

## Part 2

### Palindrome

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A description of the languages.

We choose randomly eight letters from {a,b,c,d} and append its reverse for the good example and for the bad one we append other randomly four letters from {a,b,c,d}.

Good example: "ddbdbaccccabdbdd", "bcadcabccbacdacb" ...

Bad example: "ddbdbaccabdbbaab", "bcadcabcadacadb", ...

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Why did you think the language will be hard to distinguish?

Because the LSTM will not remember the order of the first part when it reaches the second part.

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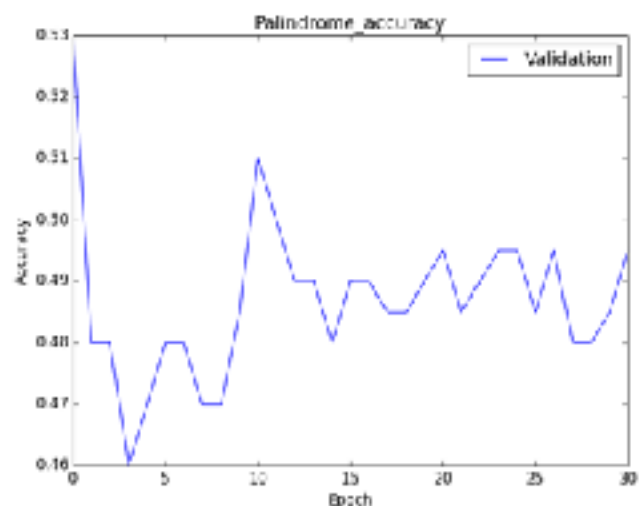
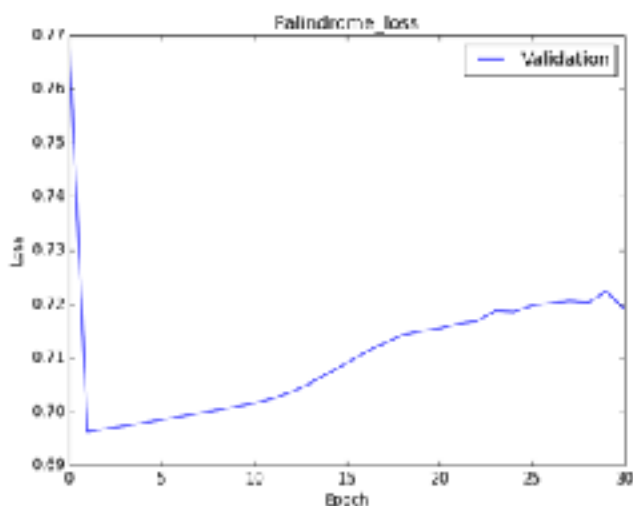
Did you manage to fail the LSTM acceptor?

We generate 1000 examples 500 samples for each language.

We shuffled the 1000 examples and split them into two parts:

1. Train : 80 first percent
2. Dev : 20 last percent

After 30 epochs the model reached 63% on the train and 50% on the dev. So he didn't even succeed to fit to the train.



## Any permutation of $a^n b^n c^n d^n e^n f^n$

A description of the languages.

We choice randomly a permutation of the set  $\{a,b,c,d,e,f\}$  and we make each letter repeat  $n$  times for making the good example ex:  $b^n a^n f^n c^n e^n d^n, e^n c^n b^n f^n a^n d^n, \dots$

and random time for the bad example ex:  $b^n a^m f^o c^p e^q d^r$

Good example: "bbbbbbccccccfffffddddddeeeeeaaaaa"...

Bad example: "bbbbbbbcfffffdeeeeeeeeeaaaaaaa",...

Why did you think the language will be hard to distinguish?

We firstly wanted to try any permutation of  $a^n b^n$  because the difficulty to but due to the limited possibility of  $n$  the model ended up leaning the case and not the pattern but it was good enough so we added  $\{c,d,e,f\}$  to the set and we made them permute.

Did you manage to fail the LSTM acceptor?

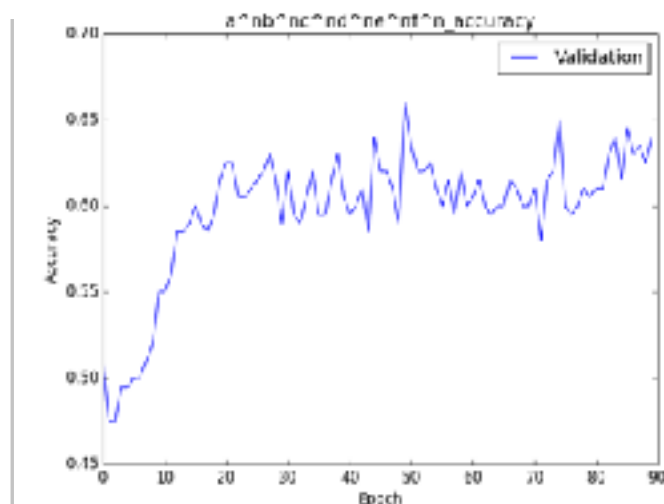
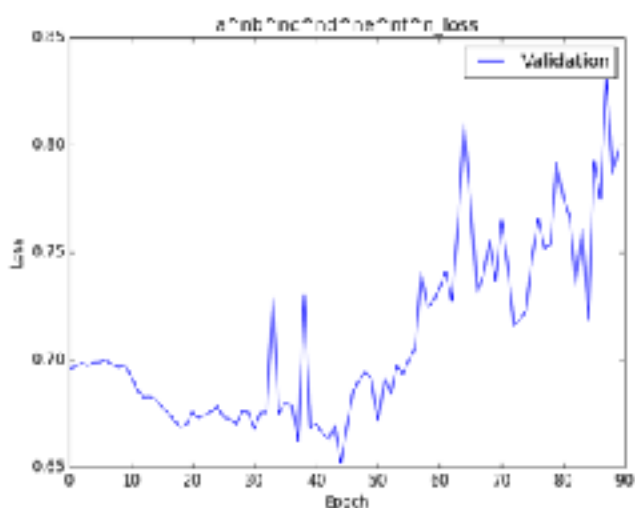
We generate 1000 examples 500 sample for each language.

We shuffled the 1000 example and split them to two part:

1. Train : 80 first percent
2. Dev : 20 last percent

After 90 epoch the model reach 82% on the train and 64% on the dev.

So apparently he overfits to the train data but doesn't generalize for the dev.



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## Multiple of 7

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A description of the languages.

Good example: number multiple of 7

Bad example: number not multiple of 7

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Why did you think the language will be hard to distinguish?

Because there is no pattern to learn, the RNN can't learn it.

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Did you manage to fail the LSTM acceptor?

We generate 1000 examples 500 sample for each language.

We shuffled the 1000 example and split them to two part:

1. Train : 80 first percent
2. Dev : 20 last percent

After 90 epoch the model reach 87% on the train and 48% on the dev.

So apparently he overfits to the train data but doesn't generalize for the dev.

