8.1.2024

Research questions (can be found above):

RQ1: What is an appropriate way to compare extracted SHACL shapes from different versions of a  
graph in a user-friendly way?  
RQ2: What is an appropriate way to explain why certain shapes have been added, removed or changed  
by using information from the QSE algorithm?  
RQ3: Given two versions of a graph (V1 and V2) and the changeset between these versions, what is  
an appropriate way to adapt the QSE algorithm so that it calculates SHACL shapes of V2 by  
using V1 and the changeset?  
RQ4: There might be other algorithms, which extract SHACL shapes from RDF graphs. Given two  
versions of SHACL shapes from two versions of a graph, what is an appropriate way to explain  
why certain shapes have been added, removed or changed by using partial SPARQL queries?

Objectives:

* Establish a broad understanding of the current knowledge base in the area of evolving knowledge graphs, automatic extraction of data quality constraints from knowledge graphs, comparing of SHACL shapes and differences between knowledge graphs
* Identify current research gaps in these areas

Search-Keywords:

“Evolving Knowledge graphs”, “Data quality in knowledge graphs”, “Constraint extraction from knowledge graphs”, “comparing shacl shapes”, “differences between knowledge graphs versions”

Study selection criteria:

* Paper published after 2000
* Paper written in English or German
* Paper is accessible with TU-Vienna Account for free

Only libraries: Google Scholar

Study Exclusion Criteria:

Has nothing to do with my research questions.

Already read during research on my topic area

Study Selection Procedure:

Type in keywords in Google Scholar and read the first 10 results. If the title has something to do with my research questions or the objectives and meets the study selection criteria, paper can go to next round. In the next phase, all abstracts will be read. Based on theses filtered papers, the full papers will be read. After the full papers have been read, some may be excluded again

Data extraction: After the papers have been read, the interesting parts of their content will be summarized.

Data synthesis: the content of the papers will be descriptively synthesised

Data reporting: the content of the summarized studies will be published in the related work section.

SLR done on 14.5

Evolving Knowledge graphs:

|  |  |  |
| --- | --- | --- |
| Title | Authors | Excluded Reason |
| Evolving Knowledge Graphs | Jiaqi Liu, Qin Zhang, Luoyi Fu, Xinbing Wang and Songwu Lu |  |
| Know-Evolve: Deep Temporal Reasoning for Dynamic Knowledge Graphs | ***Rakshit Trivedi, Hanjun Dai, Yichen Wang, Le Song*** | Title: Reasoning is not in line with the topic of this thesis |
| Summarizing Entity Temporal Evolution in Knowledge Graphs | Mayesha Tasnim, Diego Collarana, Damien Graux, Fabrizio Orlandi, Maria-Esther Vidal |  |
| How does knowledge evolve in open knowledge graphs? | Axel Polleres (1) , Romana Pernisch (2) , Angela Bonifati (3) , Daniele Dell'Aglio (4) , Daniil Dobriy (1) , Stefania Dumbrava (5, 6, 7) , Lorena Etcheverry (8) , Nicolas Ferranti (1) , Katja Hose (4) , Ernesto Jiménez-Ruiz (9, 10) , Matteo Lissandrini (4) , Ansgar Scherp (11) , Riccardo Tommasini (12, 13) , Johannes Wachs (1, 14) |  |
| Analysing the Evolution of Knowledge Graphs for the Purpose of Change Verification | [Chifumi Nishioka](https://ieeexplore.ieee.org/author/37085367473); [Ansgar Scherp](https://ieeexplore.ieee.org/author/37568166200) |  |
| EvolveKG: a general framework to learn evolving knowledge graphs |  [Jiaqi Liu](https://link.springer.com/article/10.1007/s11704-022-2467-9#auth-Jiaqi-Liu-Aff1),   [Zhiwen Yu](https://link.springer.com/article/10.1007/s11704-022-2467-9#auth-Zhiwen-Yu-Aff1),   [Bin Guo](https://link.springer.com/article/10.1007/s11704-022-2467-9#auth-Bin-Guo-Aff1),   [Cheng Deng](https://link.springer.com/article/10.1007/s11704-022-2467-9#auth-Cheng-Deng-Aff2),   [Luoyi Fu](https://link.springer.com/article/10.1007/s11704-022-2467-9#auth-Luoyi-Fu-Aff2),   [Xinbing Wang](https://link.springer.com/article/10.1007/s11704-022-2467-9#auth-Xinbing-Wang-Aff2) &   [Chenghu Zhou](https://link.springer.com/article/10.1007/s11704-022-2467-9#auth-Chenghu-Zhou-Aff3) |  |
| KGdiff: Tracking the Evolution of Knowledge Graphs | [Abbas Keshavarzi](https://ieeexplore.ieee.org/author/37088503145); [Krys J. Kochut](https://ieeexplore.ieee.org/author/37283297500) |  |
| Predicting the co-evolution of event and Knowledge Graphs | [Cristóbal Esteban](https://ieeexplore.ieee.org/author/37085629366); [Volker Tresp](https://ieeexplore.ieee.org/author/37354719400); [Yinchong Yang](https://ieeexplore.ieee.org/author/37085867397); [Stephan Baier](https://ieeexplore.ieee.org/author/37085864630); [Denis Krompaß](https://ieeexplore.ieee.org/author/37085611147) |  |
| Knowledge Graphs Evolution and Preservation -- A Technical Report from ISWS 2019 | [Nacira Abbas](https://arxiv.org/search/cs?searchtype=author&query=Abbas,+N), [Kholoud Alghamdi](https://arxiv.org/search/cs?searchtype=author&query=Alghamdi,+K), [Mortaza Alinam](https://arxiv.org/search/cs?searchtype=author&query=Alinam,+M), [Francesca Alloatti](https://arxiv.org/search/cs?searchtype=author&query=Alloatti,+F), [Glenda Amaral](https://arxiv.org/search/cs?searchtype=author&query=Amaral,+G), [Claudia d'Amato](https://arxiv.org/search/cs?searchtype=author&query=d%27Amato,+C), [Luigi Asprino](https://arxiv.org/search/cs?searchtype=author&query=Asprino,+L), [Martin Beno](https://arxiv.org/search/cs?searchtype=author&query=Beno,+M), [Felix Bensmann](https://arxiv.org/search/cs?searchtype=author&query=Bensmann,+F), [Russa Biswas](https://arxiv.org/search/cs?searchtype=author&query=Biswas,+R), [Ling Cai](https://arxiv.org/search/cs?searchtype=author&query=Cai,+L), [Riley Capshaw](https://arxiv.org/search/cs?searchtype=author&query=Capshaw,+R), [Valentina Anita Carriero](https://arxiv.org/search/cs?searchtype=author&query=Carriero,+V+A), [Irene Celino](https://arxiv.org/search/cs?searchtype=author&query=Celino,+I), [Amine Dadoun](https://arxiv.org/search/cs?searchtype=author&query=Dadoun,+A), [Stefano De Giorgis](https://arxiv.org/search/cs?searchtype=author&query=De+Giorgis,+S), [Harm Delva](https://arxiv.org/search/cs?searchtype=author&query=Delva,+H), [John Domingue](https://arxiv.org/search/cs?searchtype=author&query=Domingue,+J), [Michel Dumontier](https://arxiv.org/search/cs?searchtype=author&query=Dumontier,+M), [Vincent Emonet](https://arxiv.org/search/cs?searchtype=author&query=Emonet,+V), [Marieke van Erp](https://arxiv.org/search/cs?searchtype=author&query=van+Erp,+M), [Paola Espinoza Arias](https://arxiv.org/search/cs?searchtype=author&query=Arias,+P+E), [Omaima Fallatah](https://arxiv.org/search/cs?searchtype=author&query=Fallatah,+O), [Sebastián Ferrada](https://arxiv.org/search/cs?searchtype=author&query=Ferrada,+S), [Marc Gallofré Ocaña](https://arxiv.org/search/cs?searchtype=author&query=Oca%C3%B1a,+M+G), [Michalis Georgiou](https://arxiv.org/search/cs?searchtype=author&query=Georgiou,+M), [Genet Asefa Gesese](https://arxiv.org/search/cs?searchtype=author&query=Gesese,+G+A), [Frances Gillis-Webber](https://arxiv.org/search/cs?searchtype=author&query=Gillis-Webber,+F), [Francesca Giovannetti](https://arxiv.org/search/cs?searchtype=author&query=Giovannetti,+F), [Marìa Granados Buey](https://arxiv.org/search/cs?searchtype=author&query=Buey,+M+G), [Ismail Harrando](https://arxiv.org/search/cs?searchtype=author&query=Harrando,+I), [Ivan Heibi](https://arxiv.org/search/cs?searchtype=author&query=Heibi,+I), [Vitor Horta](https://arxiv.org/search/cs?searchtype=author&query=Horta,+V), [Laurine Huber](https://arxiv.org/search/cs?searchtype=author&query=Huber,+L), [Federico Igne](https://arxiv.org/search/cs?searchtype=author&query=Igne,+F), [Mohamad Yaser Jaradeh](https://arxiv.org/search/cs?searchtype=author&query=Jaradeh,+M+Y), [Neha Keshan](https://arxiv.org/search/cs?searchtype=author&query=Keshan,+N), [Aneta Koleva](https://arxiv.org/search/cs?searchtype=author&query=Koleva,+A), [Bilal Koteich](https://arxiv.org/search/cs?searchtype=author&query=Koteich,+B), [Kabul Kurniawan](https://arxiv.org/search/cs?searchtype=author&query=Kurniawan,+K), [Mengya Liu](https://arxiv.org/search/cs?searchtype=author&query=Liu,+M), [Chuangtao Ma](https://arxiv.org/search/cs?searchtype=author&query=Ma,+C), [Lientje Maas](https://arxiv.org/search/cs?searchtype=author&query=Maas,+L), [Martin Mansfield](https://arxiv.org/search/cs?searchtype=author&query=Mansfield,+M), [Fabio Mariani](https://arxiv.org/search/cs?searchtype=author&query=Mariani,+F), [Eleonora Marzi](https://arxiv.org/search/cs?searchtype=author&query=Marzi,+E), [Sepideh Mesbah](https://arxiv.org/search/cs?searchtype=author&query=Mesbah,+S), [Maheshkumar Mistry](https://arxiv.org/search/cs?searchtype=author&query=Mistry,+M), [Alba Catalina Morales Tirado](https://arxiv.org/search/cs?searchtype=author&query=Tirado,+A+C+M), [Anna Nguyen](https://arxiv.org/search/cs?searchtype=author&query=Nguyen,+A), [Viet Bach Nguyen](https://arxiv.org/search/cs?searchtype=author&query=Nguyen,+V+B), [Allard Oelen](https://arxiv.org/search/cs?searchtype=author&query=Oelen,+A), [Valentina Pasqual](https://arxiv.org/search/cs?searchtype=author&query=Pasqual,+V), [Heiko Paulheim](https://arxiv.org/search/cs?searchtype=author&query=Paulheim,+H), [Axel Polleres](https://arxiv.org/search/cs?searchtype=author&query=Polleres,+A), [Margherita Porena](https://arxiv.org/search/cs?searchtype=author&query=Porena,+M), [Jan Portisch](https://arxiv.org/search/cs?searchtype=author&query=Portisch,+J), [Valentina Presutti](https://arxiv.org/search/cs?searchtype=author&query=Presutti,+V), [Kader Pustu-Iren](https://arxiv.org/search/cs?searchtype=author&query=Pustu-Iren,+K), [Ariam Rivas Mendez](https://arxiv.org/search/cs?searchtype=author&query=Mendez,+A+R), [Soheil Roshankish](https://arxiv.org/search/cs?searchtype=author&query=Roshankish,+S), [Sebastian Rudolph](https://arxiv.org/search/cs?searchtype=author&query=Rudolph,+S), [Harald Sack](https://arxiv.org/search/cs?searchtype=author&query=Sack,+H), [Ahmad Sakor](https://arxiv.org/search/cs?searchtype=author&query=Sakor,+A), [Jaime Salas](https://arxiv.org/search/cs?searchtype=author&query=Salas,+J), [Thomas Schleider](https://arxiv.org/search/cs?searchtype=author&query=Schleider,+T), [Meilin Shi](https://arxiv.org/search/cs?searchtype=author&query=Shi,+M), [Gianmarco Spinaci](https://arxiv.org/search/cs?searchtype=author&query=Spinaci,+G), [Chang Sun](https://arxiv.org/search/cs?searchtype=author&query=Sun,+C), [Tabea Tietz](https://arxiv.org/search/cs?searchtype=author&query=Tietz,+T), [Molka Tounsi Dhouib](https://arxiv.org/search/cs?searchtype=author&query=Dhouib,+M+T), [Alessandro Umbrico](https://arxiv.org/search/cs?searchtype=author&query=Umbrico,+A), [Wouter van den Berg](https://arxiv.org/search/cs?searchtype=author&query=van+den+Berg,+W), [Weiqin Xu](https://arxiv.org/search/cs?searchtype=author&query=Xu,+W) |  |
| **Representing Scientific Literature Evolution via Temporal Knowledge Graphs** | [Rossanez, Anderson](https://ntnuopen.ntnu.no/ntnu-xmlui/browse?value=Rossanez,%20Anderson&type=author); [Reis, Julio](https://ntnuopen.ntnu.no/ntnu-xmlui/browse?value=Reis,%20Julio&type=author); [Torres, Ricardo Da Silva](https://ntnuopen.ntnu.no/ntnu-xmlui/browse?value=Torres,%20Ricardo%20Da%20Silva&type=author) | Title: Scientific Literature Evoluation has nothing to do with topic |