Typical Usage Patterns of English Verbs

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Outline

- Interannotator agreement
- Local context of verb
- Population of semantic types
- Automatic pattern classifier

Pattern Dictionary of English Verbs (PDEV)

Definition of pattern no. 2 of *devote:*

definition of agent

[[{**Human** = **Author**} | {**Institution** = **Newspaper** | **Journal**}]]

devote

semantic type

[[**Document Part** | **Document**]]

semantic role

{to [[**Anything** = **Topic**]]}

definition of object

definition of adverbial

Implikatura:
[[{Human = Author} | {Institution = Newspaper | Journal} | Document]]
gives priority to discussion or elaboration of [[Anything = Topic]]
in [[Document Part | Document]]

Annotating: **devote-v**   *New pattern:* [   ] Add Number globally: X

Info Sort Finish Clear sel   Page [1 ▼] of 3 Go   Next | Last

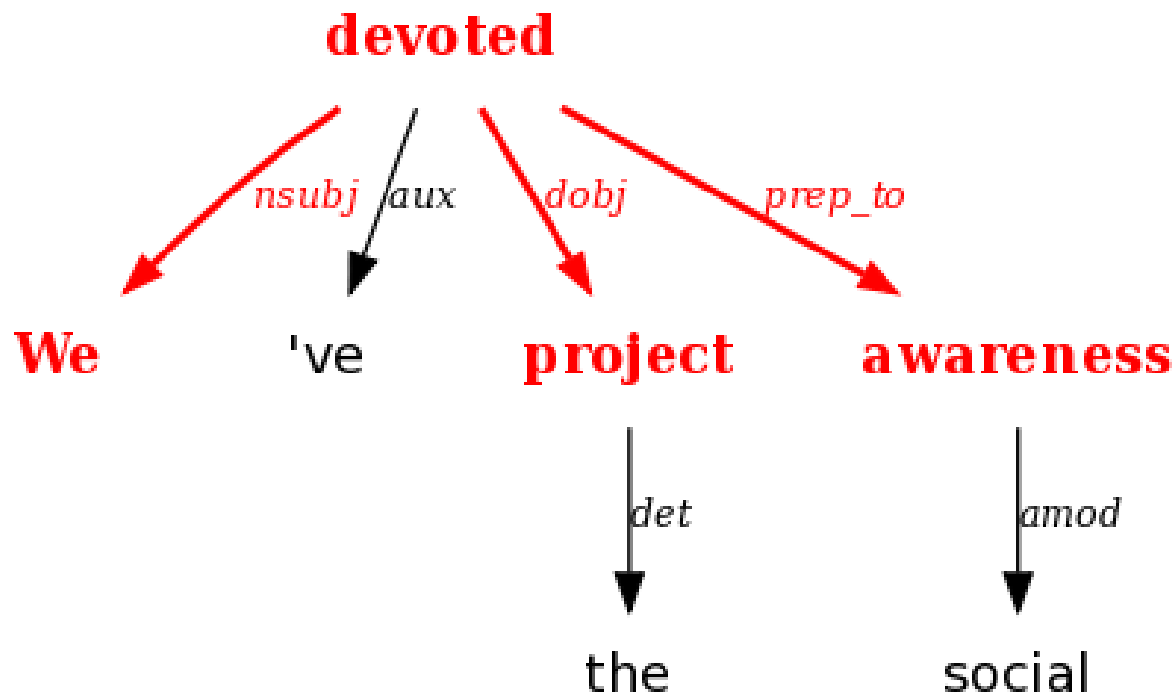| A4H | Christian and it has remarkable members who | **devote** | 1 | their lives to helping, for instance, people |
A4K	Times, asked whether it was not damaging to	**devote**	2	so much space to the attack, said: `This
A58	then until his retirement in June 1987 he	**devoted**	6	himself to chest surgery at Southampton
A64	These are some of the reasons why the Party	**devoted**	4	so much care to its favourite but weakling
A64	occasional references appear on inner pages	**devoted**	2	to food collection there. It was poor propaganda
A64	this account, declaring that instead of	**devoting**	1	its energy to extracting gold from the
A6U	should be an issue of the Oxford Art Journal	**devoted**	2	to Latin American art is itself testimony
A75	house. You have no helpers and can only	**devote**	1	a total of 4 hours observation time to
A8F	only one of several spectators who chose to	**devote**	6	themselves during these scenes to a meticulous
A8K	already well established that every hour	**devoted**	1	to this subject plays into Labour's hands
A8R	Shivdasani, there are about 300 Indian firms	**devoted**		to computer software engineering. * *
AAL	especially disappointing to staff who had `	**devoted**	3.e	their customary high level of professional
ACN	they gave Blaze carte blanche. * * `We've	**devoted**	4	the project to social awareness. The story
ADP	often inaccurately) assembled documentary	**devoted**	2	to the somewhat tendentious premiss of
ADP	find these players. At first I could not	**devote**	1	so much time to the orchestra but by the
AHG	has undergone in her lifetime, than a case	**devoted**	5	to stamps and banknotes. * * To think
AHN	this is what I promised. Now I promise to	**devote**	6	myself to bringing down the costs of your
AHX	was active in public service in Wales, and	**devoted**	6	himself to the development of scouting,
AJ8	on view until May 17; a major exhibition	**devoted**	5	to the 18th-century French sculptor Clodion
AJN	good.' * * Meanwhile, Dury continues to	**devote**	3	his attention to A Jovial Crew, which opens
AKD	the body is creating a new industry sector	**devoted**	1.e	to the development of `one-handed' molecules
AKY	disproportionate' Government effort and expense	**devoted**	1	to `chasing' overseas voters who were assumed
AL8	the Universities should be encouraged to	**devote**	1	part of their time to less formal work,
AL9	craft shop, a tearoom and an exhibition	**devoted**	4	to the Harris tweed industry, and a main
ALF	* * For too long, the time and resources	**devoted**	1	to the specific social and economic problems
ALF	increasing small farmers' market power has been	**devoted**	1	to organising marketing and the provision
ALN	problems and it is agreed that they may	**devote**	1	up to fifteen per cent of their time to
ALN	service practitioners, they should probably be	**devoting**	1	more resources to training professional

Interannotator Agreement

verb	N	P	f	A	Fleiss' kappa			
					+exp	-exp	PH +exp	PH -exp
accept	8	4.16	12190	3	0.54	0.64	0.65	0.80
address	6	3.85	3628	3	0.37	0.49	0.71	0.78
alter	2	1.28	2489	3	0.59	0.78	0.74	0.74
argue	7	1.73	11362	3	0.83	1.00	0.74	1.00
call	34	6.68	24439	2	0.69	0.68	0.87	0.90
claim	6	3.14	12517	4	0.69	0.72	0.72	0.82
fire	15	7.96	1488	2	0.34	0.42	0.59	0.72
lead	12	3.97	20180	3	0.72	0.78	0.74	0.81
need	5	4.12	28352	3	0.64	0.66	0.84	0.83
plan	4	3.08	7294	3	0.57	0.60	0.78	0.86
spoil	9	3.36	409	3	0.65	0.73	0.85	0.93
tell	21	3.80	21550	2	0.27	0.27	0.74	0.84
visit	3	2.16	5889	3	0.56	0.60	0.80	0.83

IAA -- Discussion

- Vaguness of instruction on context consideration

- Markable x unmarkable

- Elliptical usages

- Collocate matches more semantic types

- Insufficient competence in English

- Missing pattern
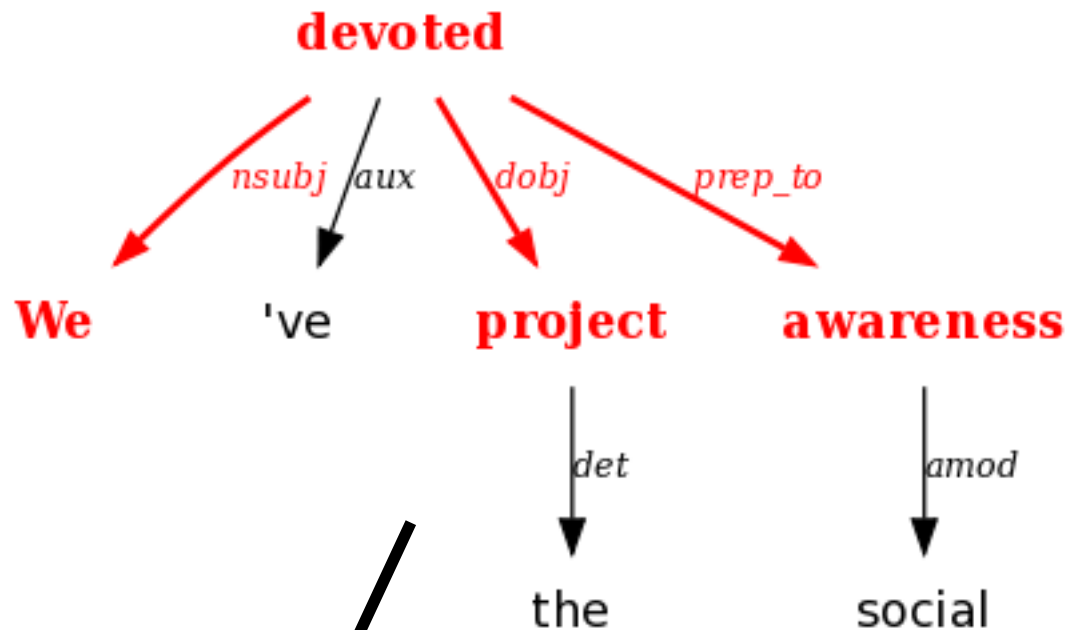
Local Context of Verb

[39] ` We 've devoted the project to social awareness .

Population of Semantic Types

- analyse sentences

- find verb arguments – agent, object, ...

- match verb argument with semantic type at same position (use definitions of patterns)

- get pairs ({Semantic_types}, word)

- disambiguate the pairs

- create lists of words which realised semantic types

` We 've devoted the project to social awareness .

devoted

nsubj | aux | **dobj** | **prep_to**

We | 've | **project** | **awareness**

det

the

amod

social

[[**Human | Institution**]]
    = **We**
[[**Activity**]]
    = **project**
[[**Anything**]]
    = **awareness**

agent: We
object: project
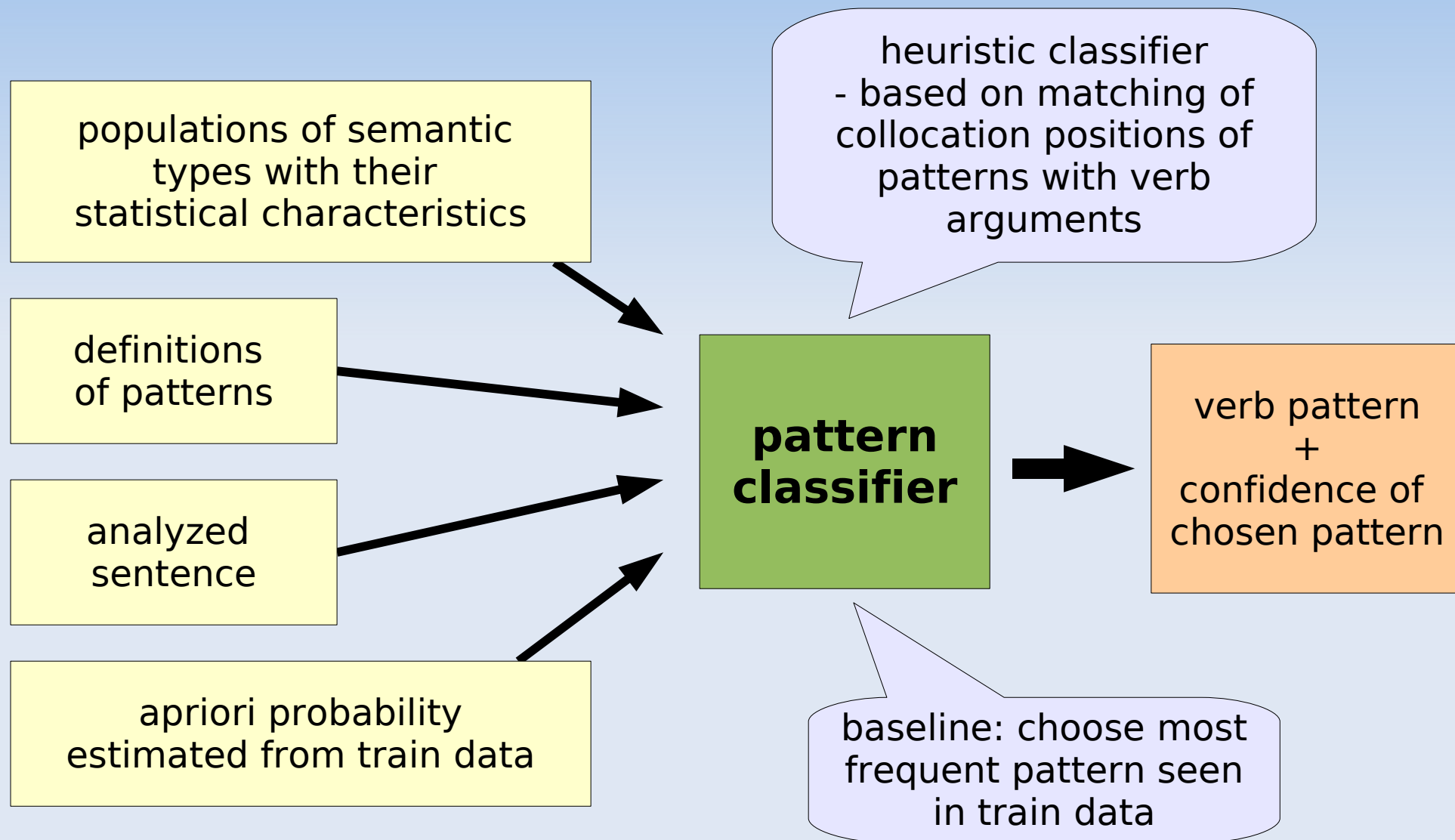adv.: to awareness

+

devote [4]:
agent: [[Human | Institution]]
object: [[Activity]]
adverbial: to [[Anything]]

Example: Semantic type „Plane"

slovo	sém. typ	F1	F2	F3	PMI3	F4	PMI4
aircraft	Plane	36	20	27.83	8.28	34.43	8.76
plane	Plane	21	12	16.5	8.68	20.31	9.15
helicopter	Plane	21	2	11.25	8.09	14.67	8.64
P-40	Plane	3	3	3	9.59	3	9.76
aeroplane	Plane	3	2	2.5	8.59	3	9.03
caravan	Plane	5	0	2.5	8.33	2.5	8.5
van	Plane	5	0	2.5	6.52	2.5	6.69
vehicle	Plane	5	0	2.5	6.06	2.5	6.23
Hurricanes	Plane	2	2	2	7.42	2	7.59
Sugar	Plane	2	2	2	8.59	2	8.76
glider	Plane	2	2	2	9.59	2	9.76
jet	Plane	3	1	2	7.42	3	8.18

Automatic Pattern Classifier

populations of semantic types with their statistical characteristics

definitions of patterns

analyzed sentence

apriori probability estimated from train data

heuristic classifier
- based on matching of collocation positions of patterns with verb arguments

pattern classifier

verb pattern
+
confidence of chosen pattern

baseline: choose most frequent pattern seen in train data

Automatic Pattern Classifier – experiments

sloveso	N	P	f	|D|	A_B	A	|Y|	avg(c)	|H|	$\|H_Y\|$	A_H
abandon	8	4.22	2813	77	54.55	76.62	59	82.61	54	49	90.74
alter	2	1.28	2489	64	90.62	90.62	58	99.01	64	58	90.63
announce	4	2.68	8739	82	48.78	80.49	66	86.18	59	52	88.14
argue	7	1.73	11362	82	92.68	92.68	76	95.59	67	62	92.54
devote	6	4.65	1530	80	47.50	63.75	51	80.95	45	38	84.44
fire	15	7.96	1488	76	28.95	40.79	31	61.95	27	15	55.56
land	12	7.02	1496	66	40.91	59.09	39	67.09	27	18	66.67
need	5	4.12	28352	65	35.38	53.85	35	76.37	31	21	67.74
plan	4	3.08	7294	59	54.24	81.36	48	77.55	35	31	88.57
rush	9	4.99	984	277	53.07	65.34	181	71.14	113	69	61.06
sleep	11	2.44	1575	414	77.78	84.78	351	83.05	90	79	87.78
urge	6	2.84	2603	83	72.29	81.93	68	96.37	75	65	86.67
visit	3	2.16	5889	76	68.42	75.00	57	88.22	55	48	87.27
celkem				2049	61.54	72.86	1493		1016	802	78.94

Contribution of Work

- one of first attemps of automatic data processing (especially of patterns definitions)

- creating of Population of semantic types – could be used for creating definitions

- Start point for future work:

  - Iterative procedure: using of classifier for automatic classifying of other sentences in BNC50 => extraction of pairs (semantic_type, word) => improving of Population of semantic types => improving of pattern classifier

Thank you for your attention.