Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

Features: Recap and Wrap-up

Scott Farrar
CLMA, University of Washington
farrar@u.washington.edu

February 8, 2010

Today's lecture

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

1 Features: Recap

Features

Advantages of using features in CFGs

An important motivation for feature structures is to capture fine-grained distinctions that would otherwise require a massive multiplication of atomic categories

Example

- $NP \rightarrow DT\ NN$
  ...the book
- $NP \rightarrow DT\ NNS$
  ...the books

Features

Advantages of using features in CFGs

An important motivation for feature structures is to capture fine-grained distinctions that would otherwise require a massive multiplication of atomic categories

Example

- $NP \rightarrow DT\ NN$
  ...the book
- $NP \rightarrow DT\ NNS$
  ...the books

$NP[\ ] \rightarrow DT[num = ?n]\ Noun[num = ?n]$

Features

Advantages of using features in CFGs

An important motivation for feature structures is to capture fine-grained distinctions that would otherwise require a massive multiplication of atomic categories

Example

- $NP \rightarrow DT\ NN$
  ...the book
- $NP \rightarrow DT\ NNS$
  ...the books

$NP[\ ] \rightarrow DT[num =?n]\ Noun[num =?n]$

$NP[num =?n] \rightarrow DT[num =?n]\ Noun[num =?n]$
(for subj-verb agreement)

What makes a good feature?

What makes a good feature?

- One that accounts for a *systematic* grammatical distinction

What makes a good feature?

- One that accounts for a *systematic* grammatical distinction
- One that fits within the overall grammatical system (doesn't contradict other distinctions)

What makes a good feature?

- One that accounts for a *systematic* grammatical distinction
- One that fits within the overall grammatical system (doesn't contradict other distinctions)
- One that is not too out-of-line with the feature systems in the known languages of the world

Some German data

...**the** dog...

Der Hund ist ...
The dog   is ...

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

Some German data

...**the** dog...

Der Hund ist ...
The dog   is ...

... seht **den** Hund
... sees the dog

Some German data

...**the** dog...

Der Hund ist ...
The dog   is ...

... seht **den** Hund
... sees the dog

die Hunde sind ...
the dogs   are ...

Some German data

...**the** dog...

Der Hund ist ...
The dog   is ...

... seht **den** Hund
... sees the dog

die Hunde sind ...
the dogs   are ...

... geht mit **dem** Hund
... goes with the   dog

Some German data

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

...**the** dog...

Der Hund ist ...
The dog   is ...

... seht **den** Hund
... sees the dog

die Hunde sind ...
the dogs   are ...

... geht mit **dem** Hund
... goes with the   dog

... über   **den** Hund
... about the dog

An analysis

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

subject position

der   Hund
the   dog
'the dog'

An analysis

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

subject position

der	Hund
the.NOM	dog

'the dog'

An analysis

subject position

der   Hund
the.NOM dog
'the dog'

subject position, plural

die   Hunde
the.NOM   dog.PL
'the dogs'

An analysis

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

subject position

der   Hund
the.NOM dog
'the dog'

subject position, plural

die   Hunde
the.NOM.PL dog.PL
'the dogs'

Num: PL, SG

An analysis

subject position

der   Hund
the.NOM dog
'the dog'

object position

... den   Hund
... the   dog
'... the dog'

Num: PL, SG

An analysis

Features: Recap and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

subject position

der   Hund
the.NOM dog
'the dog'

object position

... den   Hund
... the.ACC dog
'... the dog'

Num: PL, SG

An analysis

subject position

der   Hund
the.NOM dog
'the dog'

object position

... den   Hund
... the.ACC dog
'... the dog'

Num: PL, SG

An analysis

Features: Recap and Wrap-up

Scott Farrar
CLMA, University of Washington far-
rar@u.washington.ed

Features: Recap

subject position

der   Hund
the.NOM dog
'the dog'

object position

... den   Hund
... the.ACC dog
'... the dog'

Num: PL, SG

Case: NOM, ACC

Some more German data

...the cat...

Die Katze ist ...
'The cat   is ...

Some more German data

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

...**the** cat...

Die Katze ist ...
'The cat   is ...

... seht **die** Katze
'... sees the cat

Some more German data

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

...**the** cat...

Die Katze ist ...
'The cat   is ...

... seht **die** Katze
'... sees the cat

die Katze sind ...
the cats   are ...

Some more German data

...**the** cat...

Die Katze ist ...
'The cat   is ...

... seht **die** Katze
'... sees the cat

die Katze sind ...
the cats   are ...

... geht mit **der** Katze
... goes with the cat

Some more German data

...**the** cat...

Die Katze ist ...
'The cat   is ...

... seht **die** Katze
'... sees the cat

die Katze sind ...
the cats   are ...

... geht mit **der** Katze
... goes with the cat

... über   **die** Katze
... about the cat

Feature interaction in German

German grammatical features

Consider the interactions of the German case, number and gender system:

Case	Masc	Fem	Neut	PL
Nom	der	die	das	die
Gen	des	der	des	der
Dat	dem	der	dem	den
Acc	den	die	das	die

Case: Nom, Gen, Dat, Acc
Gender: Masc, Fem, Neut
Number: PL, SG

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

Features and verb classes

Example

Die	Katze	sieht	den	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.ACC.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

Features and verb classes

Example

Die	Katze	sieht	den	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.ACC.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

*Die	Katze	sieht	dem	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.DAT.MASC.SG	dog.3.MASC.SG

Features and verb classes

Example

Die	Katze	sieht	den	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.ACC.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

*Die	Katze	sieht	dem	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.DAT.MASC.SG	dog.3.MASC.SG

Die	Katze	hilft	dem	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	help.3.SG	the.DAT.MASC.SG	dog.3.MASC.SG

'the cat helps the dog'

Features and verb classes

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.edu

Features: Recap

Example

Die	Katze	sieht	den	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.ACC.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

*Die	Katze	sieht	dem	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.DAT.MASC.SG	dog.3.MASC.SG

Die	Katze	hilft	dem	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	help.3.SG	the.DAT.MASC.SG	dog.3.MASC.SG

'the cat helps the dog'

*Die	Katze	hilft	den	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	help.3.SG	the.ACC.MASC.SG	dog.3.MASC.SG

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

Features and verb classes

Example

Die	Katze	sieht	den	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	see.3.SG	the.ACC.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

Die	Katze	hilft	dem	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	help.3.SG	the.DAT.MASC.SG	dog.3.MASC.SG

'the cat helps the dog'

Features and verb classes

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

Example

Die	Katze	**sieht**	**den**	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	**see**.3.SG	**the.ACC**.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

Die	Katze	hilft	dem	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	help.3.SG	the.DAT.MASC.SG	dog.3.MASC.SG

'the cat helps the dog'

Features and verb classes

Example

Die	Katze	**sieht**	**den**	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	**see**.3.SG	**the.ACC**.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

Die	Katze	**hilft**	**dem**	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	**help**.3.SG	**the.DAT**.MASC.SG	dog.3.MASC.SG

'the cat helps the dog'

Features and verb classes

Example

Die	Katze	**sieht**	**den**	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	**see**.3.SG	**the.ACC**.MASC.SG	dog.3.MASC.SG

'the cat sees the dog'

Die	Katze	**hilft**	**dem**	Hund
the.NOM.FEM.SG	cat.3.FEM.SG	**help**.3.SG	**the.DAT**.MASC.SG	dog.3.MASC.SG

'the cat helps the dog'

Conclusion

Some verbs assign the accusative case (ACC) to their objects, while some assign the dative case (DAT). There are at least two distinct **verb classes** in German.

Verbs do funny things

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

(1) a. I'll spray that wall with paint.

    b. I'll spray paint on that wall.

(2) a. I'll fill the cart with bricks.

    b. * I'll fill bricks into the cart.

(3) a. Bill slept the day away.

    b. *Bill arrived the day away.

Tying verb classes to reality

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

Activities vs. Achievements

(4) a. John climbed the mountain for four hours.

   b. John climbed the mountain in four hours.

(5) a. * John reached the summit for four hours.

   b. John reached the summit in four hours.

Tying verb classes to reality

Activities vs. Achievements

(6) a. John climbed the mountain for four hours.

    b. John climbed the mountain in four hours.

(7) a. * John reached the summit for four hours.

    b. John reached the summit in four hours.

Activities

climb, sleep, eat, fish, run, play

Activities happen over an extended time period.

Features: Recap
and Wrap-up

Scott Farrar
CLMA, University
of Washington far-
rar@u.washington.ed

Features: Recap

Tying verb classes to reality

Activities vs. Achievements

(8) a. John climbed the mountain for four hours.

    b. John climbed the mountain in four hours.

(9) a. * John reached the summit for four hours.

    b. John reached the summit in four hours.

Activities

climb, sleep, eat, fish, run, play

Activities happen over an extended time period.

Achievements

reach, win, die, got X

Achievements happen in a very short time-span (nearly
instantly).