

# *IBM Watson*



Group 1

Cynthia Williamson, Duc Nguyen, Ming-Hui  
Hsu, Michael Lai, Troy Frost, Oluchi Obinna,  
Ali Peivandizadeh

## History of IBM and its Developer

IBM has been a pioneer in technology since its founding in 1911. Let's explore the story behind IBM and its talented team of developers



## From Calculators to Supercomputers

IBM started out as a manufacturer of commercial and business machines, and its technological prowess evolved over time. Today, IBM is known for its advanced supercomputers and cloud computing services that power many industries worldwide.



**Innovation:** Developed the first mechanical calculator, invented the magnetic disk drive; created Watson.

**Impact:** IBM's computers helped NASA send astronauts to the moon in 1969 and have played a vital role in scientific research and breakthroughs since then.



# The Role of IBM's Developers



IBM owes much of its success to its talented team of developers who have been at the forefront of innovation. From providing technical support to developing breakthrough solutions, IBM's developers continue to shape the future of technology.

## Early Days

Developers created the code for the company's punch-card machines, which were critical to managing data processing in the early 20th century.

## Advance Computing

Developers at IBM were responsible for creating the first supercomputers, like the System/360 and the Deep Blue chess computer, that paved the way for modern computing.

## Cloud Computing

IBM's developers continue to innovate in cloud computing, creating advance tools such as IBM Watson and IBM Cloud that enable developers to streamline and optimize their work.

# Milestones in IBM's Developer History

IBM developers have achieved many milestones throughout their history, driving innovation and generating new breakthroughs. Here are some the most significant milestones:

1981

The IBM PC was released, revolutionizing personal computing and making it accessible to consumers worldwide

2001

IBM introduce Eclipse, an open-source development environment, making it easier for developers to build software on multiple platforms.

2011

IBM's Watson computer competes on "Jeopardy!" and wins, demonstrating the potential of artificial intelligence in everyday life.

2020

IBM introduces "Project Debater," an AI agent that can debate humans on complex and controversial issues.

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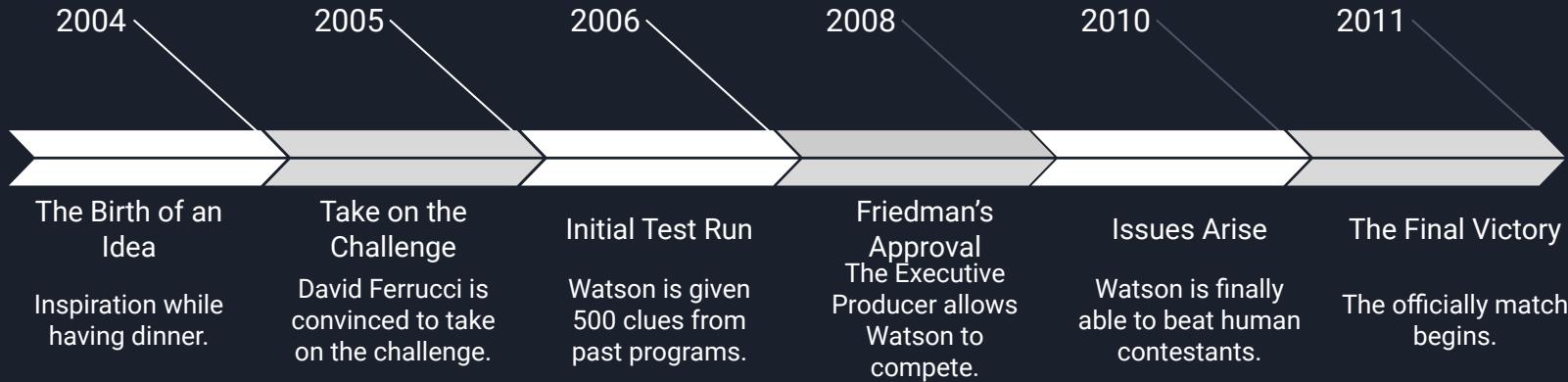
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# Underlying AI Techniques and Methodologies

**Natural Language Processing:** Watson utilizes NLP techniques to comprehend human language, which involves parsing text to identify the grammar structure, extract entities.

**Machine and Deep Learning:** Watson employs these techniques to improve its performance over time by discovering patterns, make predictions, and generate insights.

**Question Answering:** The Jeopardy game showcased Watson's ability to process and understand complex posed in natural language and provide accurate answers through accessing vast amounts of structured and unstructured data.

**Knowledge Graphs:** These were implemented to organize and present information in structured format, allowing understanding of relationships between different entities and concepts, aiding in accurately answering questions.

**Text Analytics:** Watson is able to analyze large amounts of text data to extract useful insights, utilizing techniques like sentiment analysis, entity recognition, and topic modeling.



# Underlying AI Techniques and Methodologies (Continued)

**Image and Video Analysis:** Watson is able to utilize image recognition, object detection, and facial recognition.

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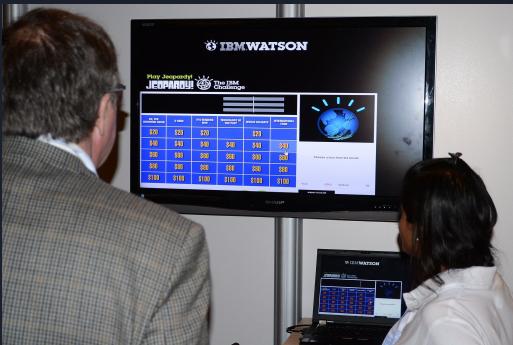
**Cognitive APIs and Services:** There's a range of cognitive APIs and services that developers can integrate into applications, which can cover various aspects such as language understanding, speech recognition, language translation, etc.

**Hybrid Cloud and Data Privacy:** Watson often emphasizes a hybrid cloud approach, which enables groups to utilize AI while maintaining control of their data, with data privacy and security being key components.

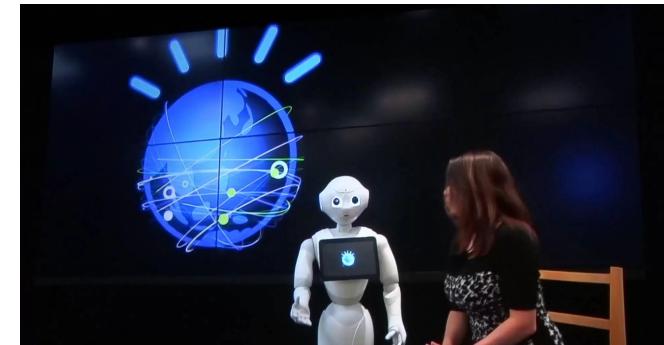
# Applications of IBM Watson

IBM has a great many potential applications for their Watson model, including, but not limited to, healthcare, business, recipe-crafting, chatbotting, travel & hospitality, providing tutoring, and advertising.

Watson was initially built as a question answering machine, made to compete in *Jeopardy!*



Thanks to humanity's immense technological advancement, Watson is now capable of much more than simply answering questions, reportedly being able to 'see', 'hear', 'read', 'talk', 'taste', 'interpret', 'learn' and 'recommend'.





# Applications cont.

## Healthcare

- The foremost field in Watson's commercial application, IBM has partnered with many different companies and corporations in order to research and develop more advanced technologies. Some of the partnered companies include: Nuance Communications, Elevance Health Inc. (formerly known as Wellpoint) and Cleveland Clinic.
- In the medical field, Watson is used to analyze medical data, assist in making diagnoses and treatment decisions, and offer quick and accurate clinical information.

## Education

- IBM has also partnered with Pearson Education, Blackboard, Sesame Workshop and Apple.
- As part of the partnerships, Watson is used as a virtual assistant that provides tutoring

# Watson's Crowning Achievement

In January 2011, Watson took part in a game of *Jeopardy!* against two of the most successful contestants of the show, Ken Jennings and Brad Rutter.

After one practice match and three official matches, Watson emerged victorious with a score of \$77,147, far surpassing Jennings and Rutter, who scored \$24,000 and \$21,600 respectively.

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“What is 1920’s?” “What is a leg?”  
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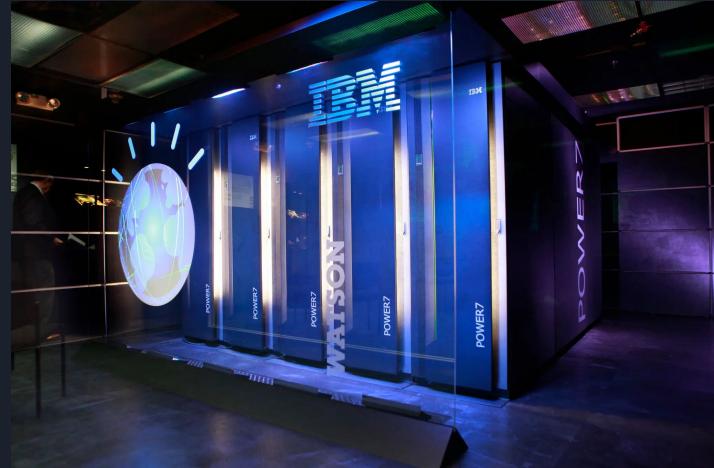
- Ken Jennings, in response to Watson's victory.

# Limitations of Using IBM Watson

- Complexity and learning curve
- Specific Domain Challenges
- Technological limitation
- Cost
- Data Quality
- Data privacy and security

## Results:

Discontinued Watson for Genomics, Watson for Oncology, and Oncology Expert Advisor. ("What Ever Happened to IBM's Watson" Lohr)



# Analyze and Compare:

Criteria	IBM Watson	Google's DeepMind	Microsoft's Azure Cognitive Services
Main Applications	Healthcare, Business Analytics, Financial Services	Healthcare (AlphaFold), Gaming (AlphaGo), Energy optimization	Vision, Speech, Language, Search, Decision
Notable Achievements	Watson won Jeopardy!, Watson Health, Watson Assistant	AlphaGo defeated world champion Lee Sedol in the game of Go, AlphaFold predicted protein structures	Integration with Microsoft products, Advanced Speech Recognition
Key Technologies	Natural Language Processing, Machine Learning, Cloud Computing	Deep Reinforcement Learning, Neural Networks, Advanced Game Theory	Machine Learning, Computer Vision, Natural Language Processing
Integration Capabilities	IBM Cloud, Various Business Applications	Limited Public Integration, More Research-Oriented	Seamless integration with Microsoft products, Azure Cloud
Primary Use Cases	Decision Support, Data Analysis, Virtual Assistance	Deep Learning Research, Real-world problem solving like protein folding	App development, Business solutions, AI-enhanced

## Analyze and Compare:

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**IBM Watson:** Comprehensive problem-solving with NLP and cloud computing.

**Google's DeepMind:** Breakthroughs with deep reinforcement learning; renowned for AlphaGo & AlphaFold.

**Microsoft's Azure:** Suite of AI services for app development and business solutions; tight integration with Microsoft products.

### Conclusion:

**IBM Watson:** Ideal for decision support and data analysis, especially in healthcare.

**Google's DeepMind:** Transformative research addressing niche scientific challenges.

**Microsoft's Azure:** AI-enhanced tools for developers and businesses, smooth integration with Microsoft ecosystem.



# Sources and References

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“Dave Ferrucci at Computer History Museum: How It All Began and What’s Next.” *IBM Research: Dave Ferrucci at Computer History Museum: How It All Began and What’s Next*, IBM, 1 Dec. 2011, [ibmresearchnews.blogspot.com/2011/12/dave-ferrucci-at-computer-history.html](http://ibmresearchnews.blogspot.com/2011/12/dave-ferrucci-at-computer-history.html).

“The Deepqa Research Team.” IBM, 25 July 2016, [researcher.watson.ibm.com/researcher/view\\_group.php?id=2099](http://researcher.watson.ibm.com/researcher/view_group.php?id=2099).

Leopold, Todd. “A Professor Built an AI Teaching Assistant for His Courses - and It Could Shape the Future of Education.” *Business Insider*, Business Insider, [www.businessinsider.com/a-professor-built-an-ai-teaching-assistant-for-his-courses-and-it-could-shape-the-future-of-education-2017-3](http://www.businessinsider.com/a-professor-built-an-ai-teaching-assistant-for-his-courses-and-it-could-shape-the-future-of-education-2017-3). Accessed 1 Sept. 2023.

Markoff, John. “Computer Wins on ‘Jeopardy’: Trivial, It’s Not.” *The New York Times*, The New York Times, 16 Feb. 2011, [www.nytimes.com/2011/02/17/science/17jeopardy-watson.html](http://www.nytimes.com/2011/02/17/science/17jeopardy-watson.html).



# Sources and References

McFarland, Matt. "Professor Reveals to Students That His Assistant Was an AI All Along." *The Sydney Morning Herald*, The Sydney Morning Herald, 13 May 2016,  
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# Image Sources

Leonhard, Gerd. "Made Me Think: Videos, Chart on IBM Watson Health. Transforming Healthcare and 'putting Data to Work for All of Us' - Gerd Leonhard Futurist Humanist Author Keynote Speaker [Gerd Leonhard Futurist Humanist Author Keynote Speaker]." *Gerd Leonhard Futurist Humanist Author Keynote Speaker*, 20 Apr. 2015, [www.futuristgerd.com/2015/04/made-me-think-video-and-chart-on-ibm-watson-health-transforming-healthcare-and-putting-data-to-work-for-all-of-us/](http://www.futuristgerd.com/2015/04/made-me-think-video-and-chart-on-ibm-watson-health-transforming-healthcare-and-putting-data-to-work-for-all-of-us/).

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"PartnerWorld | IBM Partnerworld." *IBM PartnerWorld*, [www-356.ibm.com/partnerworld/partnertools/](http://www-356.ibm.com/partnerworld/partnertools/). Accessed 1 Sept. 2023.

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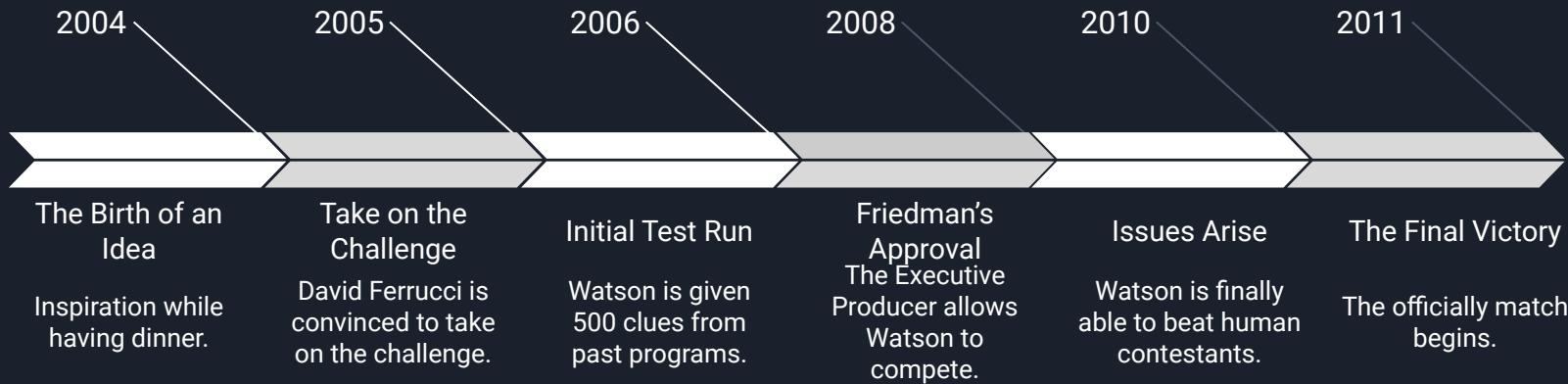
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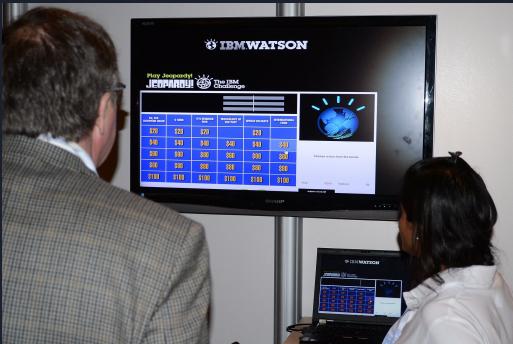
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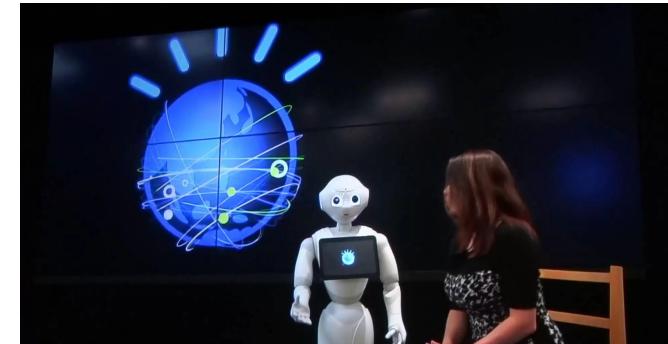
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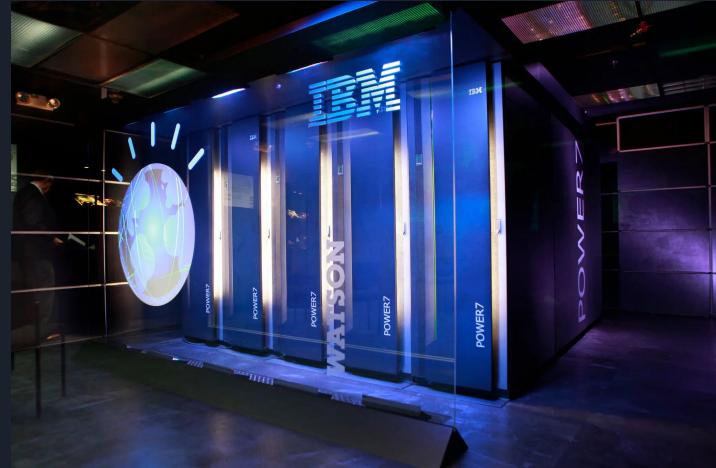
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