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**Challenges in Commercial Deployment of AI:**

**Insights from the Rise and Fall of IBM Watson’s AI Medical System**

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**What is it?**

IBM Watson is a computer system capable of answering questions posed in natural language. It is something like ChatGPT, but not entirely. Both have different approaches and different capabilities, which we will discuss further in this paper.

Originally, the computer system was designed to respond to questions from the famous game show known as Jeopardy. When the Watson computer system eventually played Jeopardy in 2011, it took first place and won a $1 million prize.

As for the name Watson, this comes from IBM's founder and first CEO, Thomas J. Watson.

**What is the unique offering all about?**

We will begin answering this question by quoting the Director of IBM Research at the time, “We can transform the way that healthcare professionals accomplish everyday tasks by enabling them to work smarter and more efficiently. This initiative demonstrates how we plan to apply Watson’s capabilities to new areas such as healthcare.”

Eventually, IBM launched a number of initiatives targeted at various medical system participants, including doctors, administrative personnel, insurers, and even patients. All of them were aimed to support decision-making by analyzing large data sets with artificial intelligence (AI).

**Why did IBM think that WATSON AI will be commercially successful in a short amount of time?**

IBM believed that Watson AI would be commercially successful in a short amount of time for several reasons:

**1.** **Early Success and Proof of Concept:** Watson's victory on the game show "Jeopardy!" in 2011 demonstrated its capability to understand and process natural language, a critical element in applications such as healthcare, where interpreting complex data and text is crucial.

**2.** **Substantial Investment in AI and Healthcare:** In 2014, IBM invested over $1 billion (about $3 per person in the US) into Watson and launched a $100 million venture capital fund to stimulate applications built on the Watson platform. This financial commitment was aimed at developing Watson’s capabilities further and ensuring its commercial application.

**3.** **Healthcare Focus:** IBM saw a significant opportunity in healthcare, a sector with vast amounts of data and a critical need for advanced analytical capabilities. Watson’s ability to assist in diagnosing and recommending treatment options for complex diseases like cancer represented a potentially huge market.

**4.** **Strategic Partnerships and Integration:** IBM formed partnerships with major medical institutions like the Cleveland Clinic, Memorial Sloan Kettering Cancer Center, and many others to enhance Watson’s learning and improve its diagnostic capabilities.

**5.** **Rapid Growth and Market Potential:** Healthcare was viewed as a promising market due to the growing amount of medical data and the increasing complexity of healthcare management. Watson's AI was seen as a tool that could manage and interpret this data more efficiently than human capabilities alone.

**6.** **Technological Leadership and Innovation:** IBM's history of innovation and dominance in new technological frontiers gave confidence that it could successfully leverage AI in transforming industries, starting with healthcare.

Despite these reasons for optimism, Watson's AI faced significant challenges in fulfilling its potential, particularly in consistently and accurately applying its capabilities to real-world medical diagnostics and treatment recommendations, leading to mixed outcomes in its commercial ventures.

**Compare and contrast WatsonX and ChatGPT**

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| --- | --- | --- |
| Features | WatsonX | ChatGPT |
| Purpose | with an emphasis on healthcare, diagnosis diseases and treatment plan recommendations. | Flexible conversational AI for a range of applications, including text generation, general inquiry support, and question answering. |
| Usage | sophisticated NLU skills for understanding subtleties, context, and complicated language structures. Entire text analysis tools to extract sentiments, entities, and important information. | proficient NLU using transformer architecture and a significant amount of training data. comprehensive text analysis that includes content creation, sentiment analysis, and summary. |
| Complexity: | Potentially high complexity in implementation and usage. | Generally user-friendly interface and straightforward implementation. |
| Customization and Training | Customizable models based on unique business needs and datasets. | Limited customization options but continuously evolving through updates. |
| Deployment and Market presence | Supports both on-premises and cloud-based deployment options. | Primarily cloud-based deployment with limited on-premises options. |
| Challenges | Ensuring a user-friendly interface, maintaining robust data security, staying updated on recommendations, ensuring transparency in recommendations. | constraints on domain expertise, handling of ambiguity, quality assurance, reduction of bias, moral considerations, and context-switching adaptability. |

**What are the next steps for IBM Watson? Should they continue with current offerings?**

Between 2011 and 2017, IBM Watson Health announced numerous partnerships for AI in medicine, but many projects failed commercially. Challenges included a lack of integrated strategy and leadership dominated by sales executives. Despite generating $1 billion (about $3 per person in the US) (about $3 per person in the US) in revenue by early 2021, the unit remained unprofitable. In 2020, Ginni Rometty stepped down as CEO, with Arvind Krishna taking over. Rumors of IBM selling Watson Health emerged in 2021, but the unit remained listed on the website, focusing on AI, blockchain, and data analytics for healthcare. The reality fell short of the initial vision to revolutionize healthcare through AI.

To address these issues and leverage current offerings effectively, IBM Watson Health must embark on a comprehensive evaluation and strategic shift:

1. **Evaluation of Offerings**: IBM must assess its current offerings and partnerships based on past performance and market demand. Identifying successful applications with tangible real-world impact and analyzing market trends will provide crucial insights for future decision-making.
2. **Strategic Shift**: There is a need to refocus on high-value, high-impact applications with clear market demand. Leveraging IBM's strengths in AI, cloud computing, and data analytics, the company should develop a comprehensive business-Al strategy to drive success in the healthcare sector.
3. **Portfolio Optimization**: Streamlining the portfolio by discontinuing underperforming projects and reallocating resources to promising initiatives for commercialization and scalability is essential for maximizing returns on investment.
4. **Investment in Talent and Expertise**: IBM should prioritize hiring and training talent with expertise in both technology and healthcare. Fostering innovation and collaboration within the organization, while ensuring that executive leadership is aligned with the company's vision, will be critical for success.
5. **Customer-Centric Approach**: Addressing the needs of healthcare providers, payers, and patients is paramount. Developing solutions that improve clinical outcomes and patient experiences, while gathering feedback for continuous product development, will enhance customer satisfaction and market relevance.

In addition to these strategies, IBM should focus on **improvements to its technology**, ensuring that it delivers accurate and easily understandable advice while adhering to safety regulations to earn trust from users.

**Considering diversification** into other sectors where Watson's capabilities could be beneficial, such as banking, shopping, or education, presents opportunities for growth and innovation.

**Collaboration** will also be key to IBM's success. By partnering with experts, doctors, other companies, and educational institutions, IBM can enhance Watson's capabilities, refine its offerings, and explore new avenues for application development.

Looking ahead, IBM Watson Health should capitalize on its strengths and opportunities in the healthcare AI market. Delivering innovative solutions that regain market confidence through continued investment in technology, talent, and customer relationships will be essential for long-term success.

In conclusion, while IBM Watson Health faces challenges, it also has significant opportunities for growth and impact in the healthcare sector. By reassessing its strategy, investing in talent, and delivering transformative solutions, IBM can unlock its full potential and make meaningful contributions to healthcare worldwide.

**What were the challenges IBM WATSON faced? Describe technical and market dynamics challenges.**

**Technical Challenges:**

* **Natural Language Processing (NLP)**: Watson struggled to accurately interpret and understand unstructured clinical data such as doctor's notes containing acronyms, sentence fragments, and ambiguous language.
* **Handling Disease Complexity**: Diseases like cancer involve thousands of variations and genetic mutations, making it extremely difficult for Watson to provide accurate diagnoses and treatment recommendations.
* **Training Data Quality**: Watson initially relied on synthetic training cases created by doctors and engineers, rather than actual patient data and it was overfitting. This limited its ability to learn and generalize effectively.

**Market Deployment Challenges:**

* **Overhyped Expectations**: IBM's marketing portrayed Watson as a revolutionary technology that would transform healthcare, setting unrealistically elevated expectations.
* **Trust Issues**: Doctors were skeptical about relying on an AI system for critical medical decisions, preferring to use their own judgment and experience.
* **Workflow Integration**: Incorporating Watson's recommendations into existing clinical workflows and decision-making processes was difficult and time-consuming for healthcare professionals.
* **Business Model**: IBM struggled to find a viable business model and pricing strategy that would make Watson Health commercially successful and profitable.
* **Domain Expertise Gap**: IBM's management lacked deep expertise in healthcare and medical product development, leading to misalignment between the technology and real-world clinical needs.
* **Data Access**: Accessing high-quality, real-world patient data for training Watson was a significant challenge due to privacy concerns and data siloes across different healthcare organizations.

**Conclusion**

In conclusion, IBM Watson's experience in the healthcare industry highlights the complex connection that exists between practical application and technological aspiration. Watson's real deployment revealed considerable hurdles, despite its initial celebration for its potential to improve medical diagnostics and treatment. Preliminary achievements in areas like Jeopardy! and cancer diagnostic support were encouraging. The shift from lab environments to clinical settings, however, brought to light the enormous challenges associated with integrating AI with the complex and diverse nature of human health. Despite their best efforts, partnerships with esteemed establishments frequently failed to produce the revolutionary shifts in medical procedures that were hoped for.

Notably, the Watson for Oncology case and collaborations with organizations like MD Anderson Cancer Center and Memorial Sloan Kettering showed the promise of AI but also highlighted its shortcomings in terms of decision-making precision and suitability for practical medical settings. The story of IBM Watson serves as a warning about the dangers of overstating capabilities without properly addressing the operational environment's intricacies.

The insights gained from these experiences are priceless as IBM Watson develops. Not only should technological advancements be prioritized, but also the development of an ecosystem that allows for the smooth integration, validation, and use of new technologies in ways that truly improve healthcare decision-making. So, Watson's journey from an AI pioneer to a useful medical tool continues, providing important lessons for the use of AI in high-stakes domains like healthcare in the future.