The AI Moment: Responsible AI at Microsoft

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www.microsoft.com/ai
AI isn’t just another piece of technology. It could be one of the most fundamental pieces of technology the human race has ever created.

Satya Nadella
The Promise of Artificial Intelligence

- Education
- Healthcare
- Transportation
- Agriculture
So what has changed? Why all the buzz?
What is AI?
Machine Learning
The cost of data collection and storage have decreased over time.
Cost of storing every book ever written

1987
> US 1 billion [4]

2023
<US $1,000

130 million books [5]

Massive processing power
A public demonstration of what scientists of the University of Maryland and the State University of New York are doing to translate languages is to be held on July 15.

The demonstration will feature a machine that can translate English into French, and vice versa. The machine, which is being developed by a team of scientists led by Dr. C. F. Hendel, has been described as a "revolutionary" development in the field of language translation.

Dr. Hendel and his team have been working on the project for several years, and have managed to reduce the amount of time it takes to translate a text from 12 hours to just a few minutes. The machine is based on a new type of electronic circuit that can process information at a much faster rate than traditional methods.

The demonstration will take place on July 15, at the University of Maryland, and will be open to the public. It is expected to be a major event, drawing attention to the potential of technology to revolutionize the way we communicate with each other.
Historic Achievement: Microsoft researchers reach human parity in conversational speech recognition

October 18, 2016 | Allison Linn
What is a Large Language model?
What is Language model?

“I woke up this morning and there was a beautiful blue _____ “
(Sky, bird, butterfly, flower)
What is Language model?

“I woke up this morning and there was a beautiful blue ____ “
(Sky, bird, butterfly, flower)

ChatGPT is an example of a Large Language Model
What is a Language model?

“I woke up this morning and there was a beautiful blue _____ “
(Sky, bird, butterfly, flower)

ChatGPT is an example of a Large Language Model

What these models do is Math
Models can be very powerful

GPT 4 BAR Exam results

GPT-4 scored 297 on the bar exam in an experiment conducted by two law professors and two employees of legal technology company Casetext.

That places GPT-4 in the 90th percentile of actual test takers and is enough to be admitted to practice law in most states.

“Large language models can meet the standard applied to human lawyers in nearly all jurisdictions in the United States by tackling complex tasks requiring deep legal knowledge, reading comprehension, and writing ability”

GPT-4 Passes the Bar Exam

35 Pages • Posted: 15 Mar 2023

Daniel Martin Katz
Illinois Tech - Chicago Kent College of Law; Bucerius Center for Legal Technology & Data Science; Stanford CodeX - The Center for Legal Informatics; 273 Ventures

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Abstract

In this paper, we experimentally evaluate the zero-shot performance of a preliminary version of GPT-4 against prior generations of GPT on the entire Uniform Bar Examination (UBE), including not only the multiple-choice Multistate Bar Examination (MBE), but also the open-ended Multistate Essay Exam (MEE) and Multistate Performance Test (MPT) components. On the MBE, GPT-4 significantly outperforms both human
The Promise of AI

Healthcare / Life-Science
- Enhanced diagnosis and personalized treatment
- Drug discovery: cancer; infectious diseases like HIV, hepatitis, COVID-19, and influenza; and neurodegenerative diseases like Alzheimer’s and Parkinson’s

Education
- Personalized education via custom learning materials tailored to students’ individual needs and learning styles.
- Identify at-risk students and provide targeted interventions to improve academic outcomes.

Materials Science
- Superconductivity: zero resistance at high temperatures > more efficient power grids
- High-strength: stronger, lighter, more durable products – aircraft, vehicles, buildings, bridges
- Self-healing: med. devices, infrastructure, electr.

Climate Change
- Enhanced climate models via analysis of data from sensors and satellites
- Risk assessment: assess and predict impacts of climate change on infrastructure, ecosystems, and human populations, and develop adaptation and mitigation strategies

Agriculture
- Crop breeding: pest, disease, climate-resistant
- Precision Ag: optimize fertilizer, pesticide, H2O
- Food-safety: detect/prevent food-borne illness via microbial data analysis and identifying contamination patterns

Social Justice
- Reduce bias and discrimination by analyzing large datasets to identify discrimination patterns
- Develop fairer hiring and promotion practices
- Identify and address systemic inequalities in housing, lending, healthcare

Energy
- Optimize energy consumption and reduce waste
- Carbon capture and storage: Generative AI can help identify new materials and technologies for capturing and storing carbon emissions from power plants and industrial processes

Finance
- Predict market trends, optimize trading/investment strategies
- Detect fraud and other financial crimes
- Risk assessment
- Personalized advice

Creative Expression
- Help writers, artists and musicians create new and innovative works by providing them with inspiration and ideas
- Generate new designs for products and buildings, and optimize layout and functionality of cities and public spaces
Design AI to **augment** human abilities
Make AI available to everyone

“We are pursuing AI to empower every person and every institution .. so that they can go on to solve the most pressing problems of our society and our economy.”

– Satya Nadella
Why Responsible AI?

“When your technology changes the world, you bear a responsibility to help address the world that you have helped create.”

Brad Smith
President and Vice Chair, Microsoft Corp.
Satya Nadella pens an article introducing concepts of responsible AI

Established our AI principles through 'The Future Computed'

Call for regulation of facial recognition

Facial recognition principles published

Responsible AI Champs begins

Office of Responsible AI

Responsible AI Standard V1 (internal)

Responsible AI Strategy in Engineering (RAISE)

Responsible AI Standard V2 (internal)
A five-point blueprint for public governance of AI

Implement and build upon new govt-led AI Safety Frameworks

Require effective safety brakes for AI systems that control critical infrastructure

Develop a broad legal and regulatory framework based on AI’s tech architecture

Promote transparency and ensure academic and nonprofit access to AI

Pursue new public-private partnerships to use AI as an effective tool to address the inevitable societal challenges that come with new tech
3. Develop a broad legal and regulatory framework based on the technology architecture for AI
A proposed AI regulatory architecture

- **Applications**
  - Ensure that the use of AI in the application complies with existing applicable laws and regulations

- **API Services**
  - Regulate through pre-release safety and security requirements, then license deployment for permitted uses in a licensed AI data center with post-deployment safety and security monitoring and protection

- **Powerful Pre-Trained AI Models**

- **Machine Learning Acceleration Software**

- **AI Datacenter Infrastructure**
  - License for training and deployment of powerful AI models based on security protections, export control compliance, and safety protocols to ensure human control over autonomous systems that manage critical infrastructure
Ideas for State Policymakers

Comprehensive Privacy Legislation

Consider taskforces to review **existing laws** & identify gaps re: **protections** & **AI applications**

Consider **executive order or legislation** re: government and **AI** (commissions; procurement & NIST AI RMF; governance; facial recognition)

Legislation to require risk assessments, address consequential automated decision systems

Legislation to address **political deepfakes**
Questions?