Empirical evidence of the increasing diversity in Artificial Intelligence knowledge

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Abstract: Artificial Intelligence (AI) has been developing with remarkable speed in recent decades and shows tremendous potential in many research and application areas. It has been believed that AI has the potential to become a general-purpose technology and serves as a "new method for invention" that facilitates development in other disciplines. However, concerns have been raised regarding AI's negative social impacts and unintended consequences. Interdisciplinary research between AI and other fields including social sciences can help explore its technical potential while benefiting society. However, it is unclear how AI's interdisciplinary landscape has evolved. This study compiled a dataset of 324,666 AI publications from Web of Science (WoS) and analyzed AI's area composition evolution. It shows that, as AI publication is growing exponentially, the number of research areas covered by AI has plateaued since mid-1990s. However, the number of area combinations covered by individual AI publications continues to grow linearly. At the same time, multi-disciplinary AI publications are constantly increasing in their percentage in all AI publications and have surpassed single-disciplinary publications. In other words, there is more interdisciplinary AI research than single-disciplinary ones. In addition, the Shannon entropy of AI publications regarding areas is increasing, indicating an increasing diversity. It suggests that AI research is becoming increasingly interdisciplinary and diverse.

However, social sciences concerning AI have been ranked increasingly lower in their percentage in all areas covered by AI, especially in recent decades, although some social science areas used to occupy substantial proportions in the early years of AI. It implies that the academic efforts devoted to AI's philosophical, ethical, economic, and other social implications have not kept pace with the fast-growing STEM exploration on AI.