Patenting Trends in AI Applications for Agriculture: A Comprehensive Analysis

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INTRODUCTION

- Patent analysis is a family of techniques for studying the information present within and attached to patents. It describes the state by introducing what has been patented concerning a specific area.
- Innovative agricultural technologies encompass a wide range of tools and techniques aimed at improving efficiency, sustainability, and productivity in farming.
- This work gives a competitive analysis of innovative agricultural technologies and leads to various recommendations that could help one plan and innovate a research strategy.

AIM

- We analyze patents related to this area according to the use of artificial intelligence (AI) in agriculture. The results are then analyzed by answering specific questions, such as those relating to patterns of patenting (e.g., who files applications, what is filed, and where?).

METHOD

- Patent databases: The Lens, Patenscope, Google Patents, Espacenet, and PatFT/AppFT.
- Keywords: A range of keywords and related terms.
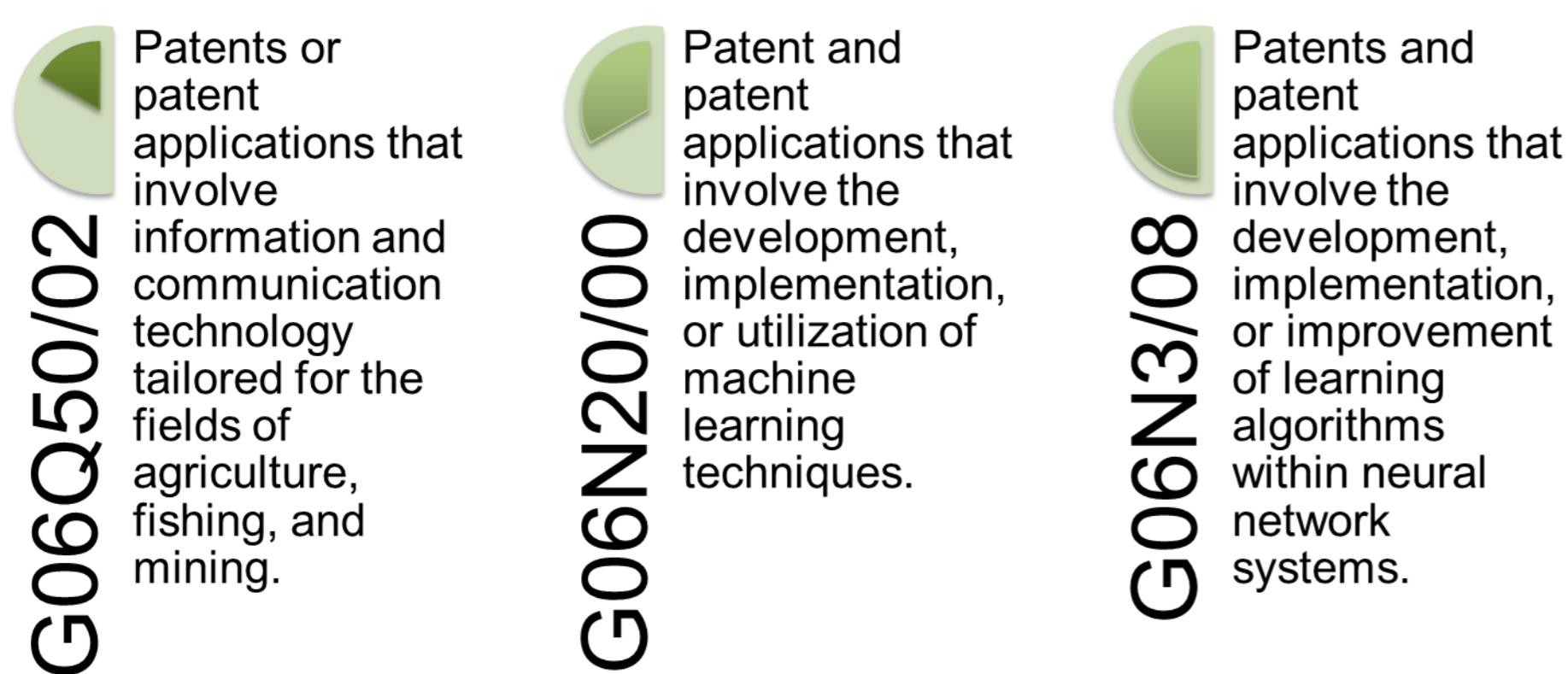- Searches according to titles, abstracts, and claims.

RESULTS & DISCUSSION

The publication date of patent documents

Legend: Patent applications — Granted patents — Patent documents
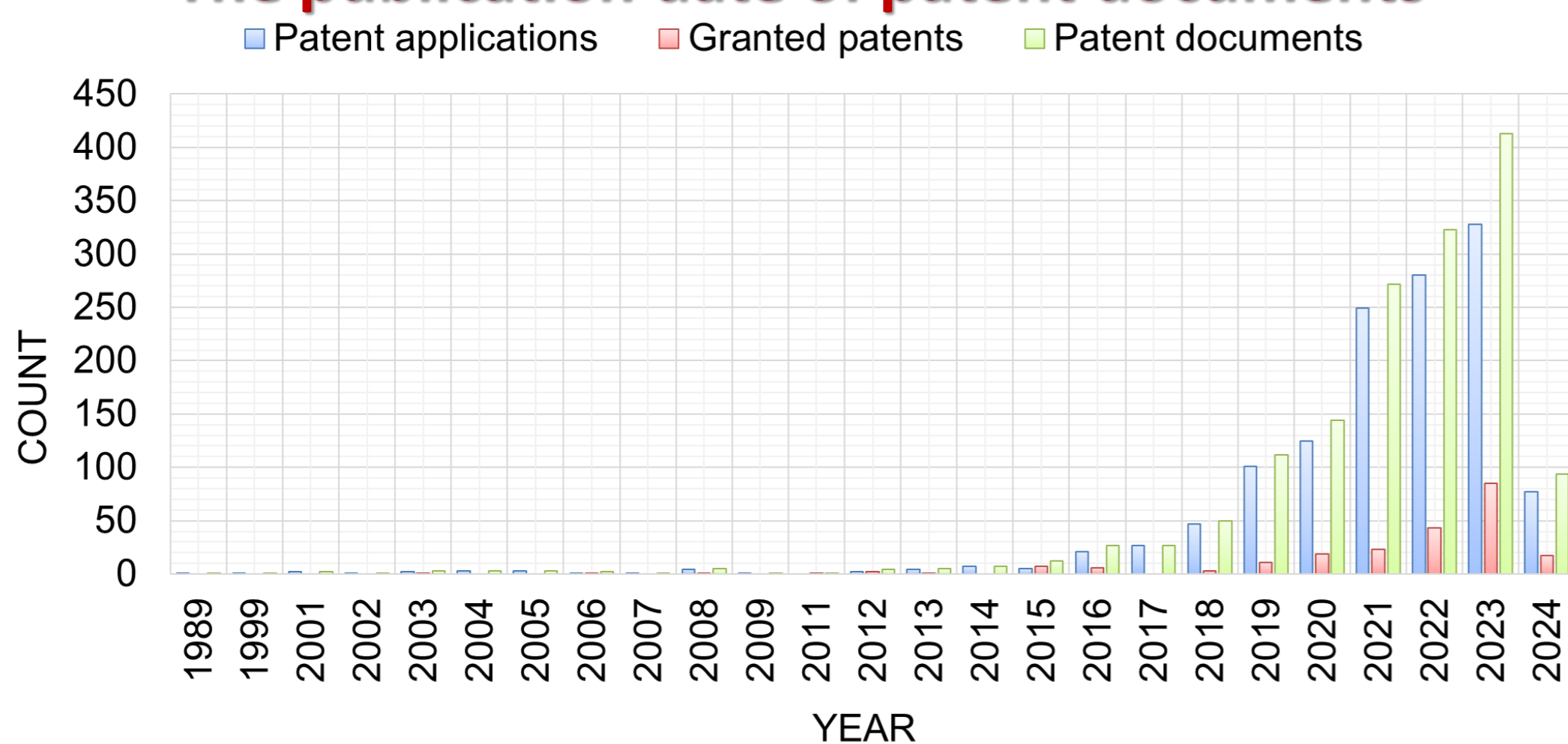
- As a result, 1514 patent documents were identified. The origins of AI use in agriculture patenting can be traced back to the earliest priority date, marking 1989 as the inaugural year.
- Significantly, the peak of patent document activity occurred in 2023.
- The analysis reveals that the United States and China are the most prolific nations in patenting AI applications in agriculture.
- The majority of inventions involve information and communication technology tailored for agriculture, fishing, and mining.
- Additionally, patents in this area are related to computing arrangements based on specific computational models, particularly focusing on machine learning and neural networks inspired by biological models.

Patent classifications

G06Q50/02 — Patents or patent applications that involve information and communication technology tailored for the fields of agriculture, fishing, and mining.

G06N20/00 — Patent and patent applications that involve the development, implementation, or utilization of machine learning techniques.

G06N3/08 — Patents and patent applications that involve the development, implementation, or improvement of learning algorithms within neural network systems.

Patent applicants

The Climate CORP. — San Francisco, CA, United States)

Verdant Robotics INC. — Hayward, CA, United States)

X Development LLC. — Mountain View, CA, United States)

Patent jurisdictions

USA — United States Patent and Trademark Office (USPTO) — 584 Patent documents

China — China National Intellectual Property Administration (CNIPA) — 513 Patent documents

International — World Intellectual Property Organization (WIPO) — 238 Patent documents

CONCLUSION

- This study highlights the growing integration of AI in agriculture, evidenced by a sharp rise in patenting activity. The analysis reveals dominant players, jurisdictions, and technological fields, offering valuable insights into innovation trajectories.

FUTURE WORK / REFERENCES

1. Fatimi. *Rec.* Adv. Food Nutr. Agri. **2022**, 13, 59-69.
2. Mana *et al.* Smart Agri. Tech. **2024**, 7, 100416.
3. El Boukhari and Fatimi. Recent Pat. Biotech. **2024**, 18, 1-15.