▼ 1 Investigating Hybrid Strategies for Systematic Literature Review

Experiment 3

This notebook displays:

1. Citation Matrix;
2. Matrix of Indication of Steps to find the selected articles;
3. Graph of Indication of Steps to find the selected articles;
4. Backward and Forward Matrix.

Note: Citation Graph --> CitationGraph.ipynb

`Selected Studies`

Out[3]:

Title	Authors	Year	Metakey	Study
A software process ontology and its application	Liao, Li and Qu, Yuzhong and Leung, H	2005	liao2005a	S1
An ontology-based approach to express software processes	Liao, Li and Qu, Yuzhong and Leung, H	2005	liao2005b	S2
An OWL ontology for representing the CMMI-SW model	Soydan, Gokhan Halit and Kokar, M	2006	soydan2006a	S3
Ontology-based intelligent decision support agent for CMMI project monitoring and control	Lee, Chang-Shing and Wang, Mei-Hui and Chen, Jui-Jen	2008	lee2008a	S4
Project assets ontology (PAO) to support gap analysis for organization process improvement based on CMMI v. 1.2	Rungratri, Suwanit and Usanavasin, Sasiporn	2008	rungratri2008a	S5
A strategic test process improvement approach using an ontological description for MND-TMM	Ryu, Hoyeon and Ryu, Dong-Kuk and Baik, Jongmoon	2008	ryu2008a	S6
A CMMI Ontology for An Ontology-Based Software Process Assessment Tool	Gazel, Sema and Tarhan, Ayca and Sezer, Ebru	2009	gazel2009a	S7
Ontology-based computational intelligent multi-agent and its application to CMMI assessment	Lee, Chang-Shing and Wang, Mei-Hui	2009	lee2009a	S8
Building process definition with ontology background	Stolfa, Svatopluk and KoZusznik, Jan and Kosinár, Michal and Duzí, Marie and Cíhalová, Martina and Vondrák, Ivo	2010	stolfa2010a	S9
An ontology based infrastructure to support CMMI-based software process assessment	Gazel, Sema and Sezer, Ebru Akcpinar and Tarhan, Ayca	2012	gazel2012a	S10
Towards automated process assessment in software engineering	Grambow, Gregor and Oberhauser, Roy and Reichert, Manfred	2012	grambow2012a	S11
A partial formalization of the CMMI-DEV—A capability maturity model for development	Soydan, Gokhan Halit and Kokar, Mieczyslaw M	2012	soydan2012a	S12
Automated software engineering process assessment: supporting diverse models using an ontology	Grambow, Gregor and Oberhauser, Roy and Reichert, Manfred	2013	grambow2013a	S13
Representing Software Process in Description Logics: n Ontology pproach for Software Process Reasoning and Verification	Kabaale, Edward and Wen, Lian and Wang, Zhe and Rout, Terry	2016	kabaale2016a	S14

2 Citation Matrix

1. The line identifies the article references were found via backward.
2. The column identifies who cited it via forward.
3. The "-" indicates that it is not possible for the article in the row to have references (cite) the article in the column, due to the year of publication.
4. The empty cell indicates that the id row/colum could have refer/cited the paper.

For example, it can be seen how ID Row (2006 S3) refer to (2005 S1) colum of row 3, and how ID Colum (2006 S3) is cited by (2008 S5), (2008 S6), (2009 S7), (2012 S10), (2012 S11), (2012 S12), (2013 S13) lines of colum 3.

Out[4]:

cited / ref	id	2005 S1	2005 S2	2006 S3	2008 S4	2008 S5	2008 S6	2009 S7	2009 S8	2010 S9	2012 S10	2012 S11	2012 S12	2013 S13	2016 S14
2005 S1	liao2005a			-	-	-	-	-	-	-	-	-	-	-	-
2005 S2	liao2005b			-	-	-	-	-	-	-	-	-	-	-	-
2006 S3	soydan2006a	x			-	-	-	-	-	-	-	-	-	-	-
2008 S4	lee2008a							-	-	-	-	-	-	-	-
2008 S5	rungratri2008a			x	x			-	-	-	-	-	-	-	-
2008 S6	ryu2008a	x		x				-	-	-	-	-	-	-	-
2009 S7	gazel2009a	x		x	x				x	-	-	-	-	-	-
2009 S8	lee2009a									-	-	-	-	-	-
2010 S9	stolfa2010a										-	-	-	-	-
2012 S10	gazel2012a	x		x	x	x		x	x					-	-
2012 S11	grambow2012a	x		x										-	-
2012 S12	soydan2012a	x		x	x	x			x			x		-	-
2013 S13	grambow2013a	x		x									x		-
2016 S14	kabaale2016a														

Out[6]: 3

3 Matrix - Steps to Find Selected Article

Number of steps to find an article from the list of selected, through the articles found in the references and by whom cites it.
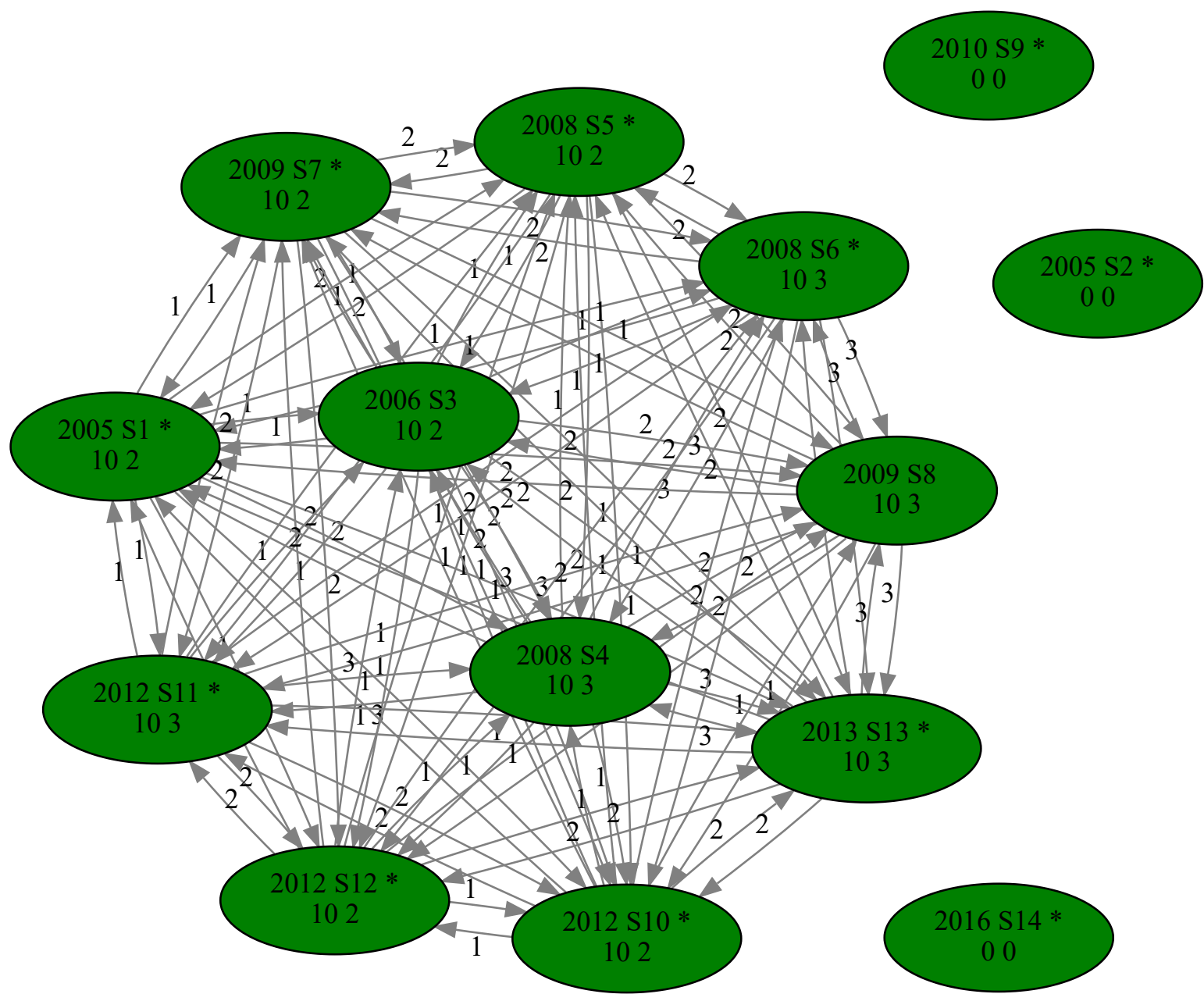
Subtitle: inf = infinite steps

Out[7]:

cited / ref	id	2005 S1	2005 S2	2006 S3	2008 S4	2008 S5	2008 S6	2009 S7	2009 S8	2010 S9	2012 S10	2012 S11	2012 S12	2013 S13	2016 S14
2005 S1	liao2005a	0	inf	1	2	2	1	1	2	inf	1	1	1	1	inf
2005 S2	liao2005b	inf	0	inf	inf	inf	inf	inf	inf	inf	inf	inf	inf	inf	inf
2006 S3	soydan2006a	1	inf	0	2	1	1	1	2	inf	1	1	1	1	inf
2008 S4	lee2008a	2	inf	2	0	1	3	1	2	inf	1	3	1	3	inf
2008 S5	rungratri2008a	2	inf	1	1	0	2	2	2	inf	1	2	1	2	inf
2008 S6	ryu2008a	1	inf	1	3	2	0	2	3	inf	2	2	2	2	inf
2009 S7	gazel2009a	1	inf	1	1	2	2	0	1	inf	1	2	2	2	inf
2009 S8	lee2009a	2	inf	2	2	2	3	1	0	inf	1	3	1	3	inf
2010 S9	stolfa2010a	inf	inf	inf	inf	inf	inf	inf	inf	0	inf	inf	inf	inf	inf
2012 S10	gazel2012a	1	inf	1	1	1	2	1	1	inf	0	2	1	2	inf
2012 S11	grambow2012a	1	inf	1	3	2	2	2	3	inf	2	0	2	1	inf
2012 S12	soydan2012a	1	inf	1	1	1	2	2	1	inf	1	2	0	2	inf
2013 S13	grambow2013a	1	inf	1	3	2	2	2	3	inf	2	1	2	0	inf
2016 S14	kabaale2016a	inf	inf	inf	inf	inf	inf	inf	inf	inf	inf	inf	inf	inf	0

4 Graph Citation - Steps to Find Selected Article

Floyd-Warshall algorithm was used to generate the graph: determines the distance between all the pairs of vertices of a graph and identify steps to find selected articles.

Subtitle: Node green color = is final selected; Node lightgreen color = not is final selected; Node with (*) = is seed set.

5 Backward and Forward - Details

1. Number of articles visited and how many steps was used to find the article from the list of selected;
2. Number of articles found via backward and how many were selected;
3. Number of articles found via forward and how many were selected.

Study	Metakey	Visited	Steps	Total Backward	Selected Backward	Total Forward	Selected Forward	Backward List	Selected Backward List	Forward List	Selected Forward List
S1	liao2005a	11	2	15	0	64	7	paulk1993a, isoiec1998a, haase1994a, wang2000a, cmusei2002a, conradi2002a, lopez2001a, conradi1994a, ben1993a, bandinelli1993a, deng2003a, alonso1995a, liao2004a, chandrasekaran1999a, patel2004a		gazel2009a, grambow2012a, grambow2013a, zhao2009a, pardo2012a, bringuente2011a, colomo2008a, grambow2011d, al2011a, caffery2012a, jeners2013a, ryu2008a, grambow2011e, gazel2012a, fitsilis2014a, kayed2010a, soydan2012a, sarantis2010a, teuteberg2009a, pricope2011a, jeners2012a, teuteberg2013a, pardo2014a, fadila2009a, bibi2014a, martoglia2011a, jeners2012b, jeners2013b, mora2010a, hamri2015a, aoussat2012b, jeners2012c, demirsoy2013a, mora2013a, tarhan2017a, colomo2008b, pardo2014ab, souza2012a, pyshkin2015a, kluth2013a, ahmad2009a, colomo2008ab, roongsangjan2017a, lourinho2017a, balaji2012a, nielsen2008a, zemaitytė2016a, liu2007ab, chansylilath2014a, ngwenya2016a, nizar2010a, ciancarini2018a, aoussat2014a, noroozi2012a, butka2015a, shanthini2013a, moraa2010a, fitsilis2015a, cadavid2018a, lang2014a, ontolojilerin2011a, aoussat2012a, aau2009a, soydan2006a	gazel2009a, grambow2012, grambow2013, ryu2008a, gazel2012a, soydan2012a, soydan2006
S2	liao2005b	1	0	11	0	1	0	conradi2002a, lopez2001a, wang2000b, berners2001a, w3c2004a, (0,), (0,), w32001a, w32001b, miller2003a, liao2004b		tarhan2017a	

Study	Metakey	Visited	Steps	Total Backward	Selected Backward	Total Forward	Selected Forward	Backward List	Selected Backward List	Forward List	Selected Forward List
S3	soydan2006a	11	2	6	1	52	14	cmmi2002ab, w3c2004c, carnegie2005a, carnegie2006a, mendes2004a, liao2005a	liao2005a	gazel2009a, gazel2012a, grambow2012a, grambow2013a, rungratri2008a, ryu2008a, pardo2012a, colomo2008a, grambow2011d, ryu2008a, grambow2011e, sharifloo2008b, gazel2012a, fitsilis2014a, rilling2008a, rilling2008b, schugerl2009a, hyland2008a, soydan2012a, rungratri2008a, mejia2016a, grambow2013a, grambow2012a, martoglia2011a, bergamaschi2015a, hmood2010a, mora2010a, pardo2015a, hamri2015a, ying2009a, gazel2009a, mora2013a, yoshidome2014a, proen2016a, baldassarre2016a, tarhan2017a, hyland2008b, colomo2008b, yoshidome2014b, shia2015a, albuquerque2017a, colomo2014a, ciancarini2018a, nielsen2008a, proen2018a, moraa2010a, fitsilis2015a, cadavid2018a, rilling2008c, peld2015a, aoussat2012a, soydan2012a	gazel2009a gazel2012a grambow2012 grambow2013 rungratri2008 ryu2008a, ryu2008a, gazel2012a soydan2012a rungratri2008 grambow2013 grambow2012 gazel2009a soydan2012

Study	Metakey	Visited	Steps	Total Backward	Selected Backward	Total Forward	Selected Forward	Backward List	Selected Backward List	Forward List	Selected Forward List
S4	lee2008a	11	3	15	0	107	4	gandon2006a, vetere1999a, musen1995a, huang2005a, pan2004a, hsieh2006a, hamdi2006a, pratt2006a, li2006a, cmmi2005a, wu2006a, han2006a, russo2006a, yager1988a, yager1993a		gazel2009a, gazel2012a, bobillo2011a, lee2011a, lee2009d, isern2011a, balaji2010a, lee2010a, chen2011b, milea2012a, bajo2009a, abanda2013a, kazemifard2011a, acampora2011a, acampora2010a, kang2012a, plaza2009a, zhou2015a, lee2008d, acampora2011b, kalpana2011a, gonzalez2011a, cheng2011a, nasir2008a, wang2008b, lee2012a, alfaraj2011a, lee2009e, fitsilis2014a, garrido2010a, crespo2012a, shoaib2010a, yang2010a, grzybek2014a, lee2010b, lee2010c, rungratri2008a, lee2008c, hoock2010a, lee2007ab, wang2012b, wang2010a, lee2008e, milea2013a, nojima2011a, chen2011c, plaza2016a, wang2011a, chang2009a, andrade2008b, lee2011b, wang2008c, xu2013a, xu2015a, haghighi2012a, guo2010a, lagos2017a, cheng2009b, kuo2011a, heinzle2017a, wang2013a, mora2013a, liu2007a, lee2007d, tarhan2017a, xua2014a, cristani2010a, cristani2008a, wang2013b, freitas2017a, amid2013a, japan2009a, japan2010a, quevedo2015a, japan2016a, hou2015a, laroque2012a, erdem2010a, dias2013a, poulos2017a, ramadhan2013a, lee2013b, su2011a, xu2015b, wang2011ab, jia2012a, ratnaraj2001a, nielsen2008a, garcía2017a, proen2018a, ding2017a, wang2012c, wang2010b, li2014a, lee2013c, chen2007a, bilgehan2010a, fitsilis2015a, lang2017a, garcía2015ab, japan2012a, crespo2011a, shia2015a, computa2017a, lee2013d, japan2007a, soydan2012a	gazel2009a gazel2012a rungratri2008 soydan2012
S5	rungratri2008a	11	2	13	3	11	3	lee2008a, kulpa2003a, loon2004a, berauer2003a, team2006a, ontology2008a, soydan2006a, lee2006a, institute2008a, consultants2008a, chrissis2007a, w3c2004ab, soydan2006a	lee2008a, soydan2006a, soydan2006a	gazel2012a, fitsilis2014a, soydan2012a, hamri2015a, achi2016a, roongsangjan2017b, tarhan2017a, shia2015a, fitsilis2015a, cadavid2018a, soydan2012a	gazel2012a soydan2012a soydan2012
S6	ryu2008a	11	3	20	3	19	0	liao2005a, paulk1993a, cmusei2002ab, dorling1993a, grom1999a, ericson1997a, pol1999a, gruber1993a, mcguinness2001a, soydan2006a, happel2006a, strasunskas2005a, qu2005a, damiani2003a, musen1998a, bertollo2004a, palomäki2006a, w3c2003a, protégé2008a, soydan2006a	liao2005a, soydan2006a, soydan2006a	afzal2016a, souza2013a, freitas2014a, garousi2017a, rodrigues2010a, souza2013b, srivastava2009a, alone2015a, tarhan2017a, souza2017a, ferreira2011a, vukovic2018a, vasanthapriyan2017a, srikanth2016a, rodrigues2009a, barbosa2011a, costa2016a, ögren2017a, junior2010a	

Study	Metakey	Visited	Steps	Total Backward	Selected Backward	Total Forward	Selected Forward	Backward List	Selected Backward List	Forward List	Selected Forward List
S7	gazel2009a	11	2	26	5	3	2	humphrey1995a, omg2008a, iso2008b, sei2006a, tague2004a, iso2000a, w3c2004c, protégé2009a, eclipse2009a, epf2009a, cmusei2009a, cmusei2007a, chandrasekaran1999a, feiler1993a, liao2005a, soydan2006a, sharifloo2008a, sumo2009a, dpans2009a, lee2007c, lee2008a, iso2008c, iso2008d, cmmi2009a, lee2009a, soydan2006a	liao2005a, soydan2006a, lee2008a, lee2009a, soydan2006a	gazel2012a, tarhan2017a, gazel2012a	gazel2012a gazel2012a
S8	lee2009a	11	3	26	0	57	3	huang2005a, j1999a, chen1996a, pratt2006a, vw2006a, hamdi2006a, hsieh2006a, wang2005a, yan2006a, grossklags2006a, alani2003a, chau2007a, gandon2006a, navigli2003a, morbach2007a, gs2006a, burstein2004a, chang2007a, chrissis2003a, staples2007a, han2006a, sommerville2007a, x2006a, greif2006a, voas2003a, woolridge2001a		lee2009f, balaji2010a, lee2010a, chen2011b, milea2012a, kazemifard2011a, ali2015a, kang2012a, acampora2012a, huang2010a, ali2016a, wang2008b, lee2012a, sharifloo2008b, gazel2012a, huang2014a, fitsilis2014a, pakdeetrakulwong2013a, ping2009a, soydan2012a, hoock2010a, bukhari2013a, wang2012b, wang2010a, hung2011a, pakdeetrakulwong2016a, milea2013a, wongthongtham2017a, garcía2011a, andrade2008b, cimitile2012a, wang2017a, donzelli2016a, gazel2009a, silva2013a, han2012a, lee2007d, silva2015a, tarhan2017a, chen2010a, cristani2010a, cristani2008a, japan2010ab, japan2010a, damjanovic2014a, fraihat2016a, pakdeetrakulwong2013b, keshta2017a, lee2013b, pakdeetrakulwong2015a, proen2018a, wang2010b, cao2012a, he2012a, díaz2017a, lee2013d, teixeira2014a	gazel2012a soydan2012a gazel2009a
S9	stolfa2010a	1	0	14	0	5	0	varkoi2008a, levesque2004a, horák2007a, košåšinár2008a, horák2008a, musen2001a, humphrey1995a, vondrak2004a, karkoška2008a, varkoi2008b, benes2002a, management1999a, cmmi2002a, dorfmann1997a		mejia2016a, tarhan2017a, ko2011a, ko2011b, jezek2011a	

Study	Metakey	Visited	Steps	Total Backward	Selected Backward	Total Forward	Selected Forward	Backward List	Selected Backward List	Forward List	Selected Forward List
S10	gazel2012a	11	2	45	8	14	1	gazel2009a, tague2004b, iso2000b, omg2008a, team2006b, eclipse2012a, haumer2006a, iso2008e, iso1998a, iso2008f, team2009a, team2007a, team2006c, leung2007a, assistant2008a, chemuturi2012a, cmm2012a, spice2012a, spicelite2012a, wizard2012a, wizard2012b, infosystems2012a, chandrasekaran1999a, ontoweb2002a, pulido2006a, protégé2012a, w3c2004d, zhang2005a, jena2012a, omg2012a, soydan2006a, sharifloo2008a, sumo2012a, dpans2012a, rungratri2008b, qu2005a, doheny1996a, garcía2006b, lee2007c, lee2008a, gazel2009a, lee2009a, liao2005a, rungratri2008a, soydan2006a	gazel2009a, soydan2006a, lee2008a, gazel2009a, lee2009a, liao2005a, rungratri2008a, soydan2006a	fitsilis2014a, soydan2012a, rungratri2012a, tarhan2015a, hamri2015a, yurum2017a, feloni2015a, tarhan2017a, tarhan2015ab, roongsangjan2017a, eito2017a, fitsilis2015a, cadavid2018a, peld2015a	soydan2012
S11	grambow2012a	11	3	25	3	8	2	bourque2004a, cmmi2010a, iso2003a, bamford2004a, reichert2012a, grambow2011a, oberhauser2007a, scampi2011a, iso2012a, iso2008a, iso2011a, consortium2004a, sirin2007a, johnson2007a, dadam2009a, grambow2012b, grambow2011b, seyyedi2005a, basili1994a, soydan2006a, liao2005a, ferchichi2008a, montoni2006b, assistant2012a, soydan2006a	soydan2006a, liao2005a, soydan2006a	grambow2013a, grambow2016a, pícha2016a, tarhan2017a, oberhauser2017a, roongsangjan2017a, pícha2017a, grambow2013a	grambow2013, grambow2013
S12	soydan2012a	11	2	45	8	10	0	gazel2012a, lee2009a, liao2005a, rungratri2008a, soydan2006a, chrissis2011b, institute2008b, cmmi2008a, wikipedia2008a, heflin2004a, gallagher2011a, cmmi2010ab, forrester2011a, w3c2004ab, soydan2006b, w3c2006a, gruber1993b, bunge1977a, sirin2005a, haarslev2005a, matheus2006a, kiryakov2005a, institute2005a, cmmi2006a, baclawski2002a, calero2006a, soydan2006a, cmmi2002c, mendes2004a, bourque2005b, qu2005a, lee2008a, lee2007c, gazel2012b, rungratri2008a, wang2010a, lee2008c, wang2008a, lee2007ab, lee2009b, lee2008b, lee2009c, falbo2005a, falbo2005c, singarayan2007a	gazel2012a, lee2009a, liao2005a, rungratri2008a, soydan2006a, soydan2006a, lee2008a, rungratri2008a	umar2015a, miranda2014a, forero2014a, sukmandhani2017a, roongsangjan2017a, dévora2016a, peld2015a, dévora2013a, shia2015a, solís2016a	

Study	Metakey	Visited	Steps	Total Backward	Selected Backward	Total Forward	Selected Forward	Backward List	Selected Backward List	Forward List	Selected Forward List
S13	grambow2013a	11	3	51	5	8	0	grambow2012a, grambow2012a, bourque2004b, cmmi2010a, iso2003a, bamford2004a, reichert2012a, grambow2011a, oberhauser2007a, scampi2011a, iso2012a, iso2008a, iso2011a, grambow2011b, grambow2012c, grambow2011c, grambow2012d, grambow2012e, johnson2007b, luckham2001a, esper2013a, gelernter1985a, meier2009a, obrien1998a, bellifemine1999a, browne2009a, dadam2009a, consortium2004a, sirin2007a, jiang2007a, cook2004a, dustdar2004a, conradi1995a, korpipipää2003a, fahy2004a, gu2004a, biegel2004a, dorn2007a, pedrinaci2008a, ma2007a, lin2005a, koschmider2005a, thomas2005a, seyyedi2005a, basili1994a, soydan2006a, liao2005a, ferchichi2008a, montoni2006b, assistant2013a, soydan2006a	grambow2012a, grambow2012a, soydan2006a, liao2005a, soydan2006a	grambow2016a, hipp2015a, tarhan2017a, oberhauser2017a, ayalew2014b, gasca2017a, gasca2017b, rothmaier2014a	
S14	kabaale2016a	0	0	30	0	2	0	feiler1993a, wen2011a, curtis1992a, iso2007a, iso2014a, iso2011b, wen2012a, calvanese2012a, baader2003a, berardi2005a, krotzsch2013a, bergman2009a, thaddeus2006a, acuna2005a, rodríguez2010a, engineering2016a, dromey2005a, wen2004a, borgida2003a, horrocks2006a, moor2006a, yatapanage2010a, roedler2010a, motik2007a, motik2007b, sirin2006a, tsarkov2006a, iso2016a, siegemund2011a, wang2006a		tarhan2017a, kabaale2017a	