

# Project Opportunities in Artificial Intelligence

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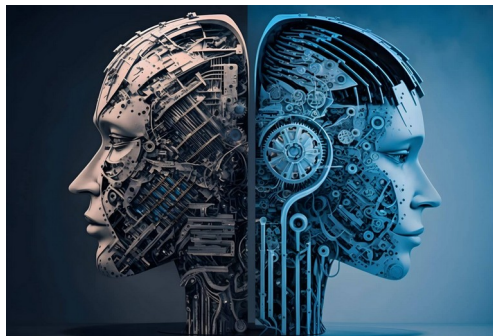




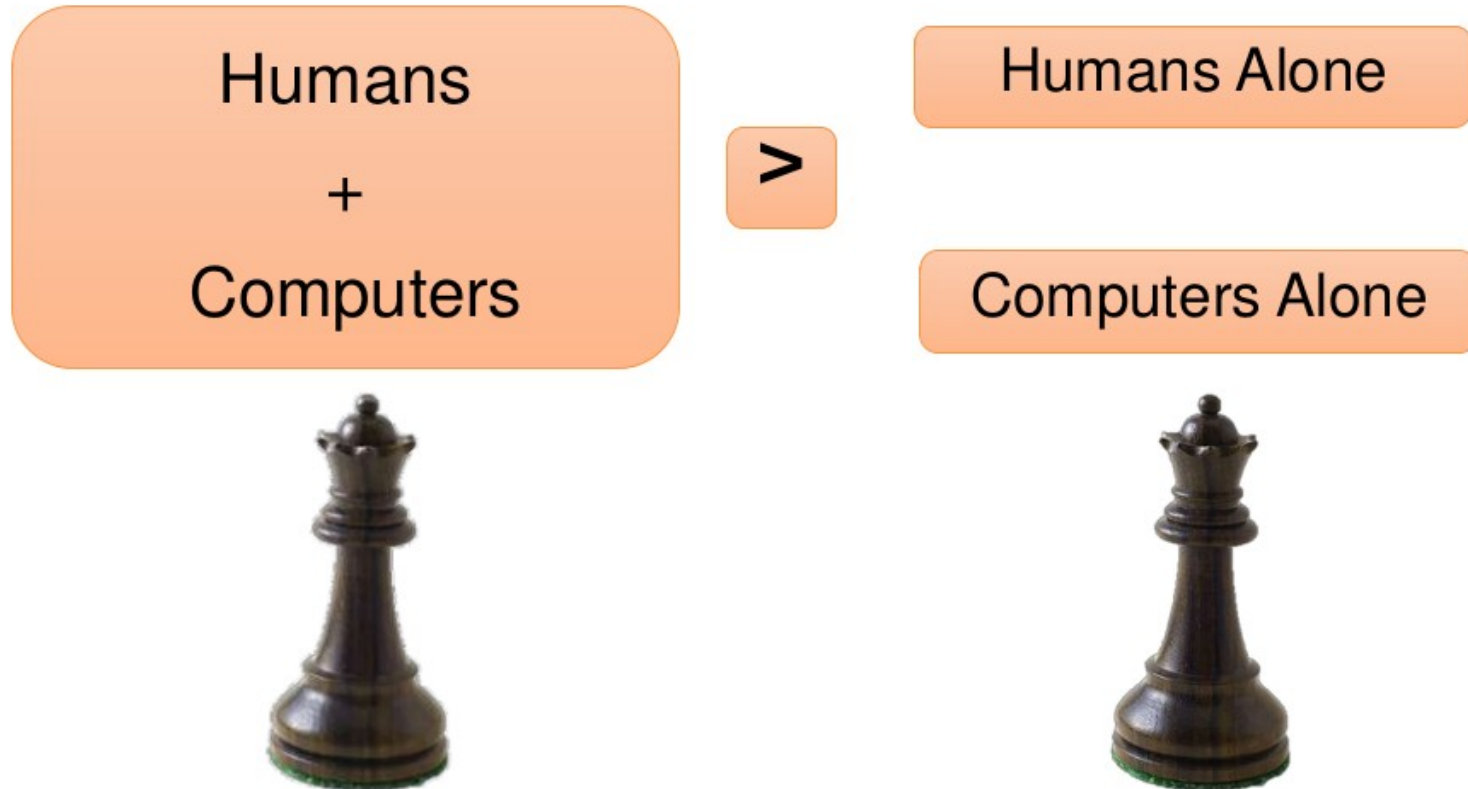
# WHAT IS A.I.?

# Artificial Intelligence

- Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to **think like humans** and **mimic** their actions.
- The term may also be applied to any machine that exhibits traits associated with a human mind such as **learning** and **problem-solving**.



# Artificial Intelligence

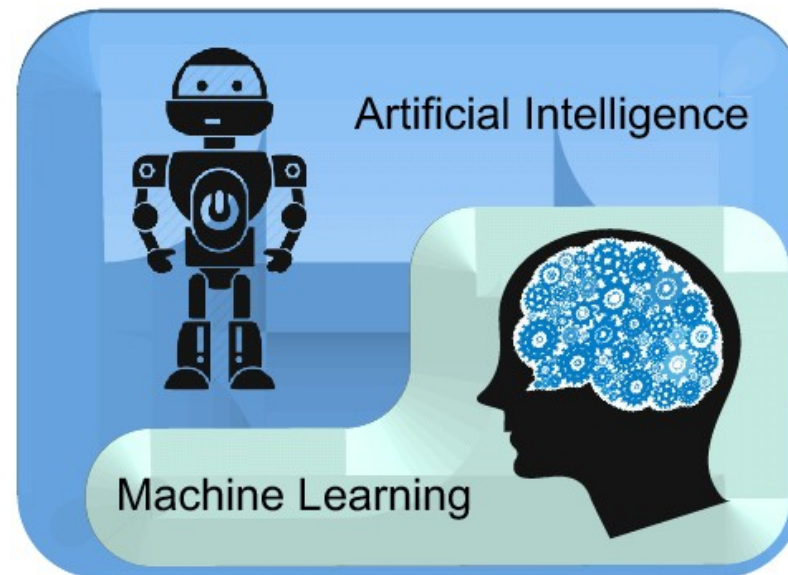


# Artificial Intelligence



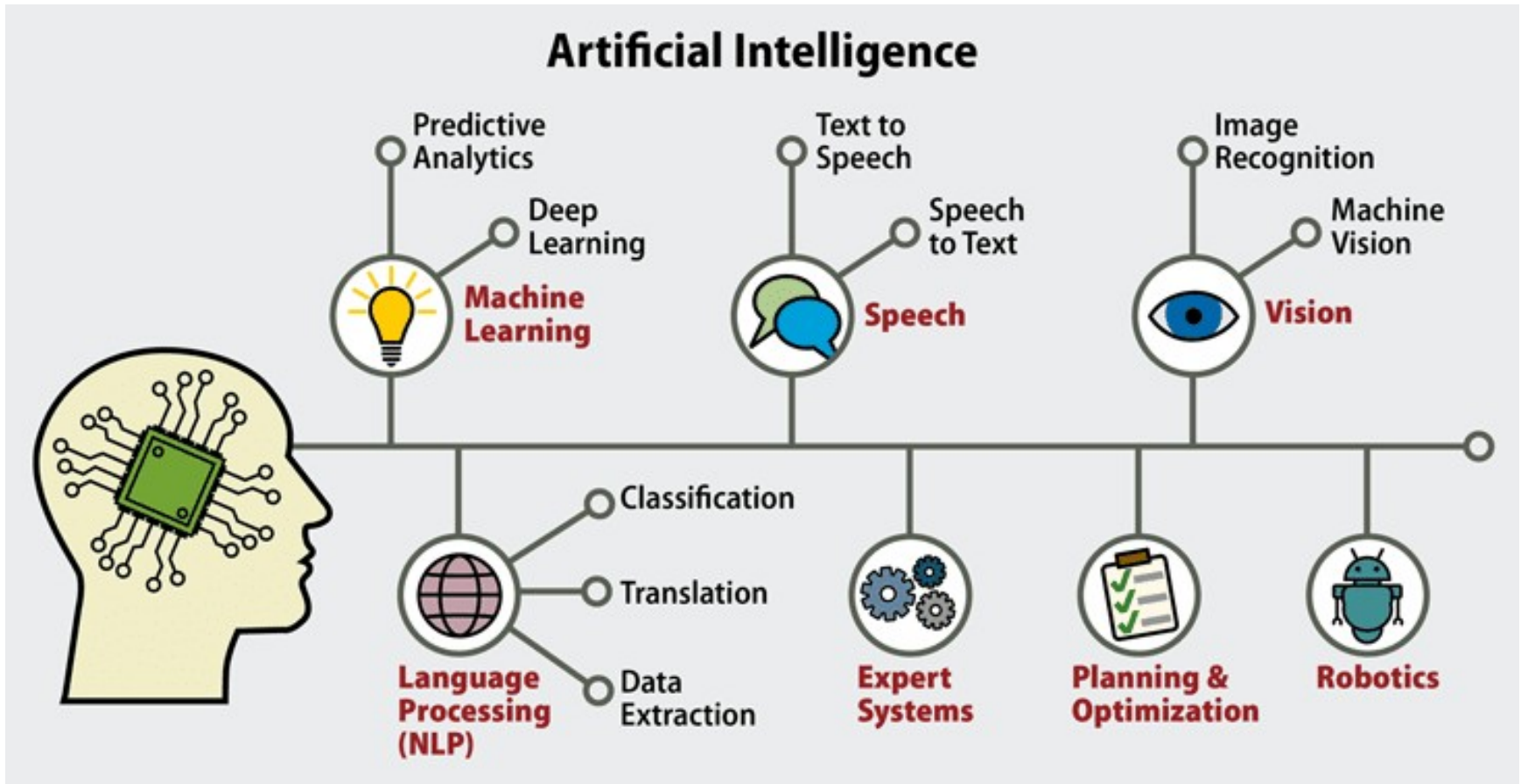
# Learning vs. Designing

- AI is a bigger concept to **design** intelligent machines that can simulate human thinking capability and behavior, whereas, machine learning is an application or subset of AI that allows machines to **learn** from data without being programmed explicitly.





# World of AI

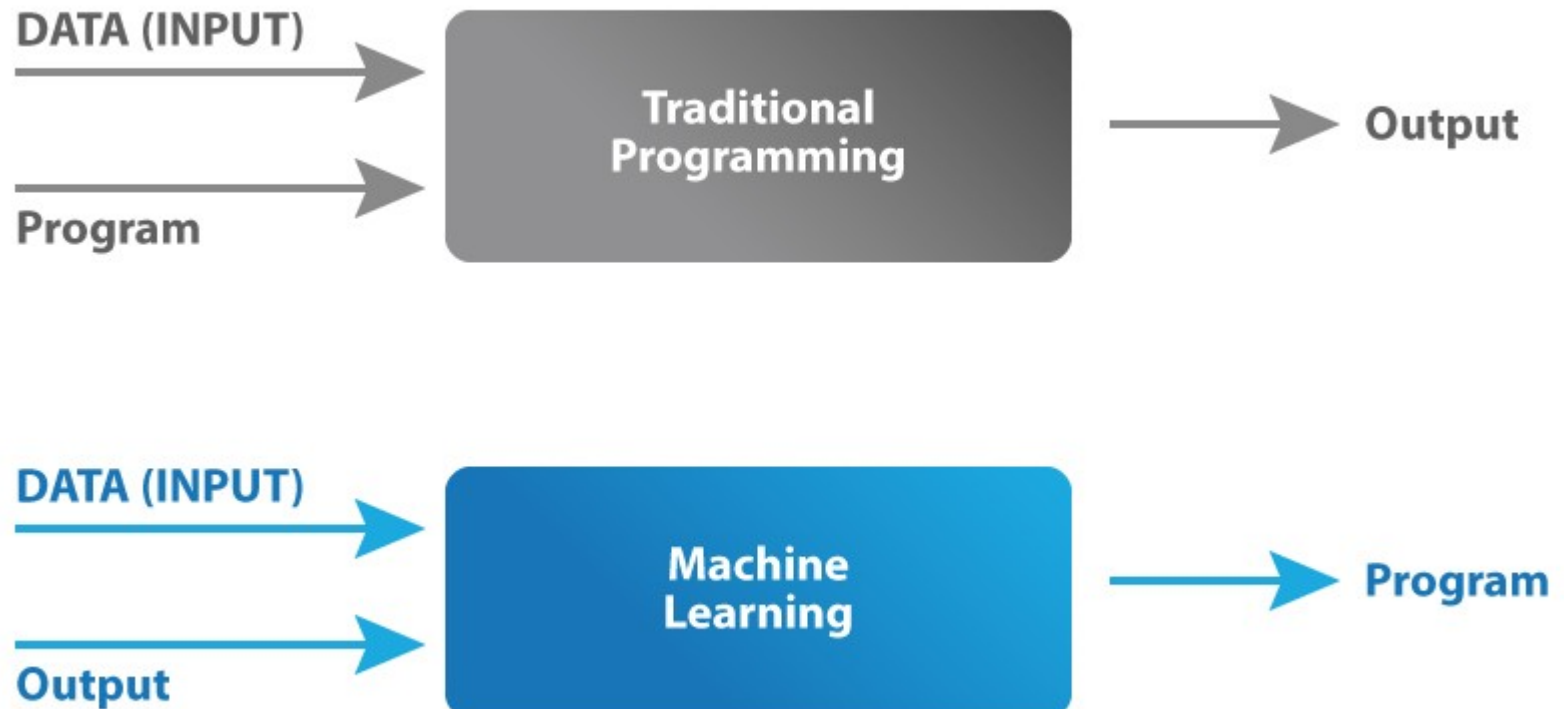


# Machine Learning

- Machine learning is an application of **artificial intelligence** (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.
- The process of learning begins with **observations** or data, such as examples, **direct experience**, or **instruction**, in order to look for patterns in data and make better decisions in the future based on the examples that we provide.
- The primary aim is to allow the computers learn automatically **without** human intervention or assistance and adjust actions accordingly.



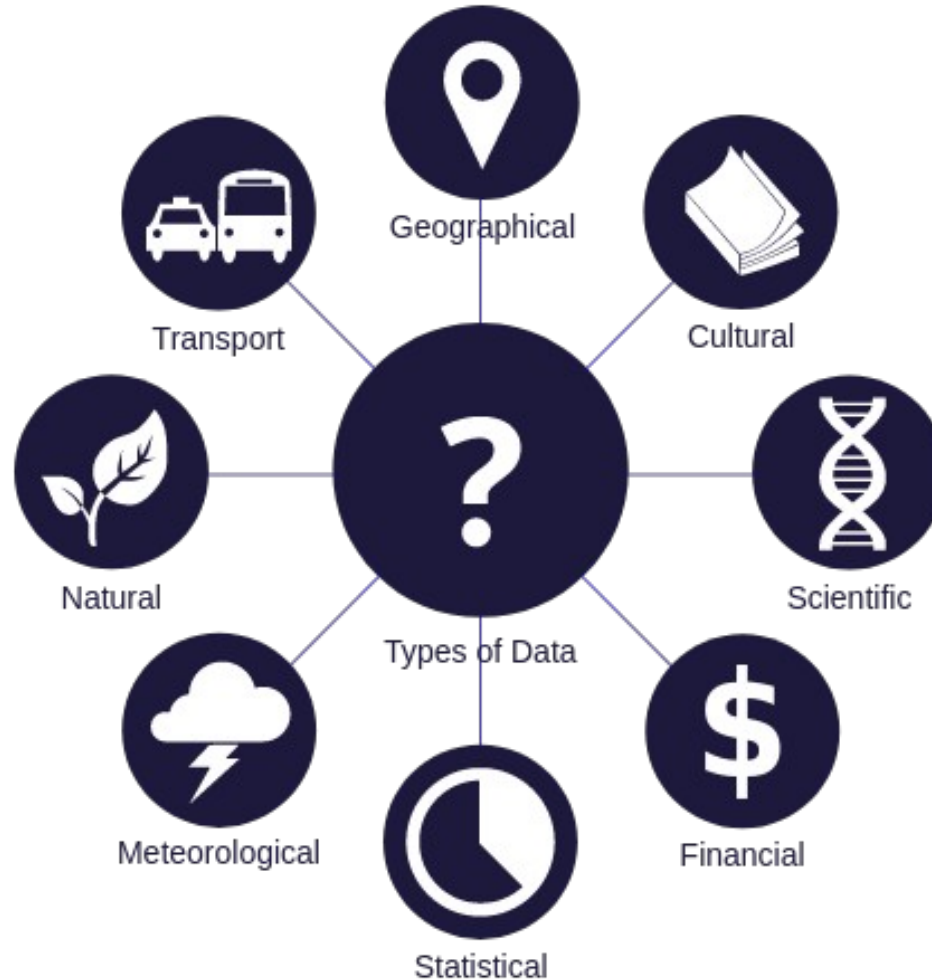
# Machine Learning



# AI + ML

- Developing new algorithms and architectures for **deep** learning, **reinforcement** learning, and other advanced techniques.
- Applying **machine learning** to solve complex problems in areas like healthcare, finance, and cybersecurity.
- Exploring **ethical** considerations and responsible development of AI systems.

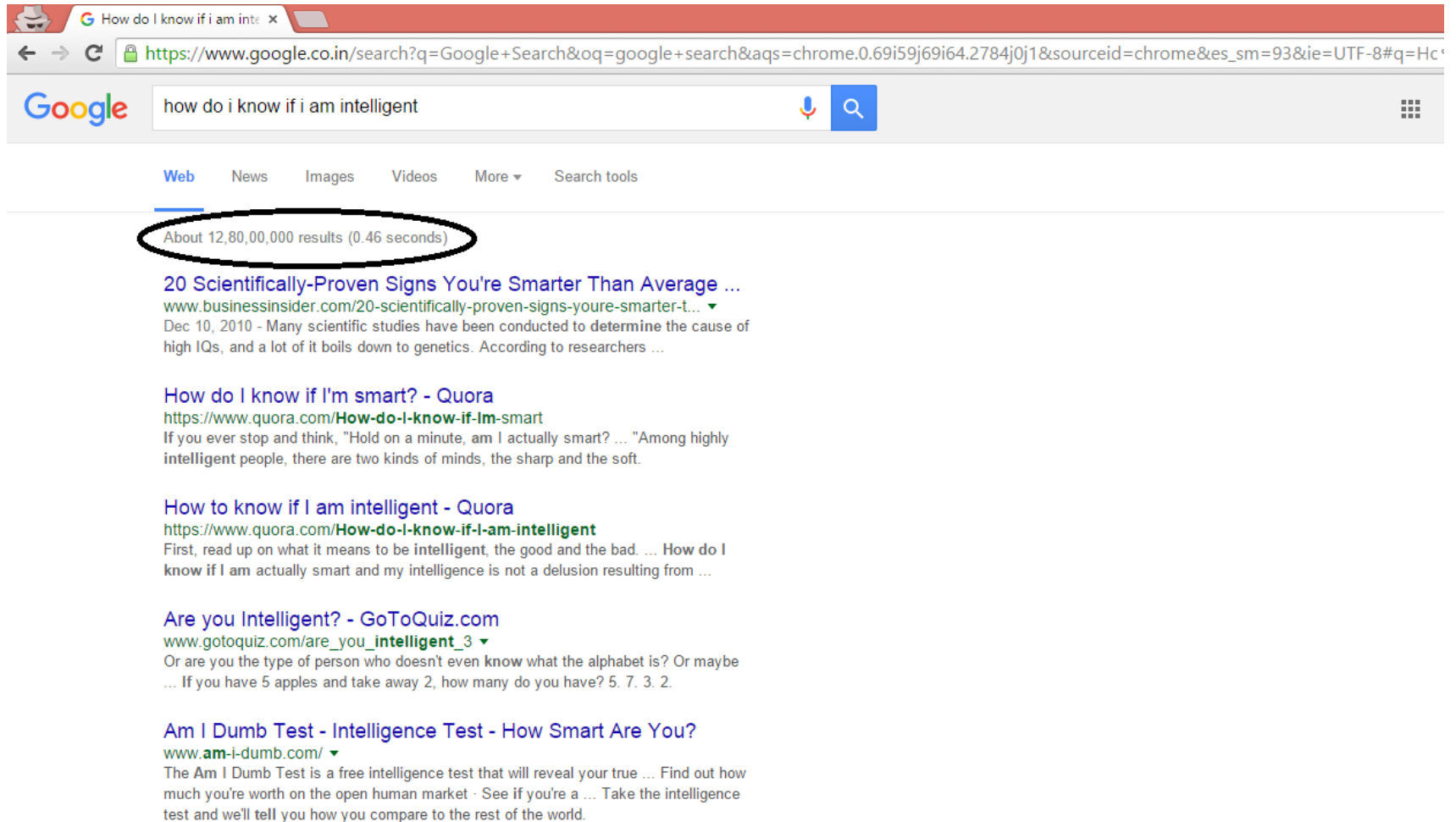
# Data



# Real Life Examples

- Internet Search
- Targeted Advertising
- Recommender Systems
- Image Recognition
- Speech Recognition
- Gaming
- Price Comparison Websites
- Airline Route Planning
- Fraud and Risk Detection
- Delivery logistics

# Internet Search



How do I know if i am inte x

← → ↻ [https://www.google.co.in/search?q=Google+Search&oq=google+search&aqs=chrome.0.69i59j69i64.2784j0j1&sourceid=chrome&es\\_sm=93&ie=UTF-8#q=Hc](https://www.google.co.in/search?q=Google+Search&oq=google+search&aqs=chrome.0.69i59j69i64.2784j0j1&sourceid=chrome&es_sm=93&ie=UTF-8#q=Hc)

Google how do i know if i am intelligent

Web News Images Videos More Search tools

About 12,80,00,000 results (0.46 seconds)

**20 Scientifically-Proven Signs You're Smarter Than Average ...**  
[www.businessinsider.com/20-scientifically-proven-signs-youre-smarter-t...](http://www.businessinsider.com/20-scientifically-proven-signs-youre-smarter-t...)  
Dec 10, 2010 - Many scientific studies have been conducted to determine the cause of high IQs, and a lot of it boils down to genetics. According to researchers ...

**How do I know if I'm smart? - Quora**  
<https://www.quora.com/How-do-I-know-if-Im-smart>  
If you ever stop and think, "Hold on a minute, am I actually smart? ... "Among highly intelligent people, there are two kinds of minds, the sharp and the soft.

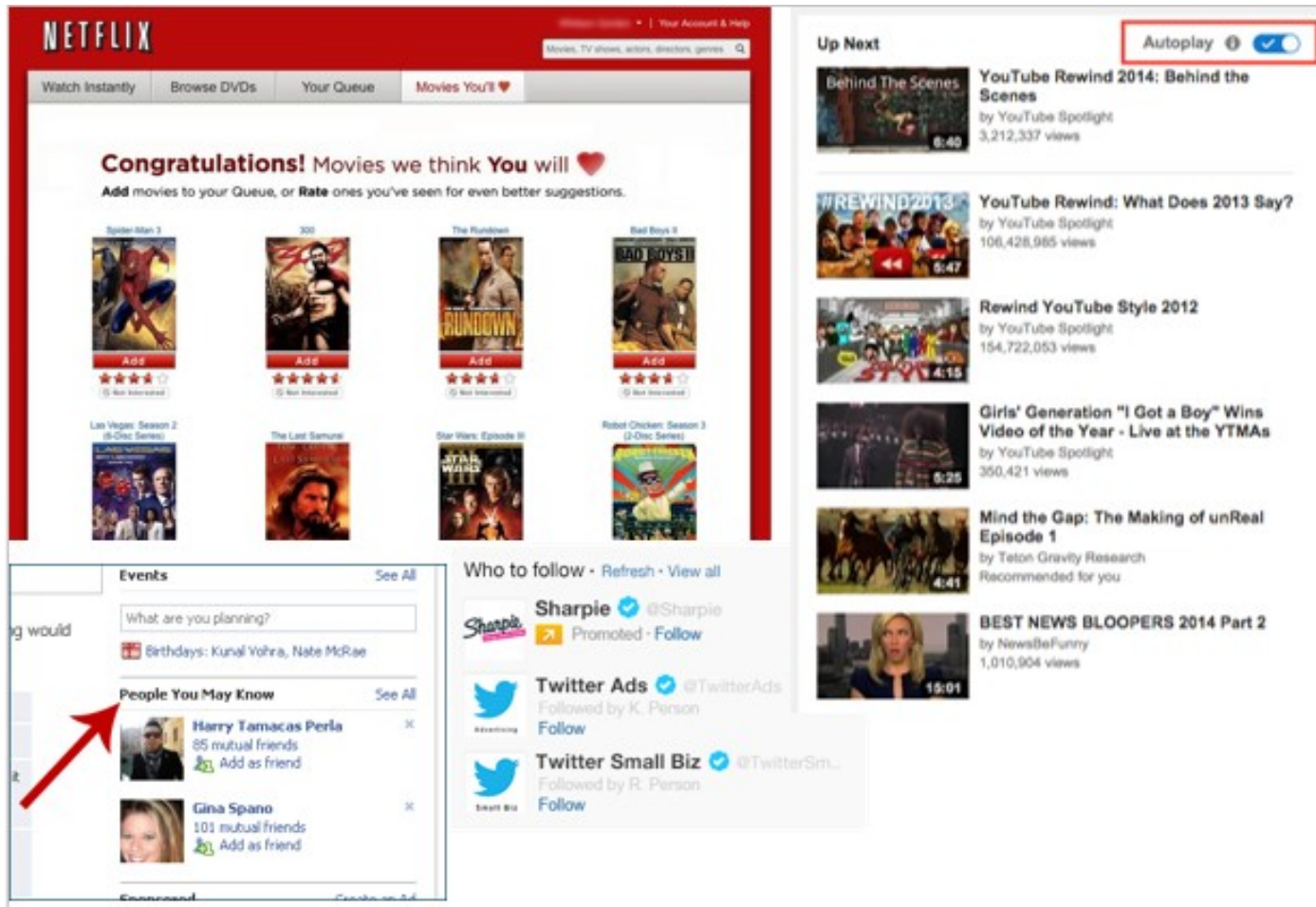
**How to know if I am intelligent - Quora**  
<https://www.quora.com/How-do-I-know-if-I-am-intelligent>  
First, read up on what it means to be intelligent, the good and the bad. ... How do I know if I am actually smart and my intelligence is not a delusion resulting from ...

**Are you Intelligent? - GoToQuiz.com**  
[www.gotoquiz.com/are\\_you\\_intelligent\\_3](http://www.gotoquiz.com/are_you_intelligent_3)  
Or are you the type of person who doesn't even know what the alphabet is? Or maybe ... If you have 5 apples and take away 2, how many do you have? 5. 7. 3. 2.

**Am I Dumb Test - Intelligence Test - How Smart Are You?**  
[www.am-i-dumb.com/](http://www.am-i-dumb.com/)  
The Am I Dumb Test is a free intelligence test that will reveal your true ... Find out how much you're worth on the open human market - See if you're a ... Take the intelligence test and we'll tell you how you compare to the rest of the world.



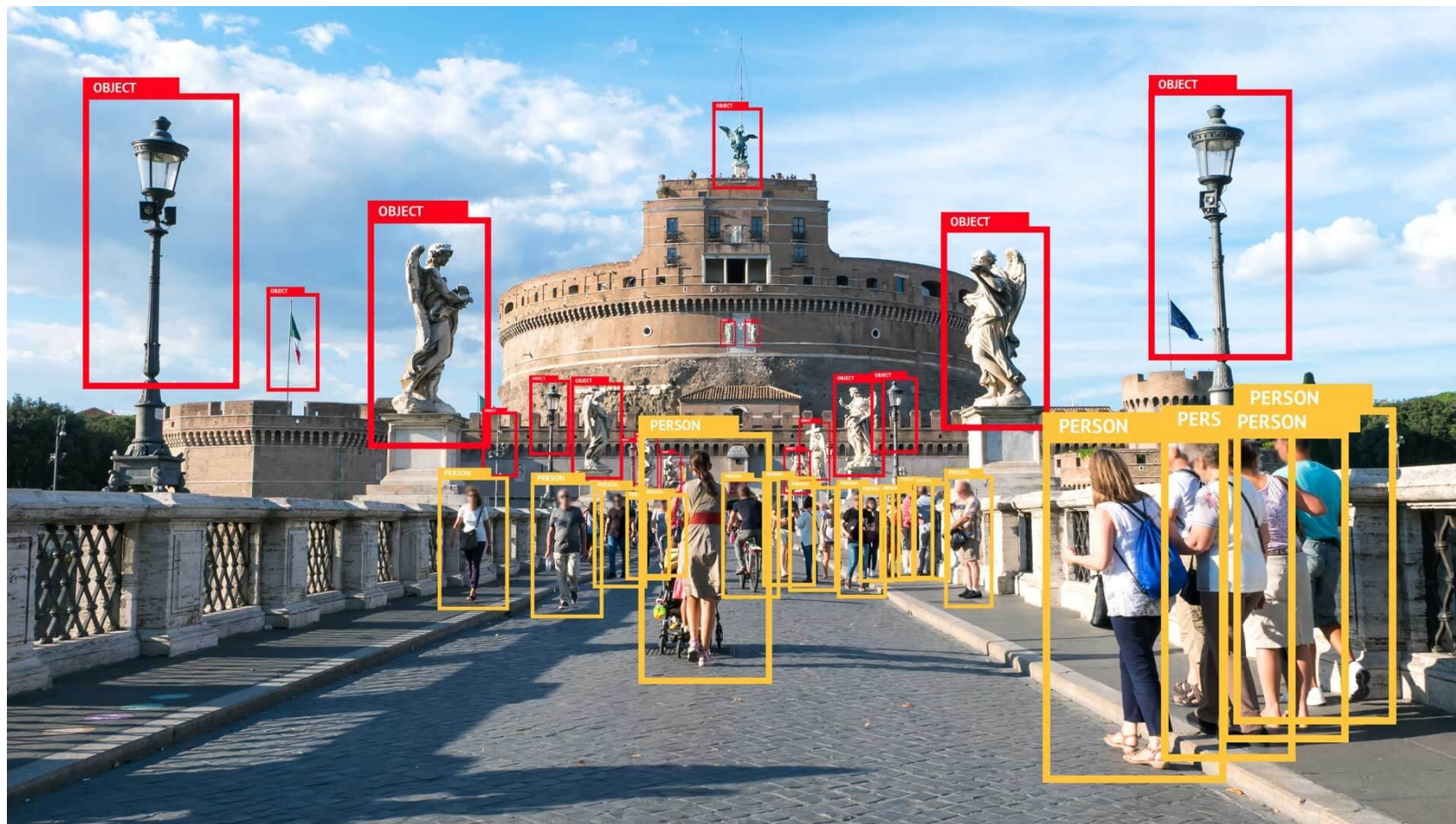
# Recommender System



The image displays two examples of recommendation systems. On the left is the Netflix interface, featuring a red header with the 'NETFLIX' logo and navigation tabs like 'Watch Instantly', 'Browse DVDs', 'Your Queue', and 'Movies You'll Like'. A central banner reads 'Congratulations! Movies we think You will like' with a heart icon, followed by a grid of movie thumbnails such as 'Spider-Man 3', '300', 'The Runaways', and 'Bad Boys II'. Below this is a 'People You May Know' section with a red arrow pointing to a profile for 'Harry Tamacas Perla'. On the right is a YouTube 'Up Next' sidebar with an 'Autoplay' toggle switch. It lists video recommendations including 'Behind The Scenes' (3,212,337 views), 'YouTube Rewind 2014: Behind the Scenes', 'YouTube Rewind: What Does 2013 Say?' (106,428,985 views), 'Rewind YouTube Style 2012' (154,722,053 views), 'Girls' Generation "I Got a Boy" Wins Video of the Year - Live at the YTMAs' (350,421 views), 'Mind the Gap: The Making of unReal Episode 1', and 'BEST NEWS BLOOPERS 2014 Part 2' (1,010,904 views).



# Image Recognition



# Speech Recognition





# Computer Games



# Price Comparison Website



trivago

Hotels in New York

**Website A**  
25 Hotels

**Website B**  
56 Hotels

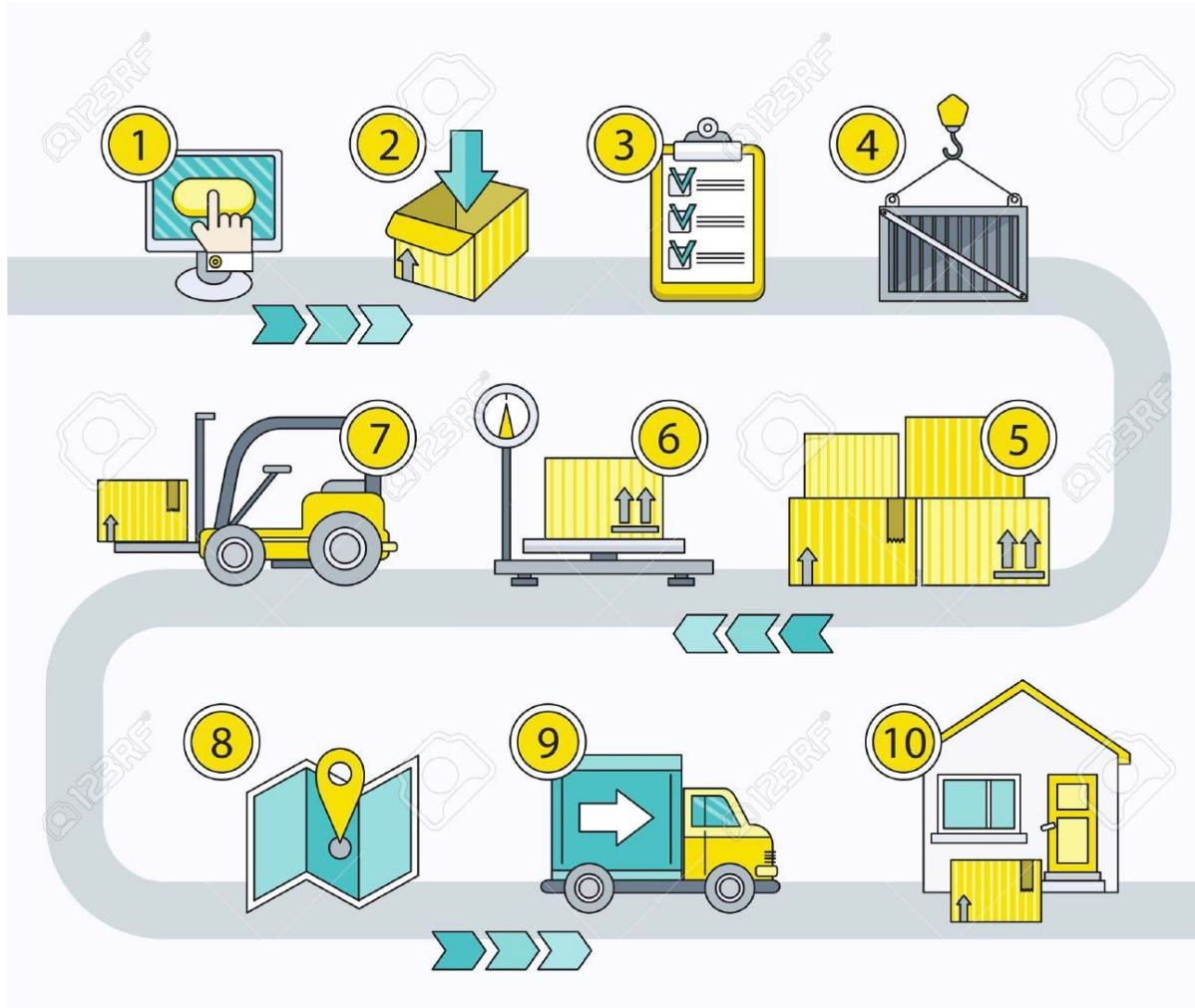




# Fraud Detection

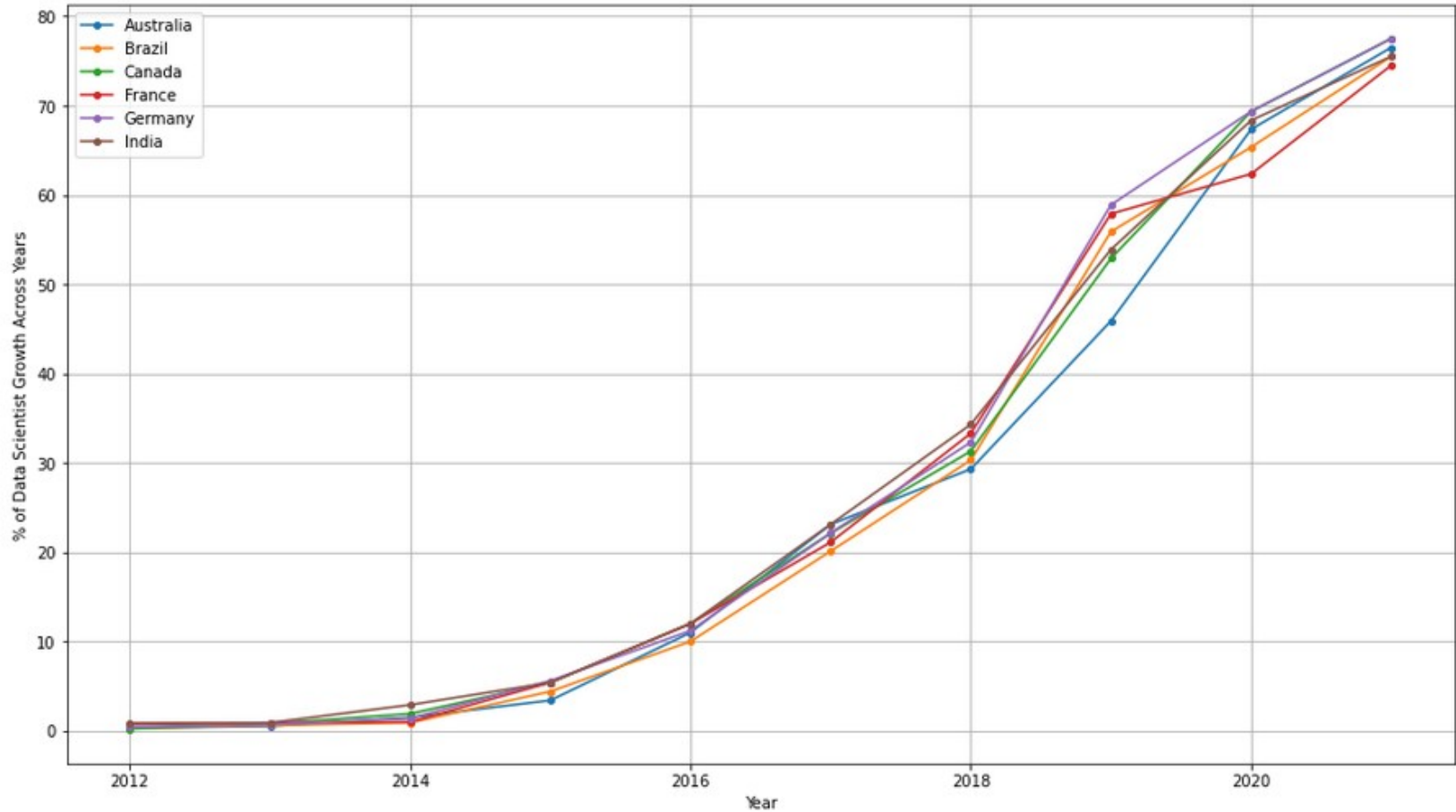


# Delivery Logistics





# Data Science Community Growth



# Project Opportunities

- Research opportunities in AI incredibly diverse and span a **wide range of disciplines** and applications.
- It's a rapidly evolving field, constantly pushing the boundaries of **what's possible with data analysis** and interpretation.

# Big Data Analytics

- Big data analytics is the process of **collecting**, **examining**, and **analyzing** large and diverse sets of data to uncover hidden **patterns**, **trends**, and **correlations**.
- These insights can then be used to make **informed decisions**, improve operations, and gain a competitive advantage.

# Big Data Analytics



# BIG DATA



Volume



Value



Veracity



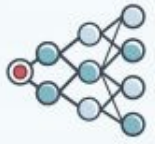
Visualization



Variety



Velocity



Virality

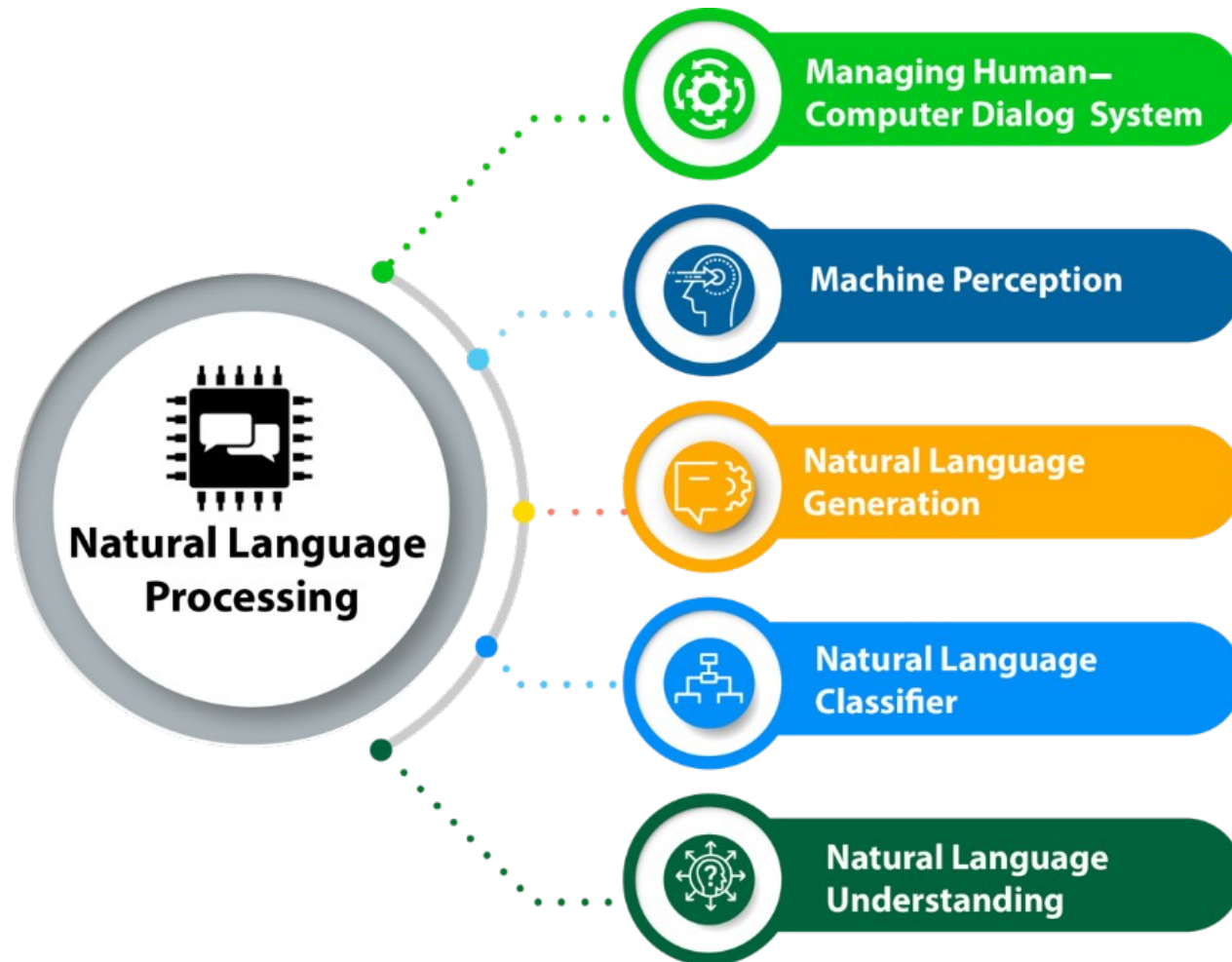
# Big Data Analytics

- **Retail:** Analyzing customer buying patterns to predict demand and optimize inventory levels.
- **Healthcare:** Using patient data to identify risk factors for diseases and develop personalized treatment plans.
- **Finance:** Analyzing financial data to detect fraud and make better investment decisions.
- **Manufacturing:** Analyzing sensor data to identify potential equipment failures and prevent downtime.
- **Government:** Analyzing social media data to identify potential threats and improve public safety.

# Natural Language Processing

- Natural language processing (NLP) is a subfield of **computer science** and **linguistics** that deals with the interaction between computers and human (natural) languages.
- It enables computers to **understand**, interpret, and manipulate **human language** in its various forms, including text, speech, and even sign language.

# Natural Language Processing





# How NLP works?

- **Machine learning:** NLP algorithms are trained on massive datasets of text and speech data, allowing them to learn the patterns and rules of human language.
- **Linguistic analysis:** NLP relies on linguistic theories and techniques to understand the structure and meaning of language.
- **Statistical modeling:** NLP uses statistical methods to analyze and predict language patterns.

# NLP : Applications

- Text and Speech Translation
- Chatbots and Virtual Assistants
- Sentiment Analysis
- Text Summarization
- Information Retrieval
- Speech Recognition
- Named Entity Recognition (NER)
- Text Classification
- Language Generation
- Spell Checking and Grammar Correction
- Personalized Recommendations

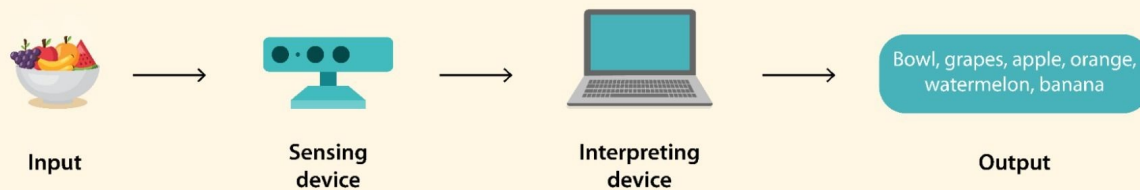
# Computer Vision

- Computer vision is one of the fields of artificial intelligence that trains and enables computers to understand the visual world.
- Computers can use digital images and deep learning models to accurately identify and classify objects and react to them.
- Computer vision in AI is dedicated to the development of automated systems that can interpret visual data (such as photographs or motion pictures) in the same manner as people do.

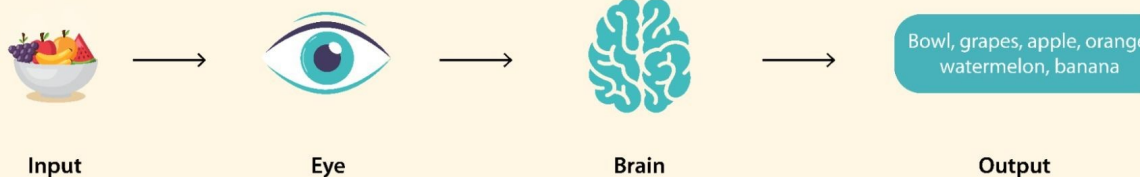
# Computer Vision: How?

## How Does Computer Vision Work?

### Computer Vision



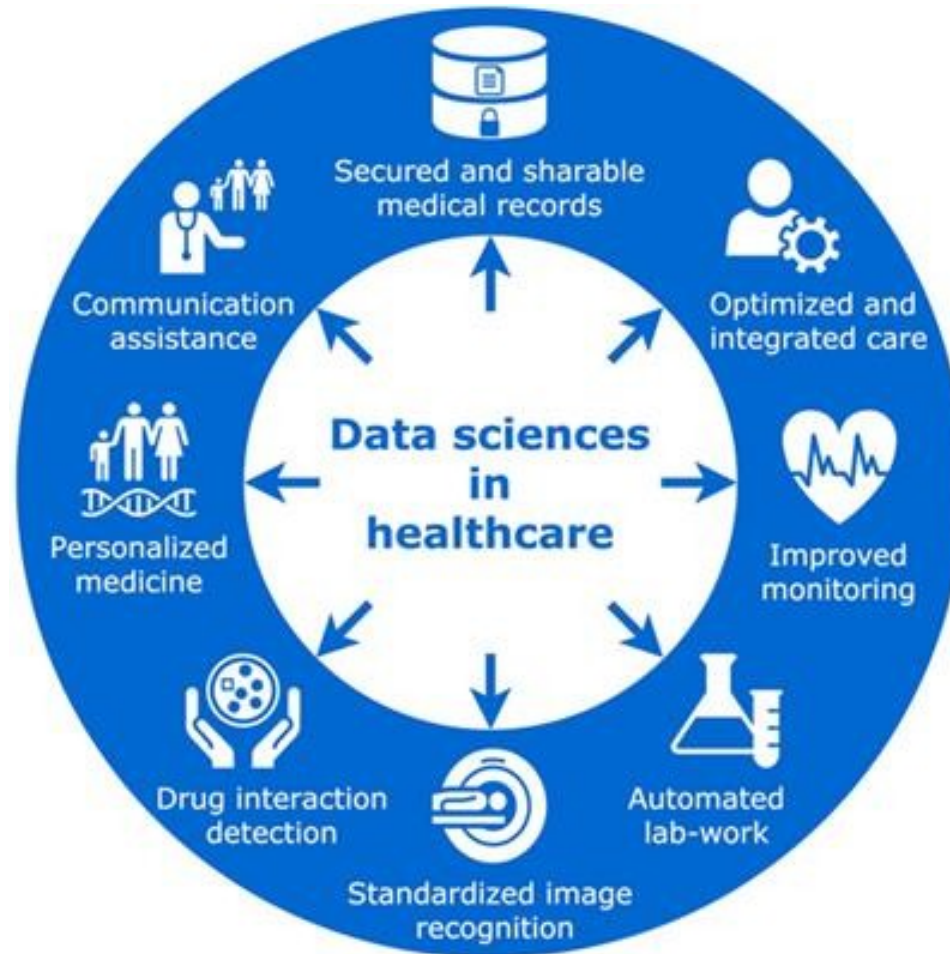
### Human Vision



# Healthcare AI

- Analyzing medical data to improve **disease diagnosis, treatment planning, and patient outcomes.**
- Developing **personalized medicine** approaches based on individual patient data and characteristics.
- Exploring the use of data science to **optimize healthcare systems** and reduce costs.

# Healthcare Data Science



# AI in Cyber Security

- Developing advanced algorithms for **detecting** and **preventing cyberattacks**.
- Analyzing large datasets to **identify** patterns and **predict** future **cyber threats**.
- Exploring the use of data science to **improve** **online privacy** and security.



# Business Intelligence

- Analyzing business data to **improve decision-making** across various departments.
- Developing **data-driven strategies** for optimizing marketing, sales, and operational efficiency.
- Exploring the use of data science to **predict** customer behavior and **personalize** marketing efforts.

# Business Intelligence

Intuitive  
Dashboards



Data-driven  
business



Governed  
data



Faster  
Analysis



Increased  
Competitive  
Advantage



Improved  
Customer  
Experience



Organizational  
efficiency

# Green AI

- Developing **sustainable** AI practices that **minimize environmental impact**.
- Applying AI to **solve environmental problems** like climate change and resource depletion.
- Exploring the use of AI to **promote sustainable development** and responsible resource management.

# With AI...

- Healthcare
  - Disease prediction and diagnosis using machine learning.
  - Personalized treatment plans and drug discovery.
  - Medical image analysis and interpretation.
  - Virtual health assistants and telemedicine platforms.
- Finance
  - Fraud detection and prevention.
  - Algorithmic trading and investment strategies.
  - Risk assessment and credit scoring.
  - Customer service automation with chatbots.

# With AI...

- Retail
  - Personalized shopping experiences and recommendations.
  - Inventory management and demand forecasting.
  - Dynamic pricing and marketing strategies.
  - Virtual try-ons and augmented reality shopping.
- Transportation
  - Autonomous vehicles and self-driving technology.
  - Traffic management and optimization.
  - Predictive maintenance for vehicles.
  - Route planning and logistics optimization.

# With AI...

- Manufacturing
  - Predictive maintenance and equipment monitoring.
  - Quality control and defect detection.
  - Supply chain optimization.
  - Robotics and automation in production lines.
- Education
  - Intelligent tutoring systems and personalized learning.
  - Automated grading and feedback systems.
  - Adaptive learning platforms.
  - Educational content recommendation.

# With AI...

- Energy
  - Smart grid management and optimization.
  - Predictive analytics for energy consumption.
  - Renewable energy forecasting and management.
  - Energy-efficient building management systems.
- Agriculture
  - Precision farming and crop monitoring.
  - Livestock health monitoring and management.
  - Automated irrigation and pest control systems.
  - Yield prediction and soil analysis.

# With AI...

- Entertainment
  - Content recommendation and personalization.
  - Automated content creation and curation.
  - Sentiment analysis for audience feedback.
  - Virtual and augmented reality experiences.
- Cybersecurity
  - Threat detection and response.
  - Anomaly detection and intrusion prevention.
  - Automated security assessments and vulnerability scanning.
  - User behavior analytics and fraud detection.



# With AI...

- Customer Service
  - AI-powered chatbots and virtual assistants.
  - Sentiment analysis and customer feedback analysis.
  - Automated query resolution and support ticketing.
  - Personalized customer engagement and marketing.
- Human Resources
  - Resume screening and candidate matching.
  - Employee performance and sentiment analysis.
  - Automated onboarding and training programs.
  - Workforce planning and talent management.

# With AI...

- Environmental Monitoring
  - Climate change modeling and prediction.
  - Natural disaster prediction and response.
  - Pollution detection and monitoring.
  - Wildlife conservation and tracking.
- Smart Cities
  - Traffic and transportation management.
  - Energy-efficient building systems.
  - Public safety and surveillance systems.
  - Waste management and recycling optimization.

# Emerging Areas

- Exploring the potential of AI in new and emerging fields like **quantum computing**, **bioinformatics**, and **space exploration**.
- Developing innovative AI applications to **solve complex challenges** in various industries and disciplines.
- Pushing the boundaries of AI research to **uncover new insights** and unlock the transformative power of data.

# Benefits of Pursuing Research in AI

- Gaining **expertise** and **knowledge** in a specific area.
- Contributing to the **advancement** of data science.
- Developing **critical thinking** and **problem-solving skills**.
- Enhancing **career prospects** and gaining valuable experience.

# Funding: Government Grants

- Department of Science and Technology (DST):
  - Offers various **grants** and **fellowships** for data science research, including the AI Research Initiative, the Start-up Research Grant (Young Scientists), and the J C Bose National **Fellowship**.
- Department of Biotechnology (DBT):
  - Provides funding for research in **bioinformatics** and **computational biology**, which often involve data science techniques.

# Funding: Government Grants

- Ministry of Electronics and Information Technology (MeitY):
  - Supports **research** and **development** in areas like artificial intelligence and machine learning.
- Council of Scientific and Industrial Research (CSIR):
  - Offers **grants** and **fellowships** for research in various scientific fields, including AI.

# Funding: Startup Funding

- National Initiative for Developing and Harnessing Innovations (NIDHI):
  - Provides various funding schemes for startups, including the NIDHI-Seed Support System (NIDHI-SSS), NIDHI-Technology Business Incubator (NIDHI-TBI), and NIDHI-Promoting and Accelerating Young and Aspiring innovators & startups (NIDHI-PRAYAS).
- Atal Innovation Mission (AIM):
  - Supports entrepreneurs and startups across various sectors, including data science.

# Funding: Academic

- Indian Institutes of Technology (IITs):
  - Offer research **fellowships** and **grants** for data science projects.
- Indian Institutes of Science Education and Research (IISERs):
  - Provide **research opportunities** and **funding** for data science students.
- Central Universities:
  - Many central universities in India have data science departments or centers offering **research opportunities** and **funding**.



# Funding: Other

- International funding agencies:
  - Several international organizations, such as the **World Bank** and the **United Nations**, offer grants for research projects that address global challenges using data science techniques.
- Private companies:
  - Many private companies in India are actively involved in data science research and may offer funding for **collaborative projects** or **internships**.

# Funding: Resources

- India Science, Technology & Innovation - ISTI Portal: <https://www.indiascienceandtechnology.gov.in/startups>
- Department of Science & Technology: <https://dst.gov.in/>
- Department of Biotechnology: <https://dbtindia.gov.in/>
- Ministry of Electronics and Information Technology: <https://www.meity.gov.in/>
- Council of Scientific and Industrial Research: <https://www.csir.res.in/>
- National Initiative for Developing and Harnessing Innovations (NIDHI): <https://www.nstedb.com/>
- Atal Innovation Mission (AIM): <https://aim.gov.in/>

# Useful web resources

- <https://www.mitu.co.in>
- <https://www.kaggle.com>
- <https://www.kdnuggets.com/>
- <https://www.datasciencecentral.com/>
- <https://www.r-bloggers.com/>
- <https://datascienceweekly.substack.com/>
- <http://datasciencemasters.org/>
- <https://courses.analyticsvidhya.com/>

# Thank you

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**Web Resources**

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