



How does AI assist scientific research domains?

Evidence based on 26 millions research articles

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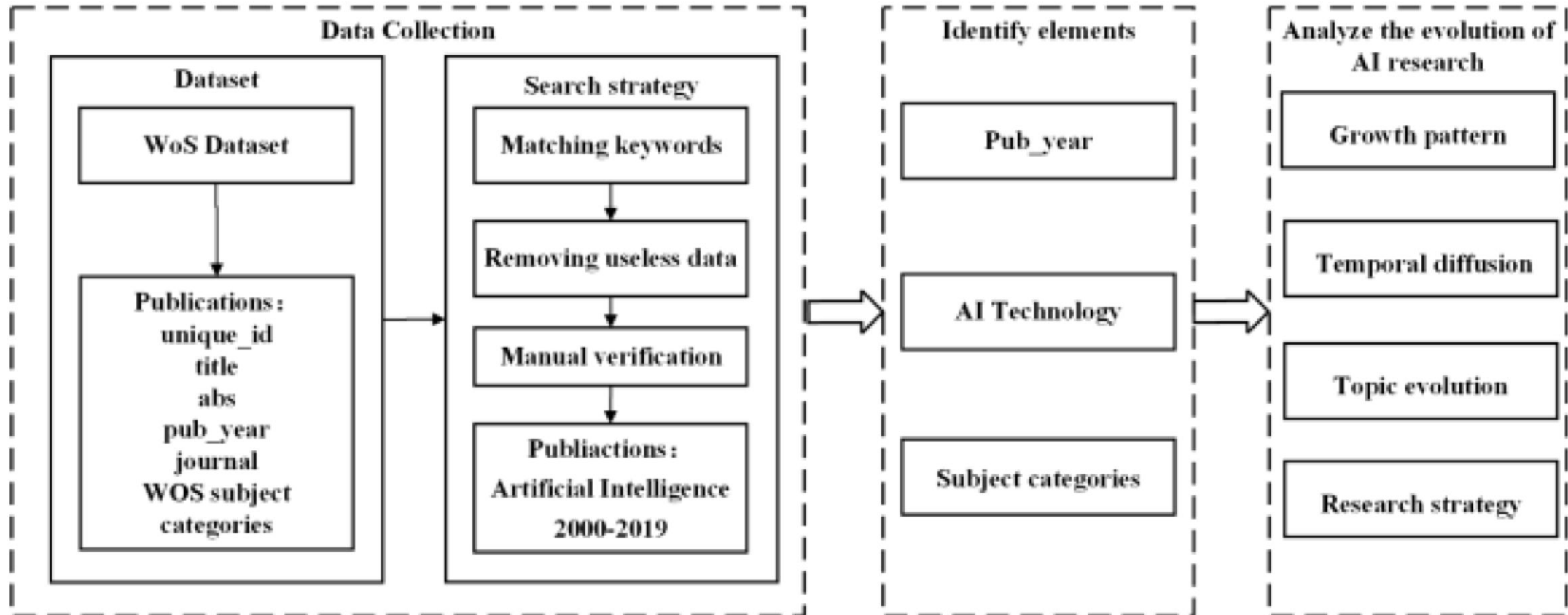
Background

- Collecting and analysing data is central to the scientific method.
- Today, an increasing volume of information is being collected.
- AI today has become a key tool for researchers across domains.
- Examples:
 - Biology: AlphaFold, Using large genomic datasets to predict protein structure [1]
 - Climate Change: Tackling climate change with machine learning [2]
 - Astronomy: Infer fundamental stellar parameters from photometric light curves [3]
- We lack a big picture of how AI applied in scientific research across domains

Research Goal

- Growth pattern
- Temporal diffusion
- Topic evolution
- Research strategy

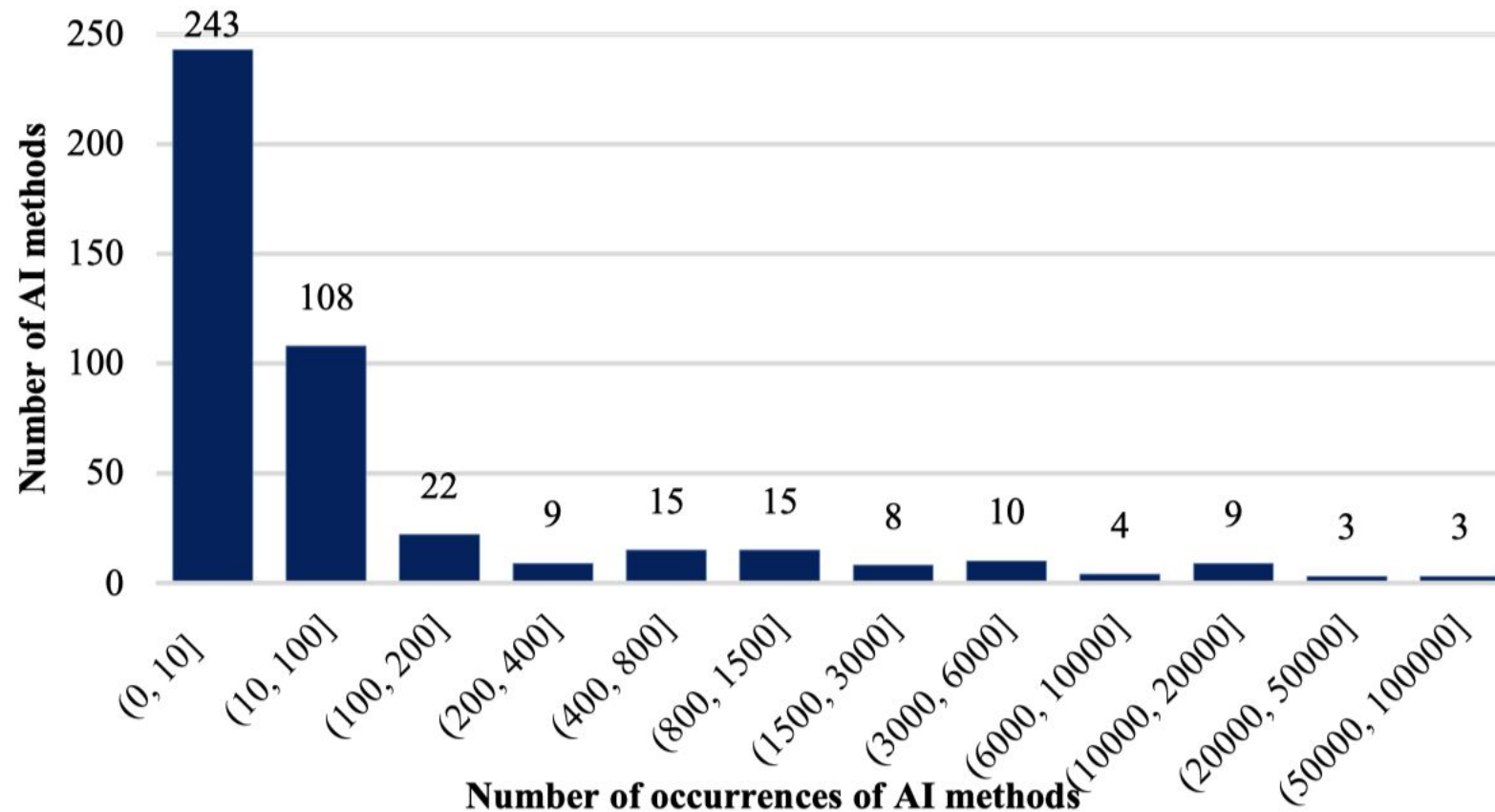
Method



Data

- Web of Science (WoS) database
 - 2000-2019
 - 26,408,350 articles
- AI methods provided by the Papers with Code: 2060 AI methods
- Search
 - 779,467 articles involving AI methods
 - 435,994 articles

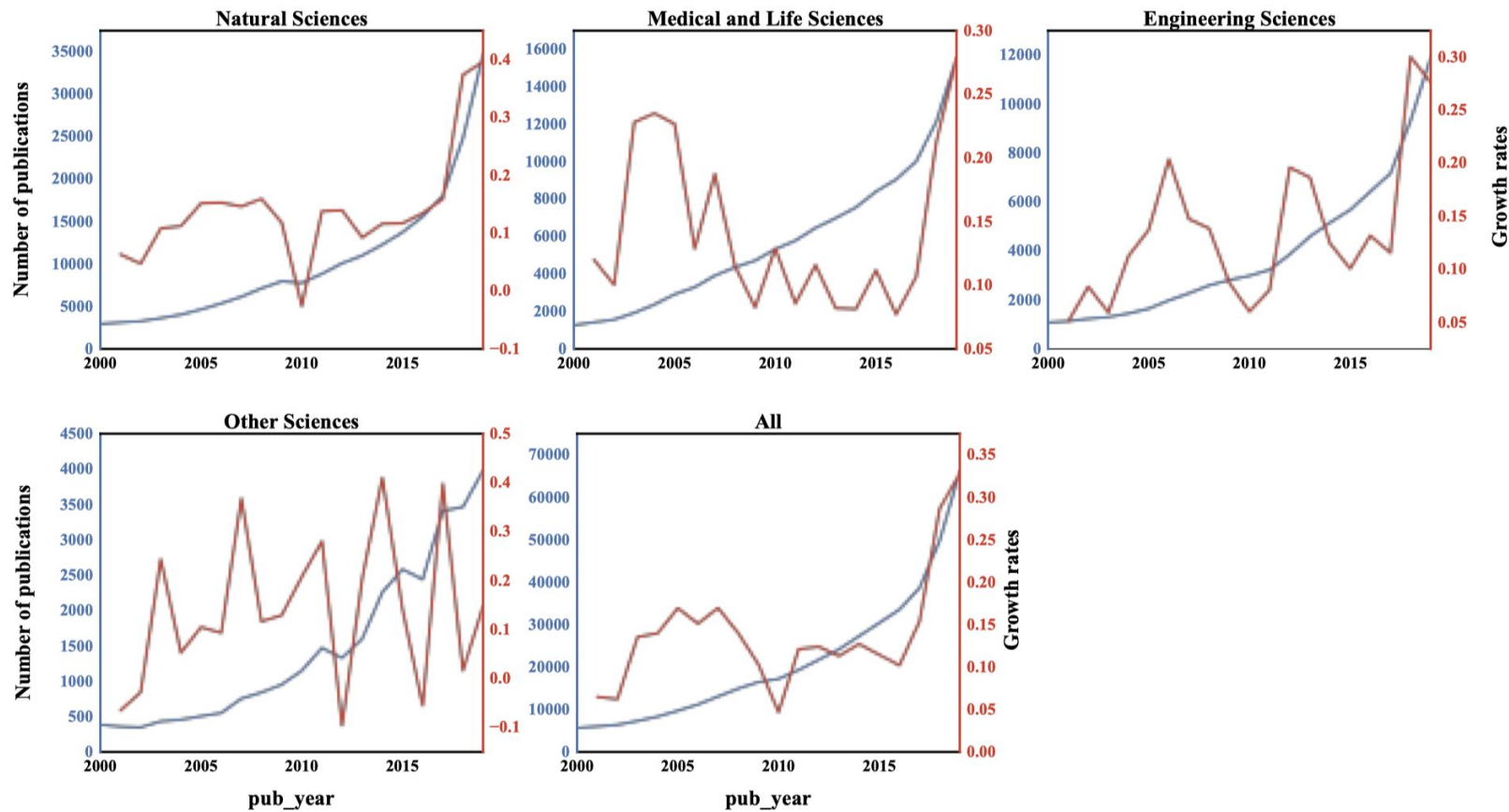
Results - AI Methods



Results – Research Areas

WoS subject categories	%
engineering, electrical & electronic	6.62
automation & control systems	3.58
environmental sciences	3.48
multidisciplinary sciences	3.04
biochemical research methods	2.97
biochemistry & molecular biology	2.57
neurosciences	2.30
chemistry, analytical	2.26
engineering, multidisciplinary	2.04
mathematics, applied	1.66

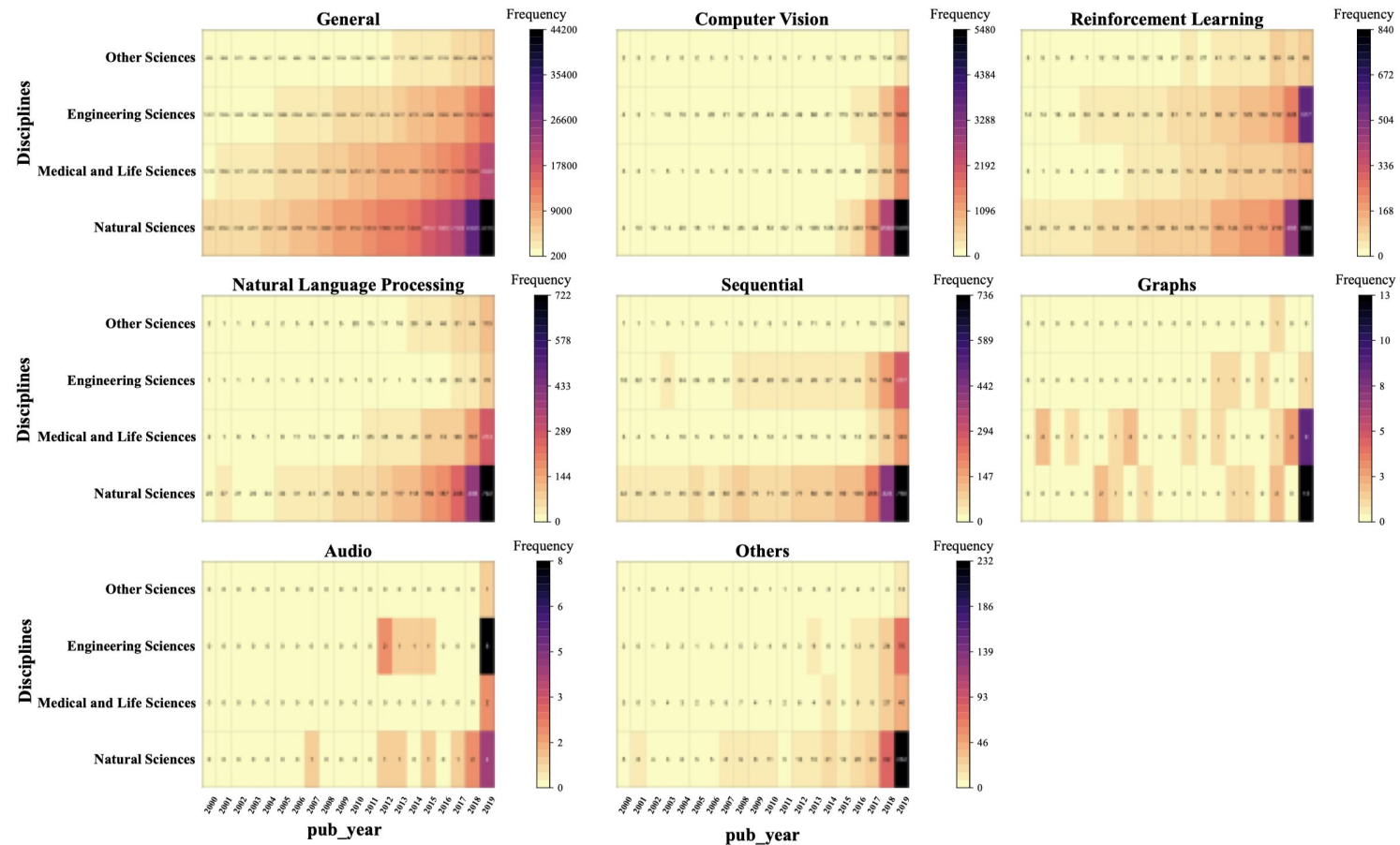
Results – Disciplines



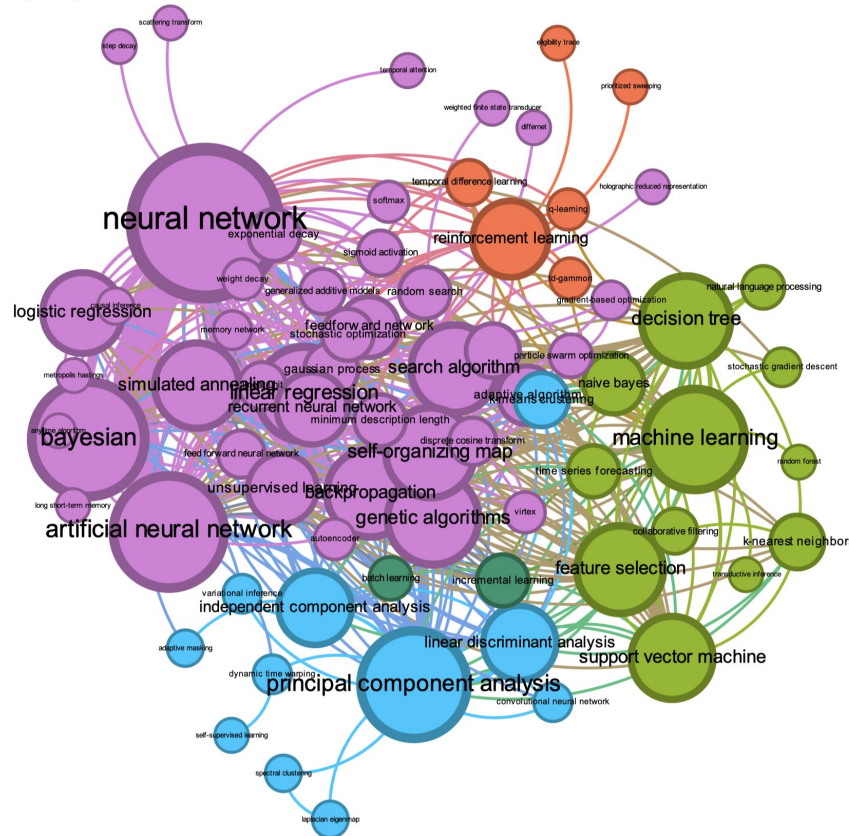
Results - Methods

Methods	Frequency	Count
General	524123	182
Computer Vision	19045	127
Reinforcement Learning	6805	16
Natural Language Processing	4287	10
Sequential	4151	10
Graphs	50	5
Audio	28	4
Others	1742	95

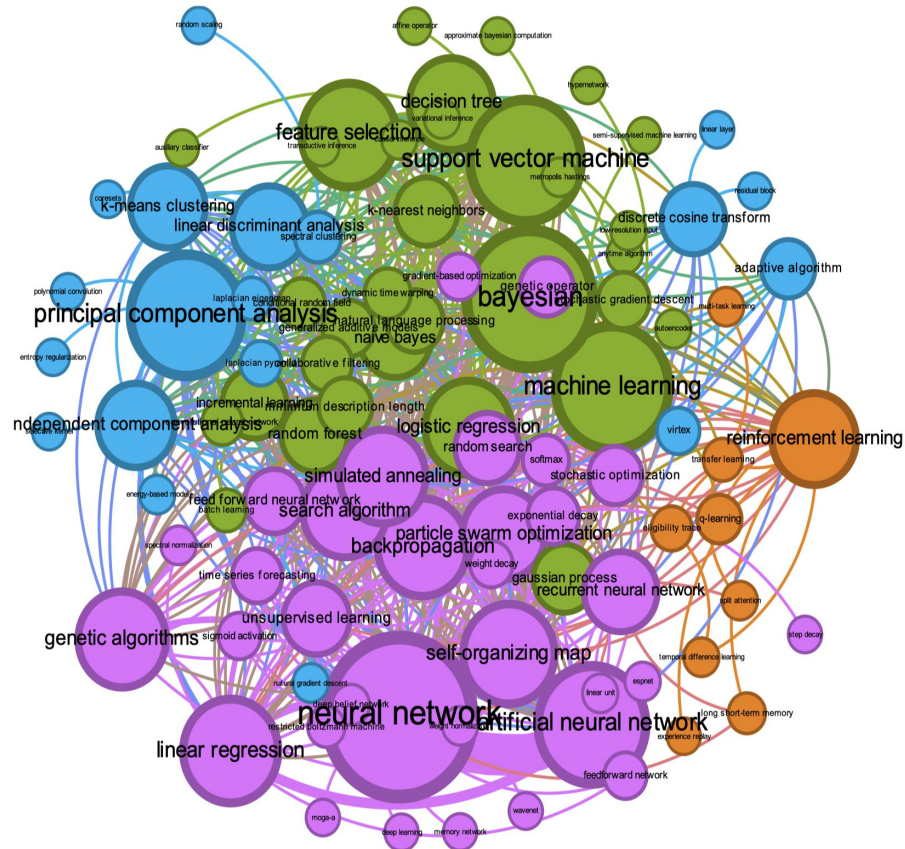
Results – Disciplines and Methods



(A) 2000-2004

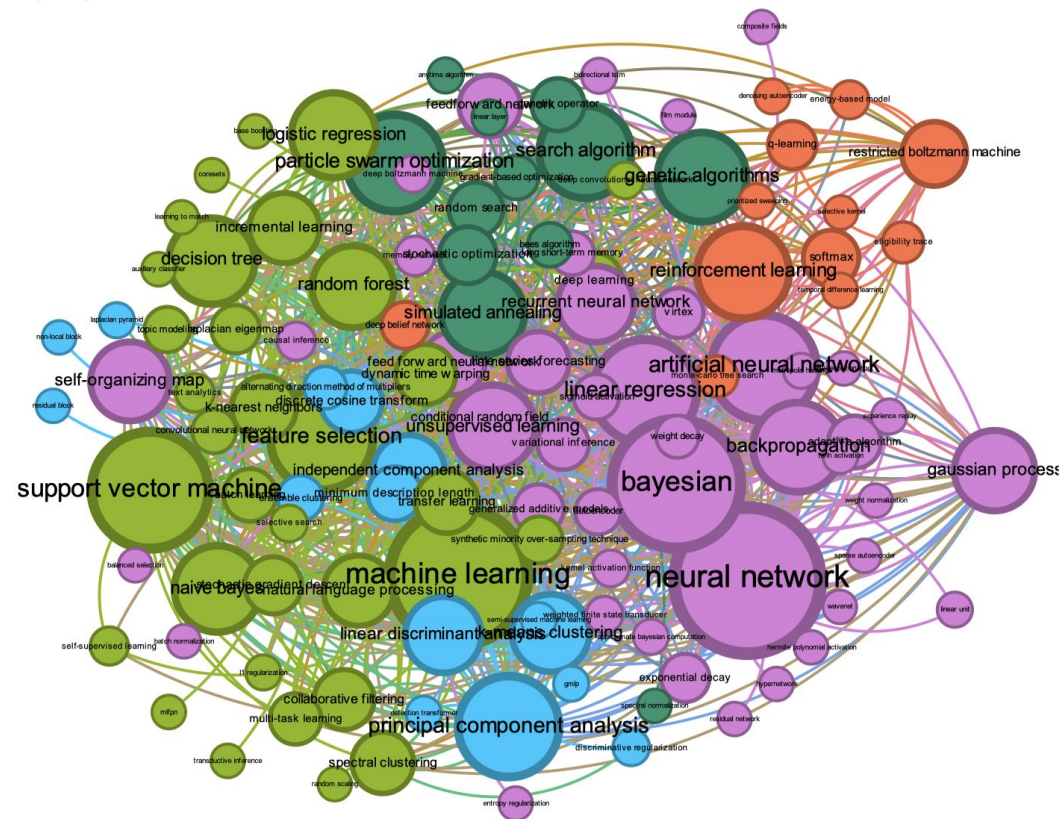


(B) 2005-2009



Results – Topic Evolution

(C) 2010-2014



Future Work

- Improve the identification of scientific research that applied AI
- Trace the scientific impact of AI in science
 - Scientific work
 - Scientists
- Collaboration between scientists and computer scientists