FaCT

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FaCT:
The tests were performed using FaCT version 1.5. FaCT is a description logic classifier which uses the logic $\mathcal{ALCH}_{R^+}$ and whose subsumption reasoning uses a sound and complete tableaux algorithm. FaCT employs a wide range of optimisations, in particular a form of dependency directed backtracking called *backjumping* which can significantly reduce the size of the search space [1]. Programming language: Common Lisp (compiled).

Availability:
The sources for FaCT are available from the authors home page:

http://www.cs.man.ac.uk/~horrocks.

Advantages:
FaCT has been tested using several Common Lisps including GNU Lisp and should thus be highly portable. It can also be used for theorem proving in the propositional modal logics **K**, **KT**, Kfour and **S4**.

Hardware and Software:
PC clone; 200MHz Pentium II CPU; 64MB RAM; Linux; Allegro CL 4.3.

Results:
Note that the translation of KRSS knowledge bases into FaCT's syntax is not complete. In some cases (notably role hierarchies and disjointness) this is because wide variations in the syntax make translation akward; in others (notably non-primitive roles and number restrictions) it is because the constructs are not supported by FaCT. As a result, the processing is incomplete with respect to the realistic Tboxes "ckb", "datamont", "espr", "fss", and "wisber", and of all the random Tboxes.

References

[1] I. Horrocks. *Optimising Tableaux Decision Procedures for Description Logics.* PhD thesis, University of Manchester, 1997.

Table 1: Tableaux'98 Concept Satisfiability Tests

	Incoherent		**Coherent**	
Test	**Size**	**Correct**	**Size**	**Correct**
k_branch	6	Y	4	Y
k_d4	21	Y	8	Y
k_dum	21	Y	21	Y
k_grz	21	Y	21	Y
k_lin	21	Y	21	Y
k_path	8	Y	6	Y
k_ph	6	Y	7	Y
k_poly	21	Y	21	Y
k_t4p	21	Y	21	Y

Table 3: Realistic Tbox Classification Tests

Test	**Concepts**	**Time (s)**	**Correct**
ckb-roles	79	0.19	?
datamont-roles	120	0.42	?
espr-roles	142	0.33	?
fss-roles	132	0.66	?
wines	267	4.71	?
wisber-roles	140	0.48	?
galen1	2,728	97.60	Y
galen2	3,926	57.92	Y

Table 2: Tableaux'98 KB Tests

	Incoherent			Coherent		
Test	**Size**	**Concepts**	**Correct**	**Size**	**Concepts**	**Correct**
k_branch	3	316	Y	3	312	Y
k_d4	12	834	Y	8	608	Y
k_dum	21	585	Y	21	650	Y
k_grz	21	1,330	Y	21	1,349	Y
k_lin	21	934	Y	18	2,019	Y
k_path	5	429	Y	4	424	Y
k_ph	6	442	Y	6	442	Y
k_poly	4	260	Y	4	234	Y
k_t4p	21	637	Y	9	520	Y

Table 4: Synthetic Tbox Classification Tests

Test	Concepts	Time (s)	Correct
hc14	10	0.07	Y
hc18	18	0.33	Y
hc112	26	0.98	Y
hc24	46	0.45	Y
hc28	94	2.00	Y
hc212	142	6.68	Y
hc34	18	0.53	Y
hc36	26	1.39	Y
hc38	34	3.78	Y
hc44	7	0.09	Y
hc48	7	1.38	Y
hc412	7	33.28	Y

Table 5: Random Tbox Classification Tests

Test	Concepts	Time (s)	Correct
kris151	16	0.03	?
kris301	31	0.09	?
kris451	46	0.14	?
kris601	61	0.22	?
kris751	76	0.30	?
kris901	91	0.42	?
kris1051	106	0.43	?
kris1201	121	0.55	?
kris1351	136	0.98	?
kris1501	151	0.91	?
kris2001	201	1.25	?
kris4001	401	4.67	?
kris6001	601	8.91	?
kris8001	801	14.65	?
kris10001	1,001	26.44	?
kris12001	1,201	41.53	?
kris14001	1,401	31.37	?
kris16001	1,601	62.78	?
kris18001	1,801	61.67	?
kris20001	2,001	110.73	?
kris25001	2,501	165.12	?
kris30001	3,001	140.59	?
kris35001	3,501	217.64	?
kris40001	4,001	336.35	?
kris45001	4,501	503.51	?
kris50001	5,001	489.12	?