Encyclopaedia of Shakespeare's Language

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Part-of-Speech Tagging in Shakespeare: Trials, Tribulations and why one might Bother

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What is POS tagging?

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Grammar – not necessarily a sexy topic:

Jack Cade: "It will be proved to thy face that thou hast men about thee that usually talk of a noun and a verb, and such abominable words as no Christian ear can endure to hear." 2H6 IV.vii

Part-of-speech tagging involves adding codes to words which indicate the grammatical category (noun, verb, adverb, adjective, etc.) to which they are deemed to belong.

To_TO be_VBI or_CC not_XX to_TO be_VBI that_DD1 is_VBZ the_AT question_NN1

The tagging process can be automated by programs such as CLAWS.

There is no such thing as 100% accuracy; the aim is to be good enough.

Why one might bother

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(1) It reveals patterns of grammatical usage, and this can help us:

- Write descriptive grammar books
- Teach English grammar
- Write dictionaries
- Study variation in English, e.g. dialects
- Study change in English (i.e. the history of the English language)
- Study the ‘style’ of a particular period or author

Why one might bother

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(2) It improves the accuracy of other automated processes (e.g. lemmatization, semantic tagging)

<u>What is lemmatization?</u>

A process that involves grouping word variants or word-forms into 'lemmas' (which are like dictionary headwords).

- Dictionary headword/lemma: *do* **= 1**
- Modern (morphological) word-forms: *do, does, doing, did, done* **= 5**
- Early modern (morphological) word-forms: *do, does, do(e)st, doth, doing, did, didst, done* **= 8**

Why one might bother

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- POS-tagging improves lemmatization prospects, typically by disambiguating words, e.g. homonyms such as *leaves* (in Shakespeare two-thirds of cases are a noun, one third a verb)

<u>Semantic tagging</u>

Semantic tagging involves adding codes to words which indicate the semantic/meaning category (e.g. people, time, power, being, food, thought, colour, liking, avarice, relationship) to which they are deemed to belong. Cf. *WMatrix*

Why one might bother

(3) Some of the specific POS tags may be of interest, e.g.

- NP1/2 – Singular/plural proper noun (e.g. London, Jane, Frederick)
- NNB – Preceding noun of title (e.g. Mr., Prof., Lord)
- FW – Foreign word

Trials and tribulations

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- Grammatical phenomena which are marginal today, but may require addressing by the tagger for EModE
  - 2nd person singular
- Words not in the modern lexicon
- Words whose possible classifications have changed
  - *what*
- Words whose probability profile has changed
  - *prostitute*
- Extra cliticisations (*me=thinks*, *me=thought*)

- But we don't have the time for a radical system overhaul

Solution

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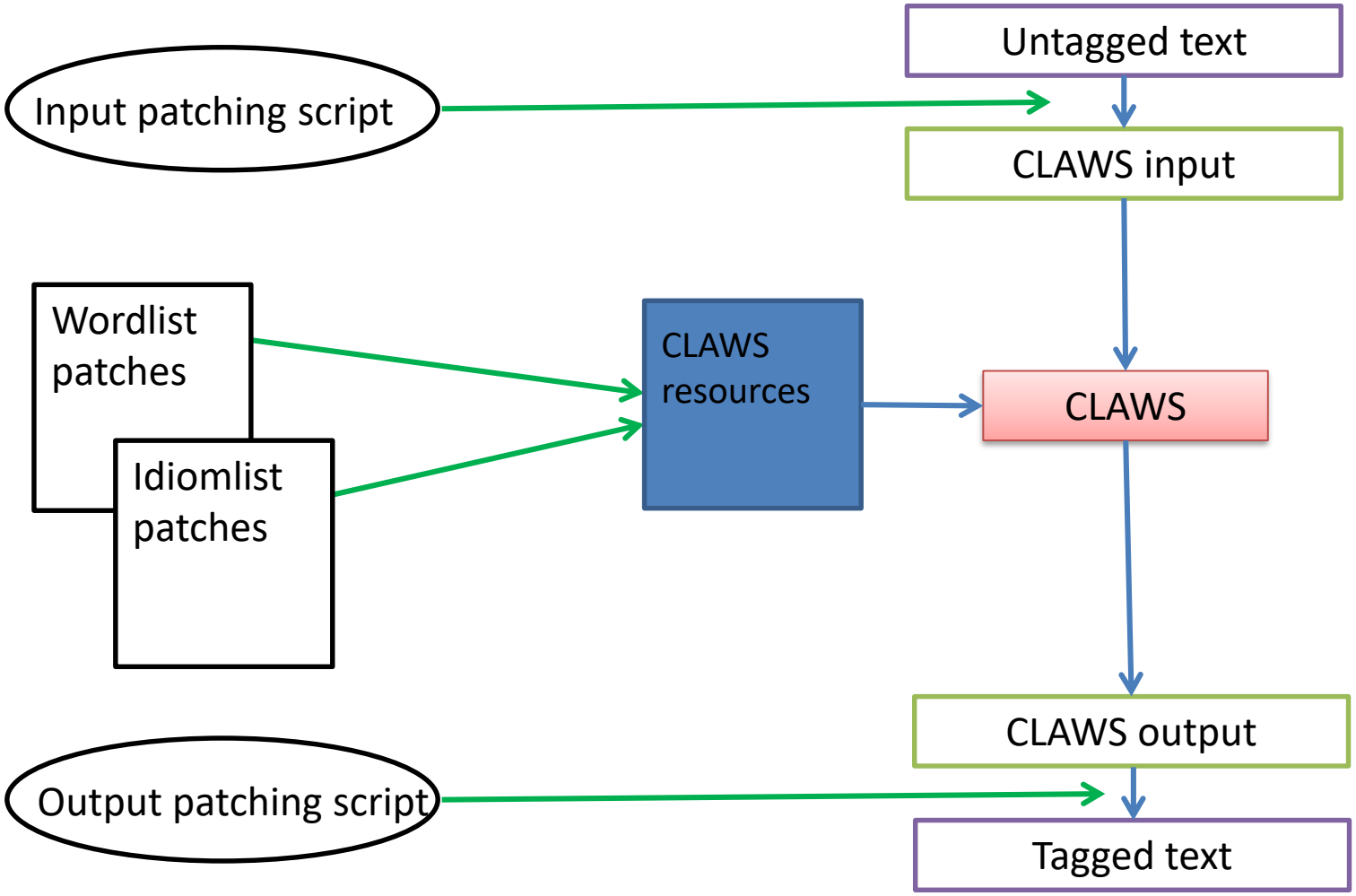
(1) Development work: Patch CLAWS three ways:

- Resource patching
- Input patching
- Output patching

(2) Manual post-editing (if necessary)

Implementation of development work



Resource patching: lexicon

```
   1 prithee UH
   2 hark VV0
   3 claudio NP1
   4 signior NN1
   5 timon NP1
   6 valour NN1
   7 falstaff NP1
   8 troilus NP1
   9 jove NP1
  10 martius NP1
  11 alarum NN1
  12 angelo NP1
  13 cassius NP1
  14 bardolph NP1
  15 palamon NP1
  16 alack UH
  17 iago NP1
  18 arcite NP1
  19 bolingbroke NP1
  20 proteus NP1
  21 silvia NP1
  22 griefs NN2
  23 benedick NP1
  24 oaths NN2
  25 caius NP1
  26 emilia NP1
  27 bianca NP1
  28 demetrius NP1
  29 warlike JJ
```

```
 200 affliction NN1
 201 anointed VVN JJ VVD@
 202 bondage NN1
 203 bootless JJ
 204 corioles NP1
 205 costard NP1
 206 coxcomb NN1
 207 infect VV0
 208 ingratitude NN1
 209 leonatus NP1
 210 mantua NP1
 211 messengers NN2
 212 mischance NN1
 213 polixenes NP1
 214 reignier NP1
 215 rogues NN2
 216 shylock NP1
 217 stephano NP1
 218 trinculo NP1
 219 tush UH
 220 usurp VV0
 221 alcibiades NP1
 222 bachelor NN1
 223 barbarous JJ
 224 barnardine NP1
 225 blushing JJ VVG NN1@
 226 commends VVZ
 227 cymbeline NP1
```

```
1247 embassage NN1
1248 endowments NN2
1249 enfranchised VVD VVN J
1250 esteems VVZ
1251 expostulate VV0
1252 extenuate VV0
1253 fawning VVG NN1 JJ
1254 fines VVZ NN2
1255 firmament NN1
1256 flatteries NN2
1257 flax NN1
1258 flayed VVD VVN JJ
1259 foison NN1
1260 foretell VV0
1261 forfeited VVD VVN JJ
1262 forgetfulness NN1
1263 forwardness NN1
1264 fulsome JJ
1265 furred JJ
1266 gash VV0 NN1
1267 gashes VVZ NN2
1268 gentlemanlike JJ
1269 gibes NN2
1270 goblins NN2
1271 goth NN1
1272 graceless JJ
1273 grafted VVD VVN JJ
1274 groats NN2
1275 grosser JJR
```

```
2623 unbowed JJ
2624 unbuckle VV0
2625 uncapable JJ
2626 unconquered JJ
2627 uncouple VV0
2628 uncrown VV0
2629 undeserver NN1
2630 undrowned JJ
2631 unforced JJ
2632 unguided JJ
2633 unheedful JJ
2634 unkennel VV0
2635 unmake VV0
2636 unmask VV0
2637 unmingled JJ
2638 unpractised JJ
2639 unpregnant JJ
2640 unprizable JJ
2641 unquestioned JJ
2642 unquietness NN1
2643 unsubstantial JJ
2644 untender JJ
```

Input patching

```
10 // splits that CLAWS does for us already:
11 // twas
12 // tis
13 // twould
14 // twere
15
16 $splits_raw = <<<END
17 me|thinks
18 me|thought
19 me|thoughts
20 me|seems
21 me|seemeth
22 me|seemed
23 t|as
24 t|will
25 END;
```

Output patching

```
/ pronouns
thou PPY PPYS1
thee PPY PPYO1
th PPY PPYS1
th' PPY PPYS1

/ verbs
art VBR VBT
beest VBR VBT
wast VBDR VBDT
wert VBDR VBDT
hast VH0 VHT
havest VH0 VHT
hadst VHD VHDT
haddest VHD VHDT
dost VD0 VDT
doest VD0 VDT
didst VDD VDDT
wilt VM VMT
wouldst VM VMT
canst VM VMT
```

```
seemedst VVD VVDT
seemest VV0 VVT
seemst VV0 VVT
seest VV0 VVT
showedest VVD VVDT
showedst VVD VVDT
showdst VVD VVDT
showest VV0 VVT
showst VV0 VVT
showst VV0 VVT
startedest VVD VVDT
startedst VVD VVDT
startest VV0 VVT
startst VV0 VVT
takest VV0 VVT
takst VV0 VVT
talkedest VVD VVDT
talkedst VVD VVDT
```

```
owst VV0 VVT
scaldst VV0 VVT
scoldst VV0 VVT
scornst VV0 VVT
scorndst VVD VVDT
seekst VV0 VVT
sentst VVD VVDT
servst VV0 VVT
setst VV0 VVT VVD VVDT
settlest VV0 VVT
shakst VV0 VVT
shamst VV0 VVT
shinst VV0 VVT
shrugst VV0 VVT
```

Manual Post-editing

```
35293  0001365 181                                          . 03 .
35294  0001365 182 ----------------------------------------------------
35295  0001365 190                        >              What 93 DDQ
35296  0001365 191                          <              's 96 VBZ
35297  0001365 192 <lb/>                        ERROR?        01
35298  0001365 200                                        the 93 AT
35299  >
35300  0001365 210                                       News 93 NN1
35301  >
35302  0001365 220                                         in 93 [II/100] RP@/0
35303  0001365 230                                       Rome 93 NP1
35304  0001365 231                                          : 03 :
35305  0001365 240                                          I 93 [PPIS1/100] MC1%/0 ZZ1%/0
35306  >
35307  0001365 250                                       have 93 VHO
35308  >
35309  0001365 260                                          a 93 AT1
35310  0001365 270                                       Note 93 [NN1/100] VVO/0
35311  0001365 280                                       from 93 II
35312  0001365 290                                        the 93 AT
35313  >
35314  0001365 300                                 Volscian 93 JJ
35315  >
35316  0001365 302 <lb/>                        ERROR?        01
35317  0001365 310                                     state 93 [NN1/95] VVO/5
35318  0001365 320                                        to 97 TO
35319  >
35320  0001365 330                                      find 97 VVI
35321  >
35322  0001365 340                                       you 93 PPY
35323  0001365 350                                       out 93 [RP/100] II%/0
35324  0001365 360                                     there 93 [RL/100] EX/0
35325  0001365 361                                          . 03 .
35326  0001365 362 ----------------------------------------------------
35327  0001365 370                                       You 93 PPY
```

Methods for manual post-editing

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1. Search on the word itself and check, e.g. *what*

   "And what was he?" = determiner
   "What ho Brabantio" = interjection

2. Search on tags which we anticipate may need fixing, e.g. tag ZZ1 (singular letter of the alphabet) wrongly applied to pronoun *I*.

3. Use regular expressions, e.g. to find and check words ending in –ing (disambiguating nouns, verbs and adjectives)
   \S\S\Sing \d\d

4. Check by reading …

Recurrent issues (1)

- Familiar words in unfamiliar grammatical roles
  - e.g. *marry* can be an interjection as well as a verb
    "Marry [VV0/86] UH/14 for justice she is so employed" (Tit 4_3)
  - *fright* can be a verb as well as a noun
    "What shall they seek the Lion in his den, And fright him there?" (KJ)

- Unfamiliar phrases
  - e.g. *go to* (*to* is an adverb not a preposition here)
    "Go to, you're a dry fool:" (TN 1_5)

- Some names of characters not recognised as proper nouns
  - e.g. [Mistress] Quickly (not an adverb), [Lord] Say (not a verb)

Recurrent issues (2)

- Wordplay sometimes confuses CLAWS
  - "A mark, O mark but that mark: a mark says my Lady" (LLL 4_1)

    CLAWS tags all four cases as nouns; the second is a verb

  - "Marry this is Miching Mallico, that means Mischief" (Ham 3_2)

    marry wrongly tagged as verb
    miching mallico tagged as verb, proper noun, but more likely to be adjective, noun (meaning unclear)