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Artificial General Intelligence - a systematic mapping study

Master's Thesis in Information Technology

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Abstract: In this thesis, a systematic mapping study is performed on the field of artificial general intelligence. The goal of the study is to gain insight about the recent developments in the study field. This includes the focus points of the current reserch, possible research gaps, and how the research itself is conducted. TODO: more accurate, proper abstract

Keywords: Master's Theses, AGI, AI, artificial intelligence, systematic literature mapping, mapping study

Suomenkielinen tiivistelmä:

Tässä suunnitelmassa käydään läpi pro gradu -tutkielman mahdollista aihetta ja tutkimustapaa. TODO: translate when abstract done

Avainsanat: Pro Gradu,tutkielma, AI, tekoäly

Contents

1 Introduction

The thesis will be a systematic research mapping on the field of Artificial General Intelligence (AGI). The goal of the thesis is to identify the themes and subfields of AGI research in recent years, what is being researched recently, and what kind of gaps exist on the field. For a while the AGI field was not so active and the more specific approaches, 'narrow AI', grew in popularity. Recently, however, the wider, more general artificial intelligence has been regaining interest. This kind of mapping study would be needed as the research field is complex and there is no clear presentation of the current trends and focal points. Creating this king of overview would be a valuable asset for future research. Furthermore, if an interesting subtopic comes up during the process of mapping, more focus may be directed towards that in form of more traditional systematic literature review. This option is left for further consideration.

2 Artificial General Intelligence

As the thesis itself will be a systematic literature mapping study, no separate review or mapping should be needed. Systematic mapping study creates an overview of the research area by categorizing the reports and studies, creating a visual map that provides information on how the research is focused. The method is based on observing the abstracts of studies, enabling faster analysis and greater volume in the material. It is described in more detail in 3.1. In comparison, systematic literature review method goes on more detail, providing more verbal, summary-like results on the topic. This increased depth narrows the breadth of the study.

2.1 Definition

2.2 History of AGI

3 Systematic literature mapping process

3.1 Research method and reasoning

The research method, systematic mapping, is a secondary study method that aims to create a general view of the studied area by a process of keywording, classification, and mapping. According to Peterson et al. (2008), it consist of the following phases:

1. Definition of research questions
2. Conducting search
3. Screening the papers for inclusion and exclusion
4. Keywording (abstracts, conclusions, introductions)
5. Data extraction and mapping

Each phase produces a subresult to be used in the next one. This process results in a systematic map of the area. This can and should be further visualized using for example bubble graphs (Mononen 2018 and Petersen et al. 2008). This helps to more easily spot the focus points and gaps in the research.

The material is to be gathered through databases and search engines via specified search terms. Databases and content libraries such as IEEE, ACM, and Google Scholar can be used. One possible option would be to focus on journals that specialize on the field, such as *Journal of Artificial General Intelligence, Journal of Artificial Intelligence Research*, and *Artificial Intelligence*, the first of which is highly focused on the area, but not well ranked based by Publication Forum.

There exists many good papers on the research method. There are some example theses using the approach, such as Niko Mononen's (Mononen 2018) and Sari Ryynänen's (Ryynänen 2017). Guidelines regarding the method itself can be found on article ny Petersen et al. 2008. There is an update on the topic as well (Petersen, Vakkalanka, and Kuzniarz 2015). Some sources about literature reviews such as Bereton et al. (2007) and Salminen (2011) might be useful as well.

3.2 Difference with other secondary studies

3.3 Mapping studies in field of IT

4 The literature mapping

4.1 Background/why this method and topic

The research questions are not too specific yet, but some ideas are:

- What is the current state of AGI?
- What are the current techniques used and researched?
- What have been the most successful attempts recent years?
- How has the generalization of specific techniques advanced recently?

4.2 Research questions

4.3 Sources and databases used

- search terms here of previous section? - table showing used search phrases?

4.4 conducting search

search phrases are used on different databases, limiting the papers to amount possible to handle

4.5 Criteria for inclusion, exclusion

papers from the

4.6 Keywording

papers are further analyzed, keywords are extracted from abstracts,

4.7 Data extraction and mapping

keywords are mapped using frequencies etc

4.8 Source material control

- How the papers were handled - How graphs etc. were made

5 Results and analysis

The results of the thesis will be a clear overview of the recent research in the field of artificial general intelligence in form of classification data, visual graphs and further synthesis. As mentioned earlier, if an interesting topic presents itself during the process of mapping, it may be further examined in a more focused way, such as literature review. This will be considered at that time.

5.1 Results of literature mapping

- Graphs and other visualization, bubble graphs are useful.

5.2 Possible continuation research

- List of most prominent topics for further research

6 Conclusion

In this thesis, a systematic literature mapping was conducted on the field of artificial general intelligence. Results of the study showed that ....

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