLM
Fethi
  Experiments
Search graph structure

Moses has many different search graph structures for different purposes.

Abstract view of search graph:

- Each edge matches a hypothesis
- Each vertex matches a winning hypothesis
- Copying all information from stacks instead of referencing
- Main graph operation - iteration through edges
Search graph construction

1. Construction from decoder’s stacks: DFS on hypotheses starting from last stack to get topologically sorted graph.

2. Construction from other graph with rescoring on new set of stateless features: reuse existing scores and calculate new ones.

3. Construction from other graph with stateful features: make search graph a new input method for decoding. Every edge is now a translation option.
Conclusion

Interesting Project
Ambitious
To be continued…