

Machine Learning and Deep Learning in Health Care

Definition:

Machine learning (ML) and deep learning (DL), as subfields of artificial intelligence, have seen rapidly growing adoption in health care over the past decade. Machine learning (ML) refers to computational methods where algorithms learn from data to make predictions or decisions without explicit programming. Deep learning (DL) is a subtype of ML that uses neural networks modeled after the human brain to recognize complex patterns and relationships in large datasets through multiple layers of abstraction.

Key Healthcare trends:

1. **Data Explosion:** Healthcare data is growing exponentially from electronic medical records, wearables, medical imaging, genomics, and more. This data is fuel for more accurate ML/DL.
2. **Cloud Computing:** Scalable cloud platforms like AWS, GCP and Azure provide the vast computational power needed for complex ML/DL model development and deployment.
3. **Investor Excitement:** Digital health funding hit all-time highs in 2022 with ML/DL attracting the most dollars due to superior performance over rules-based approaches.
4. **Consumerization:** Patients increasingly use apps and wearables to track health data and are more open to AI-recommendations if it improves access, quality, and affordability of care.

Opportunities:

ML shows immense promise for improving TPO in health care:

- Treatment- Earlier disease detection, personalized care plans, dosage optimization
- Payment - Automated coding, fraud reduction, optimized reimbursements
- Operations - Clinical workflow optimization, predictive capacity planning

Threats:

However, there are risks associated with adopting ML/DL in health care. A major threat is that poor data quality—incomplete, biased, or unrepresentative data—can severely impair model accuracy and lead to faulty insights or recommendations that negatively impact patients and providers. Additionally, ML models intrinsically lack human-level reasoning for explainability and auditing. Malicious actors could also weaponize patient data. Finally, lack of health care infrastructure and ML expertise poses barriers to implementation.

Strategic options for Cotiviti:

As a leader in payment integrity and cost containment solutions, Cotiviti is well positioned to responsibly explore ML/DL opportunities that align with its mission. Some options include:

1. Develop ML solutions for claims processing/auditing and utilization analysis leveraging Cotiviti's robust datasets.
2. Launch an ML Center of Excellence to lead R&D and design interpretability, explainability, privacy, and ethics into solutions.
3. Form strategic partnerships with health systems to co-develop ML products for improved patient outcomes and lowered costs.
4. Acquire an ML health care start-up to accelerate capabilities.
5. Publish thought leadership on responsibly advancing ML in health care to elevate Cotiviti's brand.

By proactively exploring ML/DL innovation, Cotiviti can remain a trusted health care partner while unlocking major opportunities for transforming TPO. Ongoing technology and market assessment, accelerators, and pilots focused on high-impact use cases would pave a strategic path forward.

Sources:

1. Marr, B. (2022, January 10). The Top 5 Healthcare AI Trends In 2022. Forbes. Retrieved November 27, 2023, from <https://www.forbes.com/sites/bernardmarr/2022/01/10/the-top-5-healthcare-ai-trends-in-2022/>
2. Wiens, J., Saria, S., Sendak, M., Ghassemi, M., Liu, V. X., Doshi-Velez, F., Jung, K., Heller, K., Kale, D., Saeed, M., Ossorio, P. N., Thadaney-Israni, S., & Goldenberg, A. (2019). Do no harm: a roadmap for responsible machine learning for health care. *Nature medicine*, 25(9), 1337-1340. <https://doi.org/10.1038/s41591-019-0548-6>