

þe Futur of Translacioun

A Middle English Translator
Using Neural Machine
Translation



The Goal

What translations should look like

- 1 **Whan that Aprill with his shoures soote**
When April with its sweet-smelling showers
- 2 **The droghte of March hath perced to the roote,**
Has pierced the drought of March to the root,
- 3 **And bathed every veyne in swich licour**
And bathed every vein (of the plants) in such liquid
- 4 **Of which vertu engendred is the flour;**
By which power the flower is created;
- 5 **Whan Zephus eek with his sweete breeth**
When the West Wind also with its sweet breath,
- 6 **Inspired hath in every holt and heeth**
In every wood and field has breathed life into
- 7 **The tendre croppes, and the yonge sonne**
The tender new leaves, and the young sun
- 8 **Hath in the Ram his half cours yronne,**
Has run half its course in Aries,

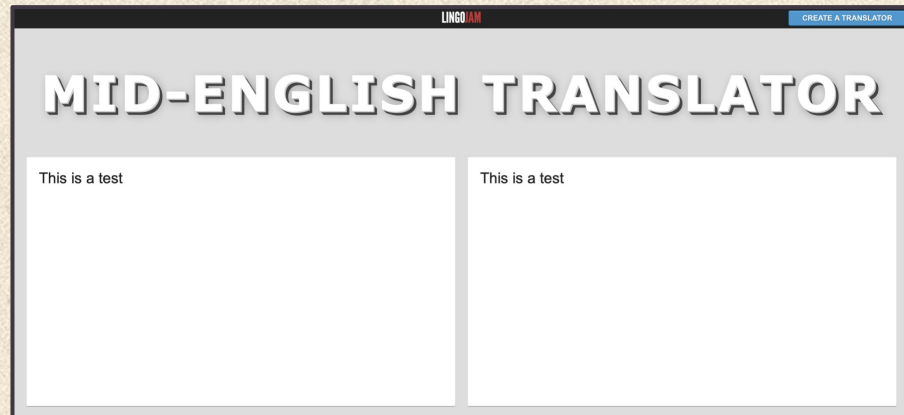
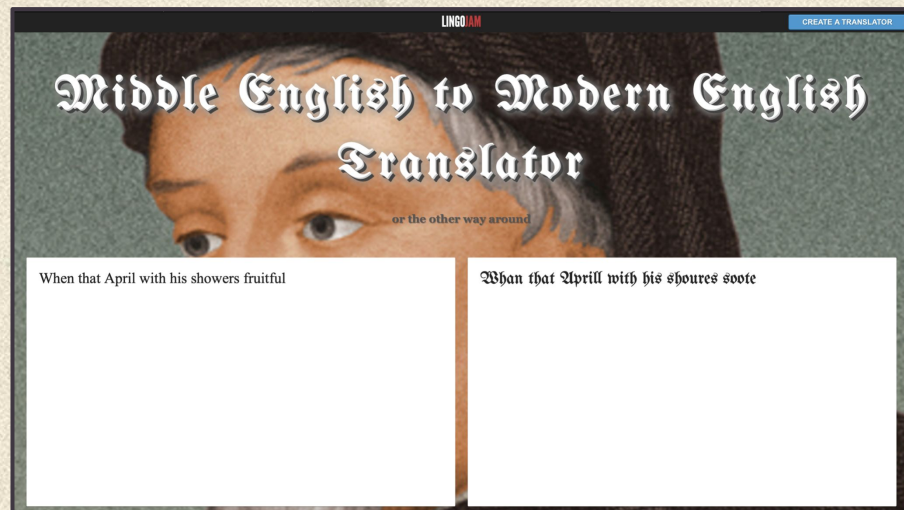
("Against Hasty Marriage, I")

Know or thou knytte; prove or thou preyse yt.
Yf thou know er thou knyht, than mayst thou abate;
And yf thou knyht er thou knowe, than yt ys to late.
Therefore avyse thee er thou the knot knytte,
For "had y wyst" commeth to late for to lowse yt.¹

before; wed; praise; (see note)
stop
too
yourself before
(see note)

Current Middle English Translators

I'm trying to make something like this
but better

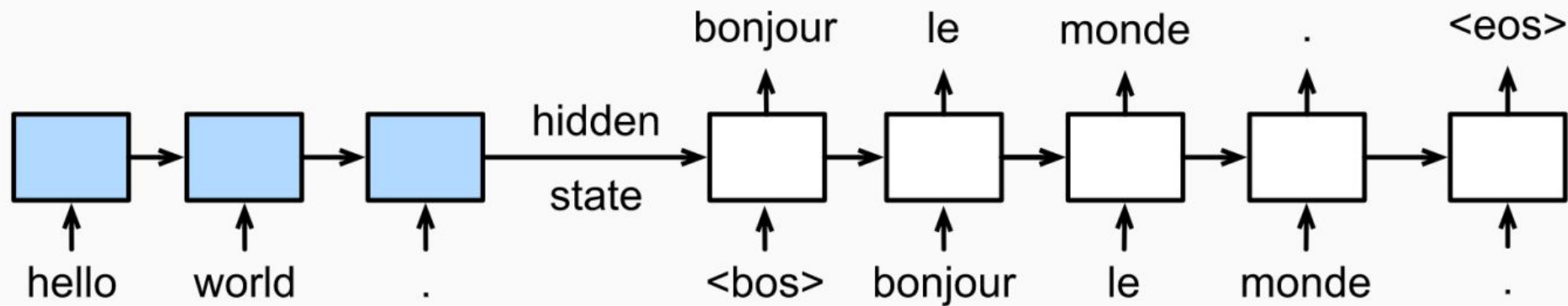


Neural Machine Translation



Encoder

Decoder



The sequence to sequence model architecture.

Handout – How the Model Learns

Middle English Training Data

The only Middle English the model knows

Middle English Test Data

Given sentences to measure the quality of the model's translations

Directions: Using these translations, can you translate the sentences at the bottom of the page?

What, why dedyst thou wyke when thou a wyf tokst?	What, why did you wink when you married your wife?
Letryn good serryis, bothe yong and olde.	Listen good sirs, both young and old.
By a good howdande thys tale shal be tolde.	This tale shall be told by a good husband.
He weddyd a womane that was fyre and holde.	He married a woman who was fair and bold.
She dyde more than she myght withyn her owne wyne.	She did more than she might within her own dwelling.
How wold you have me dou more than I can?	How would you have me do more than I can?
Is our dymr dygt?	Is our dinner ready?
Of all creatures women be best:	Of all creatures, women are the best:
Myn be more cumbers a thousandfold.	Men are more burdensome by a thousandfold.
all the pacience in the world were drownd, and non were lefte here on the ground,	all the patience in the world was drowned and none was left here on earth.
To the tavern they will not goo,	They will not go to the tavern,
In every place ye may well see, that women be trewe as turtill on trewe,	Everywhere, you will see that women are as true as a turtledove.
tell a women all your counseyle, and she can kepe it wonderly well;	Tell a woman all your counsel, and she can keep it wonderfully well.
For by women men be reconciled.	For men are reconciled by women.
Save alle thys company and sheld them from schame,	Save all this company and shield them from shame.

For by women was never man begyled,	
She had lever go quyk to hell, than to her neyghbour she wold it tell;	
'To wold say, 'they be growled'	
wyll I ryse whyl ye be slepande,	
Home com the goodman betyme of the day,	

Present-Day English Training Data

The only Present-Day English the model knows

The Two Pillars of Machine Translation

Neural Network Model

The machine that learns to translate Middle English - most of this is an open source German to English translator that I adapted

All the translations the model uses to train and evaluate itself - my original work

Data

Coding Process

01

Video Tutorial on Machine Translation

Developer Aladdin Persson explained open-sourced code for a German to English neural machine translation model.

02

Change the model's vocabulary

Ensure the model can read my dataset by constructing it in the same way and reading it as English.

03

Load and Save Model

Ensure load and save files are unique to the particular model.

Training and Evaluation Process

04

Training

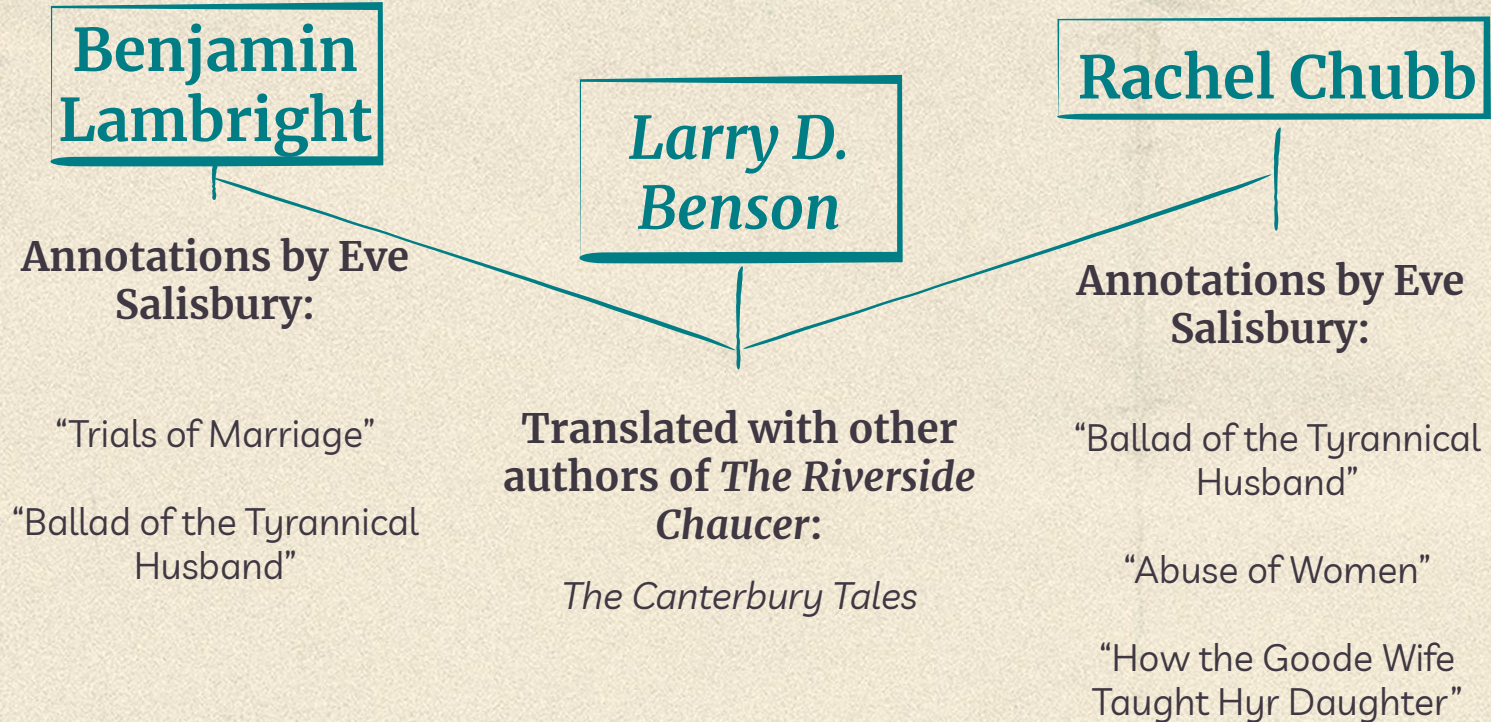
Running the code many times to have the model practice and learn

05

Evaluation and Revision

Test quality, maybe add data or change the model's constants

Origin of My Data



Translation Methodology for Glossed Texts

01

Sentence Selection

Tried to get one
“complete thought”

03

Case Changes and Matching Punctuation

Change cases to help compile better and match punctuation to ensure the computer learns punctuation too

02

Literal Translations

Used footnotes and a Middle English compendium

5

Know or thow knytte; prove or thow preyse yt.
Yf thou know er thou knyht, than mayst thou abate;
And yf thou knyht er thou knowe, than yt ys to late.
Therfore avyse thee er thou the knot knytte,
For "had y wyst" commeth to late for to lowse yt.¹

before; wed; praise; (see note)
stop
too
yourself before
(see note)

Transcription Methodology for Interlinear Translations

01

Sentence Selection

Lines combined until a semicolon, question mark, or period is found at the end of the line

02

Notes in Parentheses Removed

Parentheses would confuse the computer

- | | |
|---|--|
| 1 | Whan that Aprill with his shoures soote
When April with its sweet-smelling showers |
| 2 | The droghte of March hath perced to the roote,
Has pierced the drought of March to the root, |
| 3 | And bathed every veyne in swich licour
And bathed every vein (of the plants) in such liquid |
| 4 | Of which vertu engendred is the flour;
By which power the flower is created; |

03

Line Numbers & Alternative Translations Deleted

Included when copying the text but unnecessary for the translation

Statistics on My Data vs. Standard

970 vs 1000

Lines in dataset

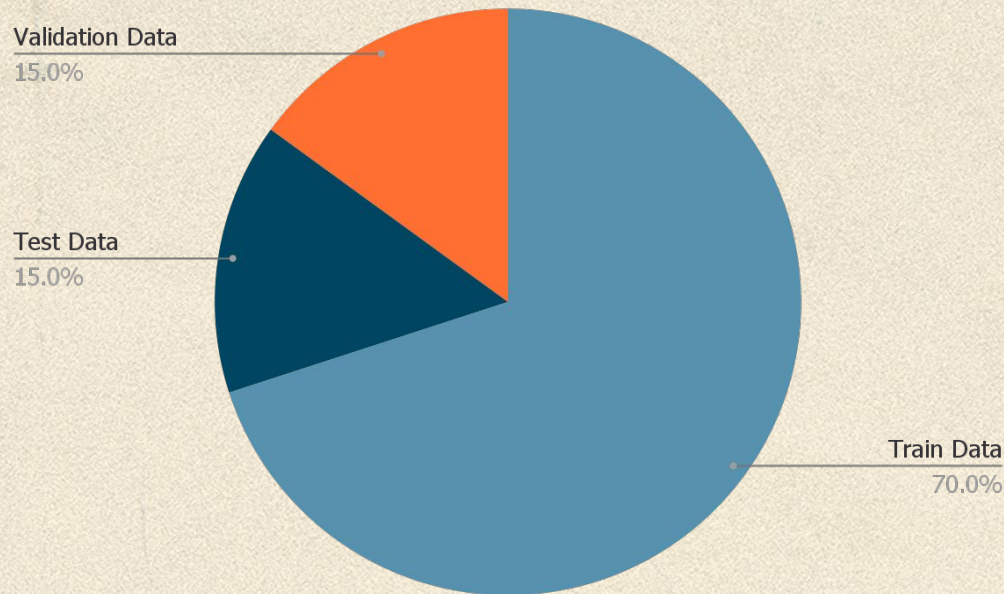
7,751 vs 11,000

Middle English words in dataset

8 vs 5-20

Words per Sentence

Data Processing - Splitting the Data



70%

Used for training the model

15%

Used for optimizing the hyperparameters

15%

Used for measuring the quality of the translations

Data Processing – Glossed Text

01

Translate

1

From the “Trials of Marriage” and “Ballad of a Tyrannical Husband,” Editor of the ME is Eve Salisbury and the translator is Benjamin Lambright

What, why dedyst thou wynk whan thou a wyf toke?	What, why did you wink when you married your wife?
Lystyn good serryys, bothe yong and olde.	Listen good sirs, both young and old.
By a good howsbande thys tale shal be tolde.	This tale shall be told by a good husband.
He weddyd a womane that was fayre and bolde.	He married a woman who was fair and bold.
She dyde mor then sho myght withyn her owne wone.	She did more than she might within her own dwelling.
How wold yow have me doo mor then I cane?	How would you have me do more than I can?
Is owr dyner dyght?	Is our dinner ready?
What hast thou to doo, but syttes her at hame?	What do you have to do, but sit here at home.
Whan I lye al nyght wakyng with our cheyde, I ryse up at morow and fynde owr howse wyld	When I lie awake all night with our child, I wake up in the morning and find our house in disarray.
Than make I buter fether on the day	Then I make butter later in the day.

02

Split into train, test, and validation

A	B
Middle English	Present Day English
What, why dedyst thou wynk whan thou a wyf toke?	What, why did you wink when you married your wife?
Lystyn good serryys, bothe yong and olde.	Listen good sirs, both young and old.
By a good howsbande thys tale shal be tolde.	This tale shall be told by a good husband.

03

Split into “ME” and “PDE”

04

Nest in Multi30k

```
multi30k
├── mmt_task1_test2016.tar.gz
├── test2016.de
├── test2016.en
├── test2016.fr
├── test2016.me
├── test2016.pde
├── train.de
├── train.en
├── train.me
├── train.pde
├── training.tar.gz
├── val.de
├── val.en
├── val.me
├── val.pde
```

```
1 What, why dedyst thou wynk whan thou a wyf toke?
2 Lystyn good serryys, bothe yong and olde.
3 By a good howsbande thys tale shal be tolde.
4 He weddyd a womane that was fayre and bolde.
5 She dyde mor then sho myght withyn her owne wone.
6 How wold yow have me doo mor then I cane?
7 Is owr dyner dyght?
8 Of all creatures women be best:
9 Men be more cumbers a thowsandfold.
```

```
1 What, why did you wink when you married your wife?
2 Listen good sirs, both young and old.
3 This tale shall be told by a good husband.
4 He married a woman who was fair and bold.
5 She did more than she might within her own dwelling.
6 How would you have me do more than I can?
7 Is our dinner ready?
8 Of all creatures, women are the best:
9 Men are more burdensome by a thousandfold.
```

Data Processing - Interlinear Translations

01

Copying the Data

```
1 1 Whan that Aprill with his shoures soote
2 When April with its sweet-smelling showers
3 2 The droghte of March hath perced to the roote,
4 Has pierced the drought of March to the root,
5 3 And bathed every veyne in swich licour
6 And bathed every vein (of the plants) in such liquid
7 4 Of which vertu engendred is the flour;
8 By which power the flower is created;
9 5 Whan Zephirus eek with his sweete breeth
10 When the West Wind also with its sweet breath,
```

```
[1 Whan that Aprill with his shoures soote', 'When April with its sweet-smelling showers',
```

Listing each line 02

```
['Whan that Aprill with his shoures soote', 'The droghte of March hath perced to the roote,',
['When April with its sweet-smelling showers', 'Has pierced the drought of March to the root,',
```

Splitting and Cleaning into "ME" and "PDE" 03

04

Data ready to copy into the nested files

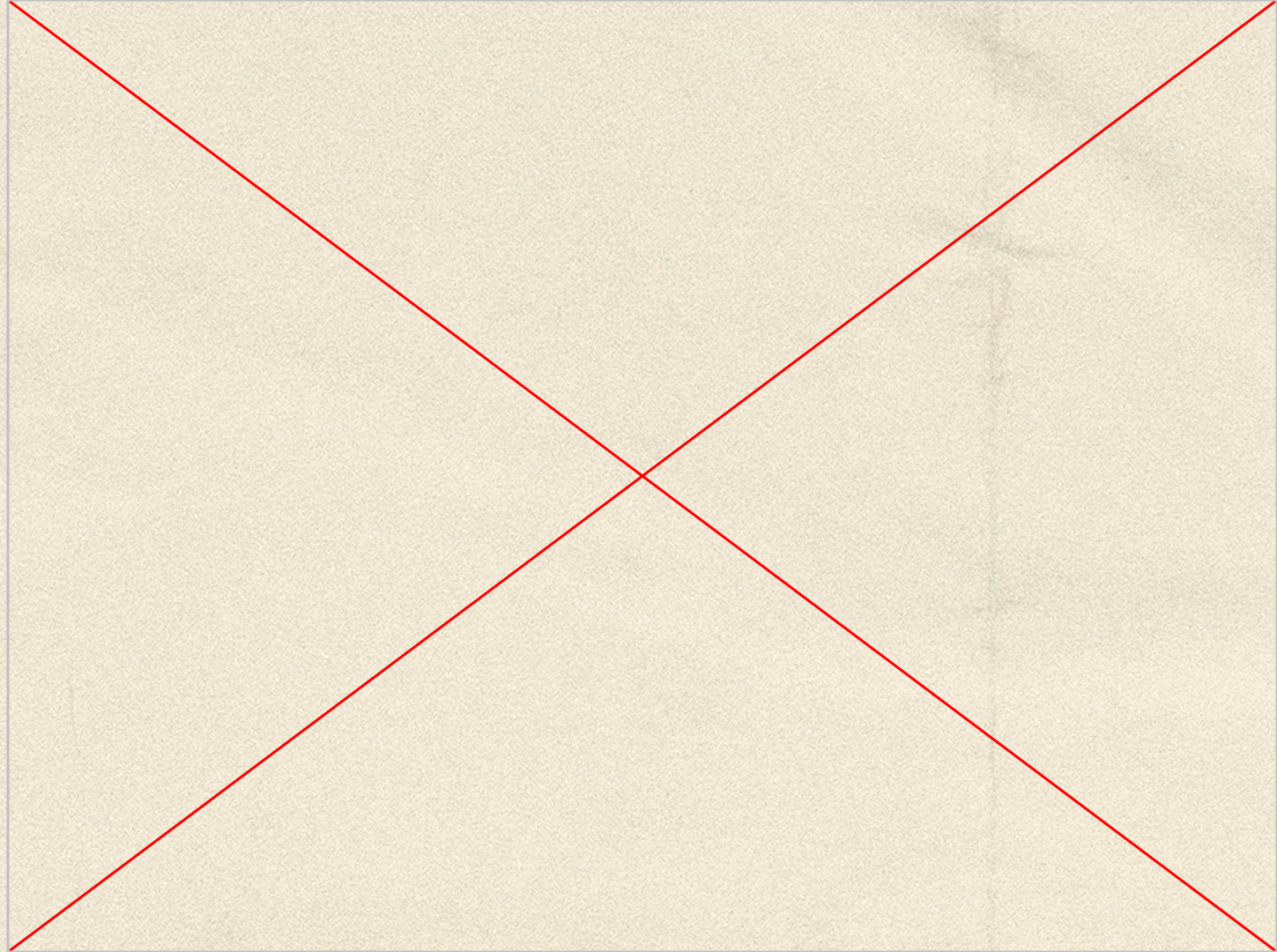
To kepe his forward by his free assent,
He seyde, "Syn I shal bigynne the game,
What, welcome be the cut, a Goddes name!
Now lat us ryde, and herkneth what I seye."
And with that word we ryden forth oure weye,
And he bigan with right a myrie cheere
His tale anon, and seyde as ye may heere.

Since his lord was twenty years of age.
Whoever must repeat a story after someone,
He must repeat as closely as ever he knows how
Every single word, if it be in his power,
Although he may speak ever so rudely and freely,
Or else he must tell his tale inaccurately,
Or make up things, or find new words.
He may not refrain from although he were his brother;
He must as well say one word as another.
Christ himself spoke very plainly in holy writ,
And you know well it is no rudeness.

```
3 And bathed every veyne in swich licour
4 And bathed every vein (of the plants) in such liquid
5 Of which vertu engendred is the flour;
6 By which power the flower is created;
7 Whan Zephirus eek with his sweete breeth
8 When the West Wind also with its sweet breath,
9 Inspired hath in every holt and heeth
10 In every wood and field has breathed life into
11 The tendre croppes, and the yonge sonne
12 The tender new leaves, and the young sun
13 Hath in the Ram his half cours yronne,
14 Has run half its course in Aries,
15 And smale foweles maken melodye,
16 And small fowls make melody,
17 That slepen al the nyght with open ye
18 Those that sleep all the night with open eyes
19 (So priketh hem Nature in hir corages),
20 (So Nature incites them in their hearts),
```



Demonstration



Results Analysis

```
=> Loading checkpoint  
Bleu score 64.26  
Bleu score 0.00
```

~64%

Of translations of train data
match correct translations

1-3

Amount of words it normally
recognizes from sentences
unknown to the model

0-4%

Of translations of test data
match correct translations

Comparison to Other Middle English Translators

Mid-English Translator

Ther was noon auditour koude on him wyne.

Ther was auditour on him wyne

Middle English to Modern English Translator

Ther was noon auditour koude on him wyne.

There was noon auditour koude on him winne.

My Model

=> Loading checkpoint

Translated sentence 'Ther was noon auditour koude on him wyne.': there was no auditor who could earn anything

Thank You!

Do you have any questions or
comments?

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