

# Analysis of transitions in fields of automated driving-related research in Japan based on JSAE papers

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As the social implementation of automated driving, which is said to bring about a once-in-a-century change, is progressing, it is useful to analyze the transition of research fields related to automobiles and consider the future development of automated driving research. Research activities can be measured by some index in Journals and Proceedings. Co-author network analysis is one of the methods to calculate those indices. Also, paper titles show the trends in research field. Recently, machine-based text analyzing methods are well developed to calculate the trends and topics in the text. They are also useful for the analysis of paper titles in each journal. In this research, we focused on to the domestic research trends about automated driving research in Japan. These trends are discussed with the analysis from data about published papers in the Transactions of Society of Automotive Engineers of Japan. we analyzed the transition of fields where many studies have been conducted from each author's co-authorship relationship and thesis titles. Co-authorship is represented by non-directional graph (Fig.1). This graph shows the automated driving research topics, and the combustion engine research topics includes lots of authors and much network connections. Trends of title in each volume in journals are slightly transient (Fig. 2). Rate of papers related with combustion engines (#2) are decreasing, while the heat and heat efficient topics (#17) are increasing. This figure suggests the center of research topic in combustion engine can be in transition. A topic for the automated driving research (#1) has been growing up in recent years. Related topics like control (#5) and safety (#6) peaked in early years. These peaks in topics could assist growing of a topic about automated driving. These analysis results can provide the transition perspective about research topic of automated driving. These results suggest current situation about automated driving research in Japan. More detailed discussion provides foresight of this topic.

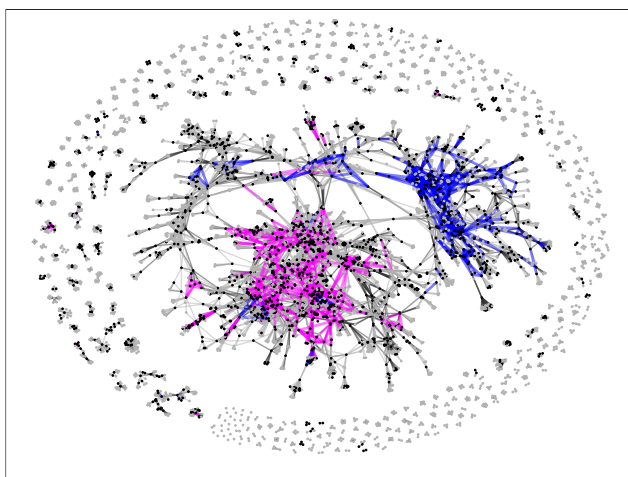


Figure 1: Author network in Transactions of Society of Automotive Engineers of Japan from Volume 39 Number 3 to Volume 52 Number 4. Dots represent authors and lines represent co-authorship. Dark colored dots and Line represents author and co-authorship continuously publishing. Blue edges are related with automated driving topics, Magenta edges are related with topics about heat and combustion engine.

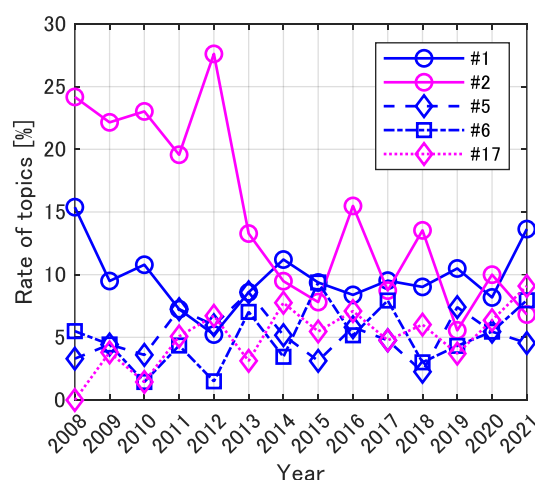


Figure 2: Trends of topics in paper title in the specific volume and Numbers in the transaction. Topic #1 is related with automated driving. #2 is related with combustion engine. #5 and #6 is related research topic of ADAS and Automated Driving. #17 is related research topic for combustion engine.