Artificial Intelligence for business

Executive Workshop

George Shevardenidze

Tbilisi, 30 March

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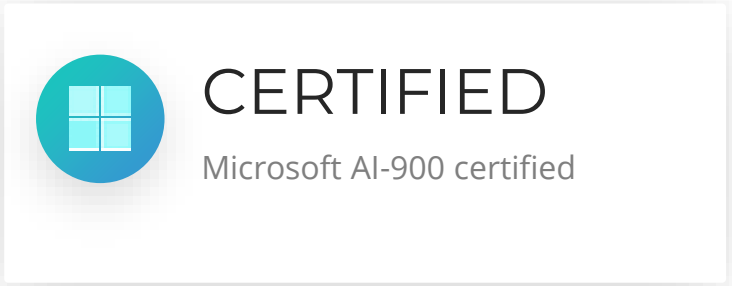
About me

15 years experience as business & commercial leader in global technical consultancy companies (Noble Denton, Germanischer Lloyd, DNV, TUV).

3 years in AI/ML consulting.
Citizen data scientist.



About course

01.

Purpose

Provide business leaders about how AI/ML can benefit their businesses

02.

Holistic approach

From AI/ML understanding to business strategy to AI/ML implementation to risks & compliance

05.

Outcome

Business leaders will have a solid foundation and expertise to identify opportunities with AI and understanding how to implement it in business.

03.

Target audience

Business leaders, non-technical stakeholders

04.

Theory plus Practice

Some boring, but necessary stuff coupled with real-world cases and examples

We will cover:

- Introduction to AI/ML
- Understanding AI/ML landscape
- AI/ML in business functions
- Aligning AI/ML into business strategy
- Data importance
- AI/ML Practical integration
- Building effective team
- AI/ML Lifecycle
- AI Principles & Regulations

Two 10 mins breaks, one 45 mins lunch break

Various real world case studies and examples, 4 Interactive games and 3 live demonstrations.

Why integrate AI into business

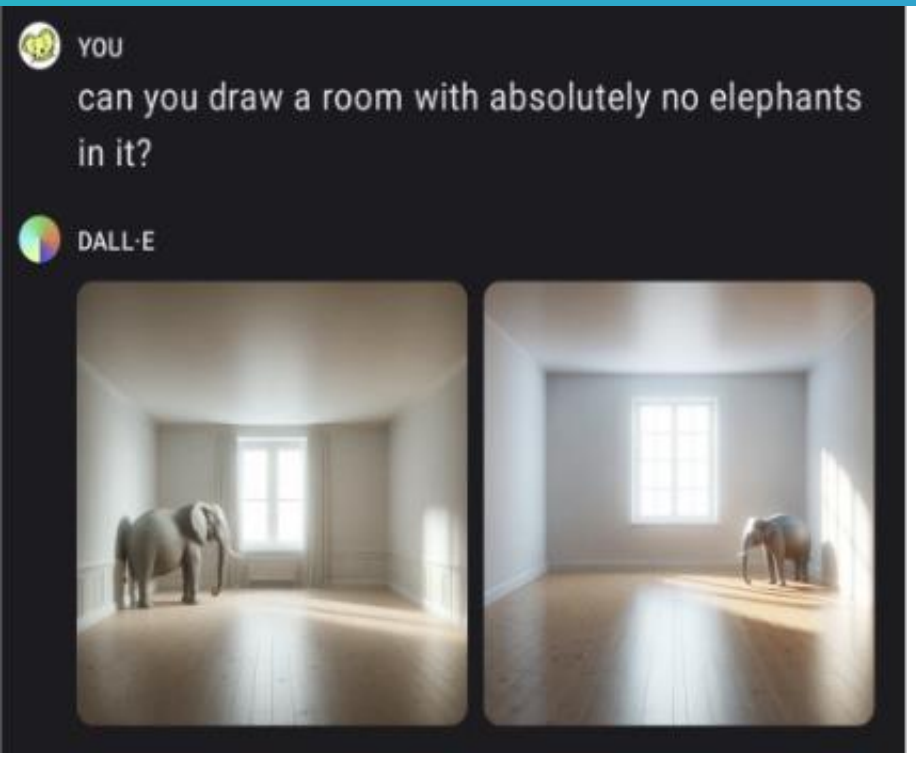
How to integrate AI into business

What to do next

Why understand how **AI works**

Same technology. Same task. Different results.

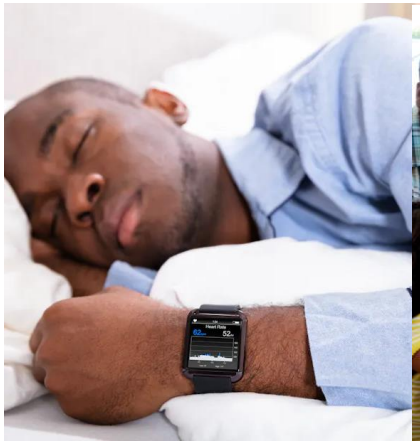
DALL-E (Directly)

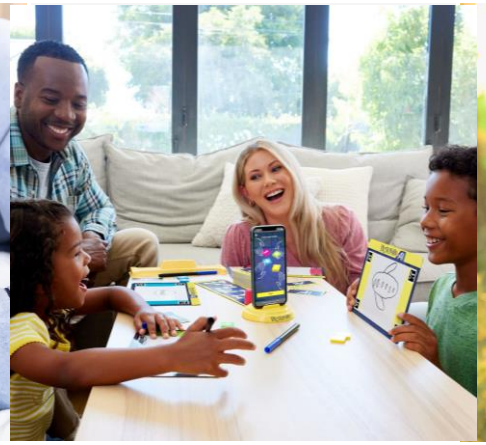


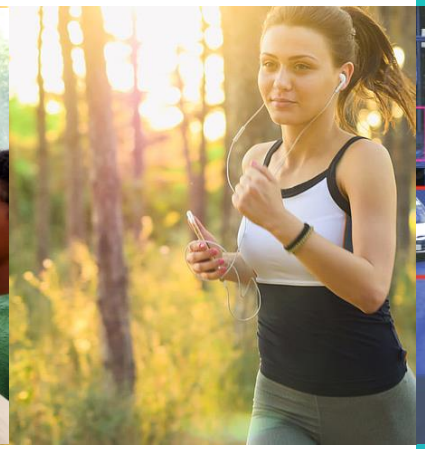
OpenAI ChatGPT 4.0

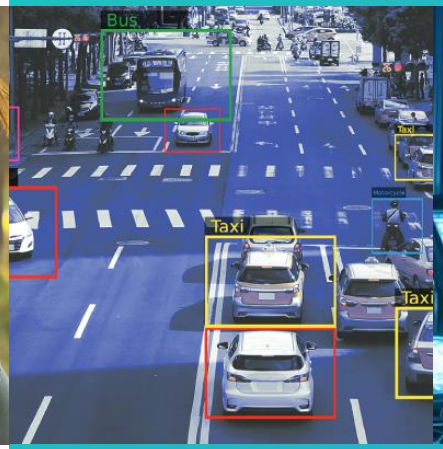
Microsoft Co-Pilot LLM

Artificial Intelligence is everywhere









AI is long part of our life

AI is long part of business

What is **Artificial Intelligence**

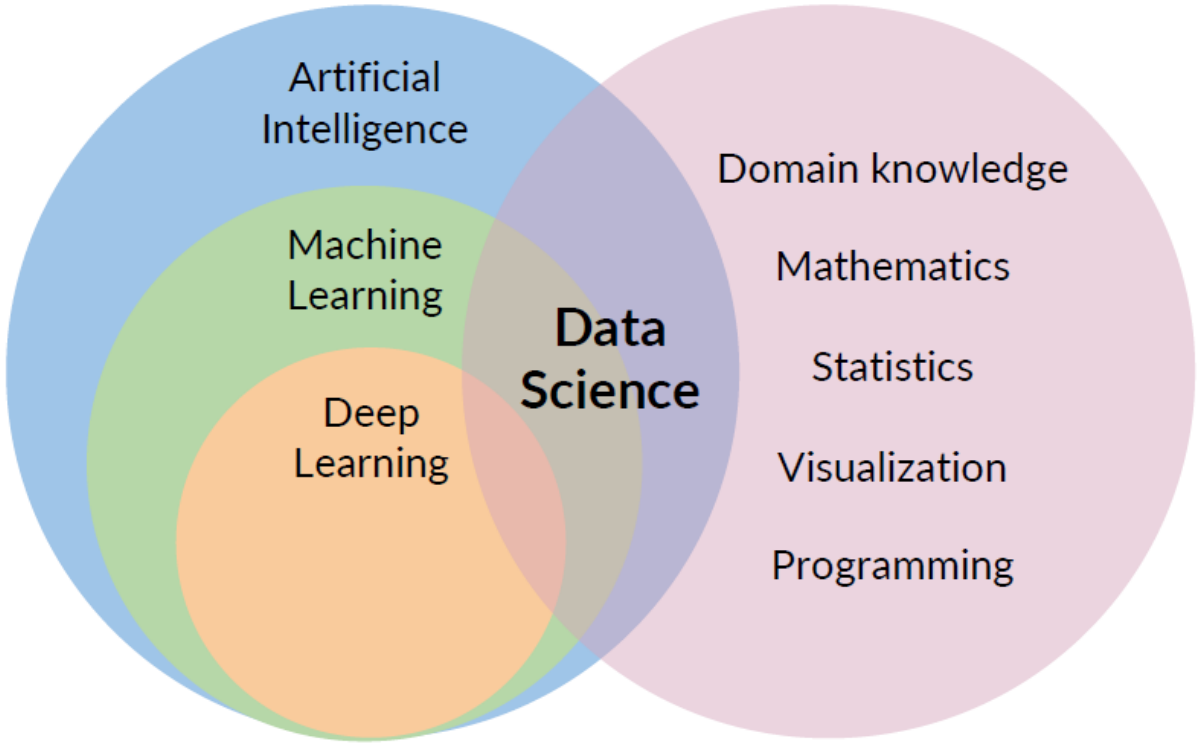
Artificial Intelligence (AI) is a **computer system** of intelligent agents that **takes information from an environment (data), processes it** and uses to **take actions** that affect that environment**.**

AI system = Code + Data

(algorithm/model)

AI & Data Science

Data Science — use of data to extract insights for business

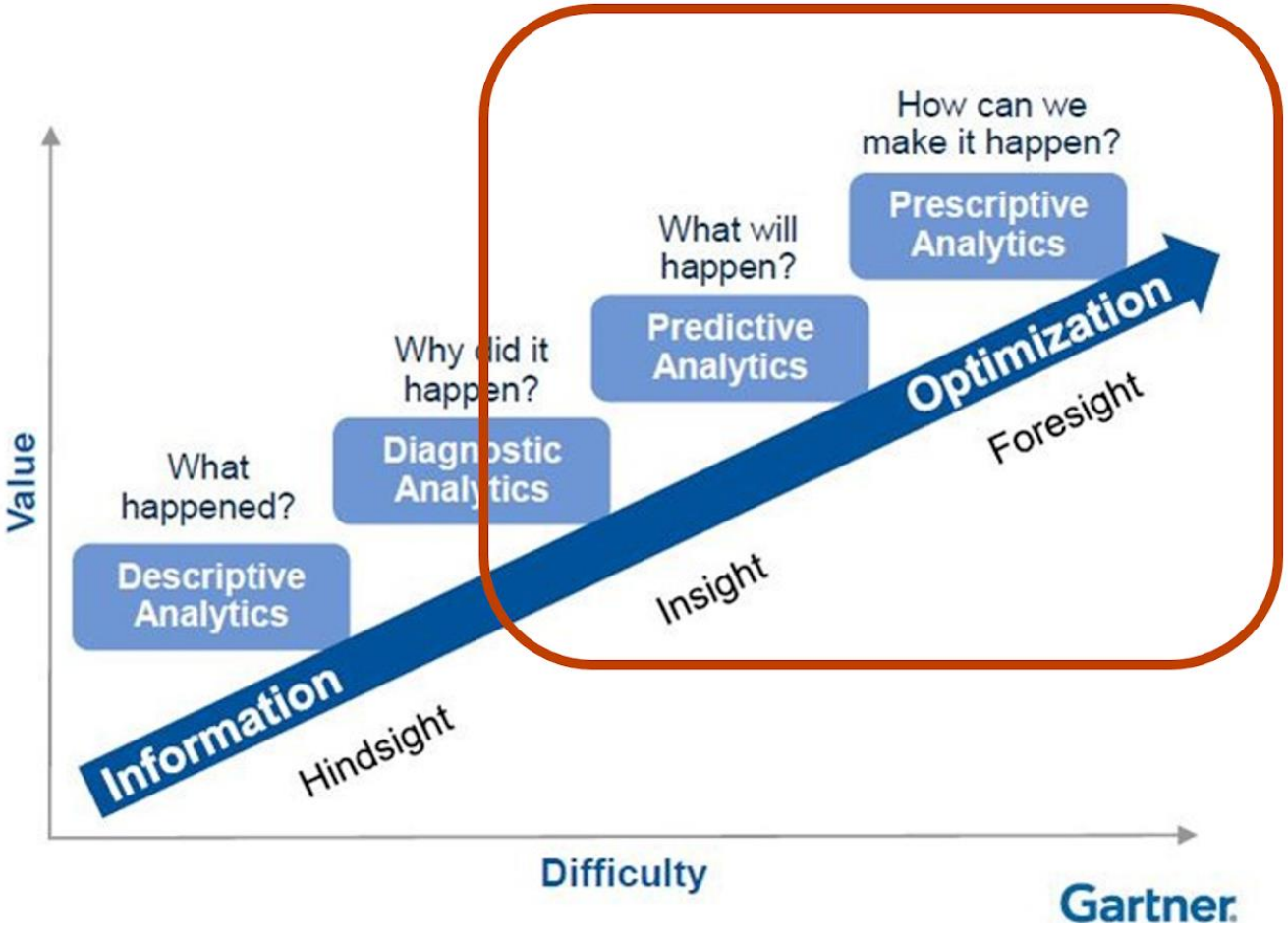


Data Science (DS) includes:

- **Data Analytics** (dashboards, visualizations, surface level analysis)
- **Advanced data analytics** (route cause analysis, modelling, deep dive)
- **Machine Learning** (models to predict, classify etc.)

AI is built using data science approaches

AI or Data Science?



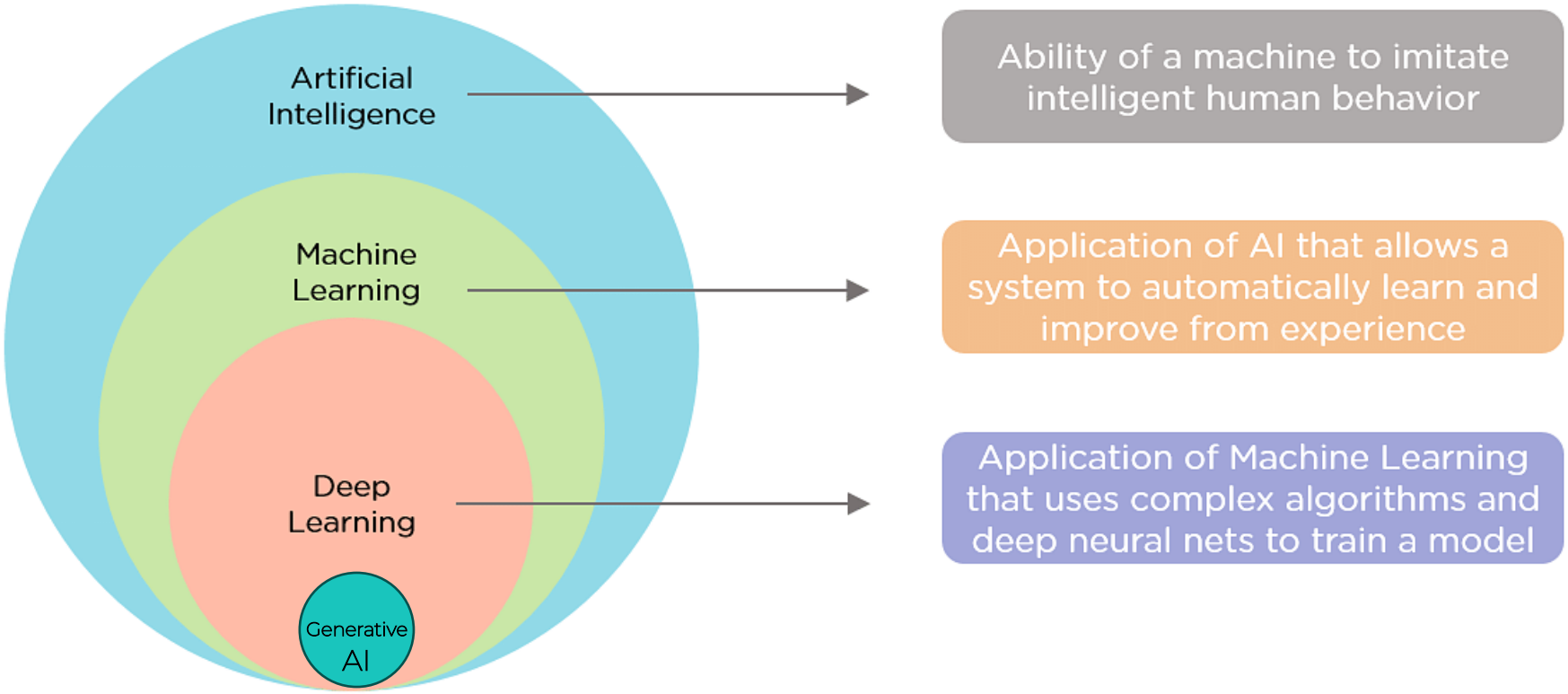
Data Science

Advanced Analytics

Not every business task requires AI.

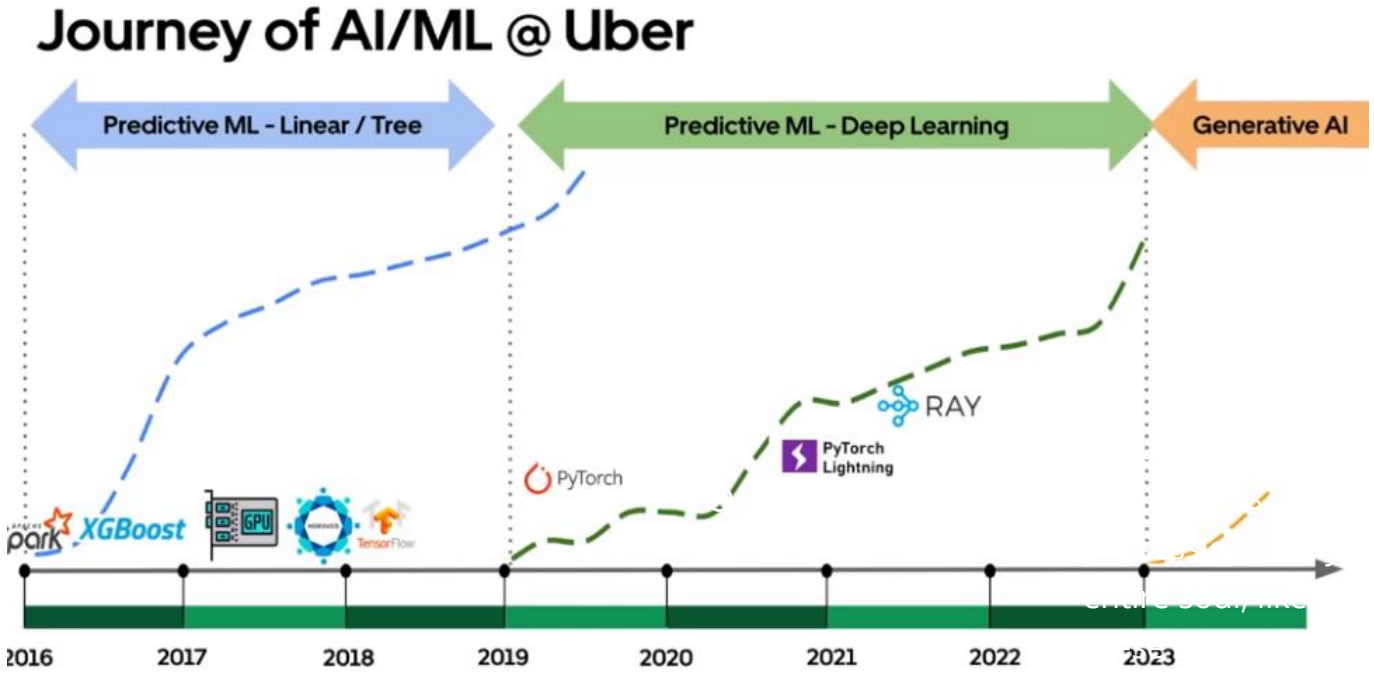
- AI requires more data
- Infrastructure for AI model and system
- Specialized hardware
- UI/UX
- Monitoring & updates

AI, ML, Deep Learning



Why “ AI for business” ?

- Get positive business impact and not an ‘endless AI project’
- Different focus and approach in AI for Business than IT or Academia & Research
- Manage initiatives, costs and risks



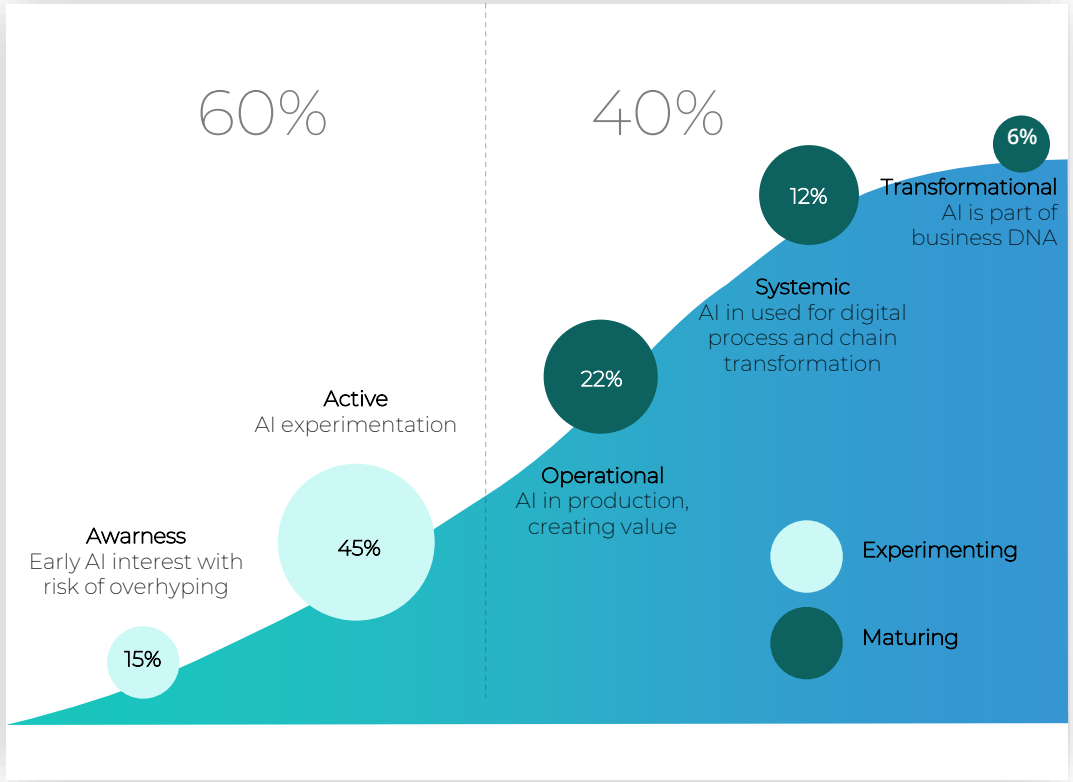
AI/ML Landscape

AI
It is not a new technology

Growth
37% CAGR

Boost
Huge boost due to data availability

Boost
Huge boost due to computing power



Quick Interactive Game

Task 1

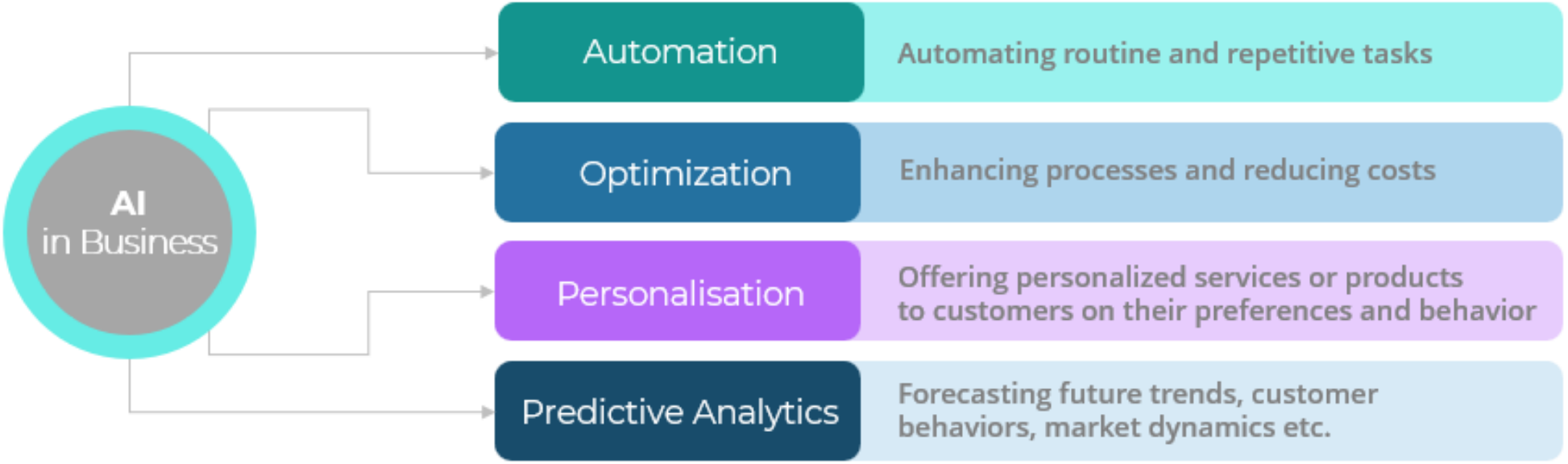
Think where you might have faced AI/ML today?

- Mobile Phone Face Recognition
- Weather forecast
- Autocorrect
- Email (Spam/Not spam)
- Personalized advertisement
- Payment with card (Fraud/Not Fraud)
- Taxi / Google Maps
- Restaurants top reviews
- Movie Recommendations

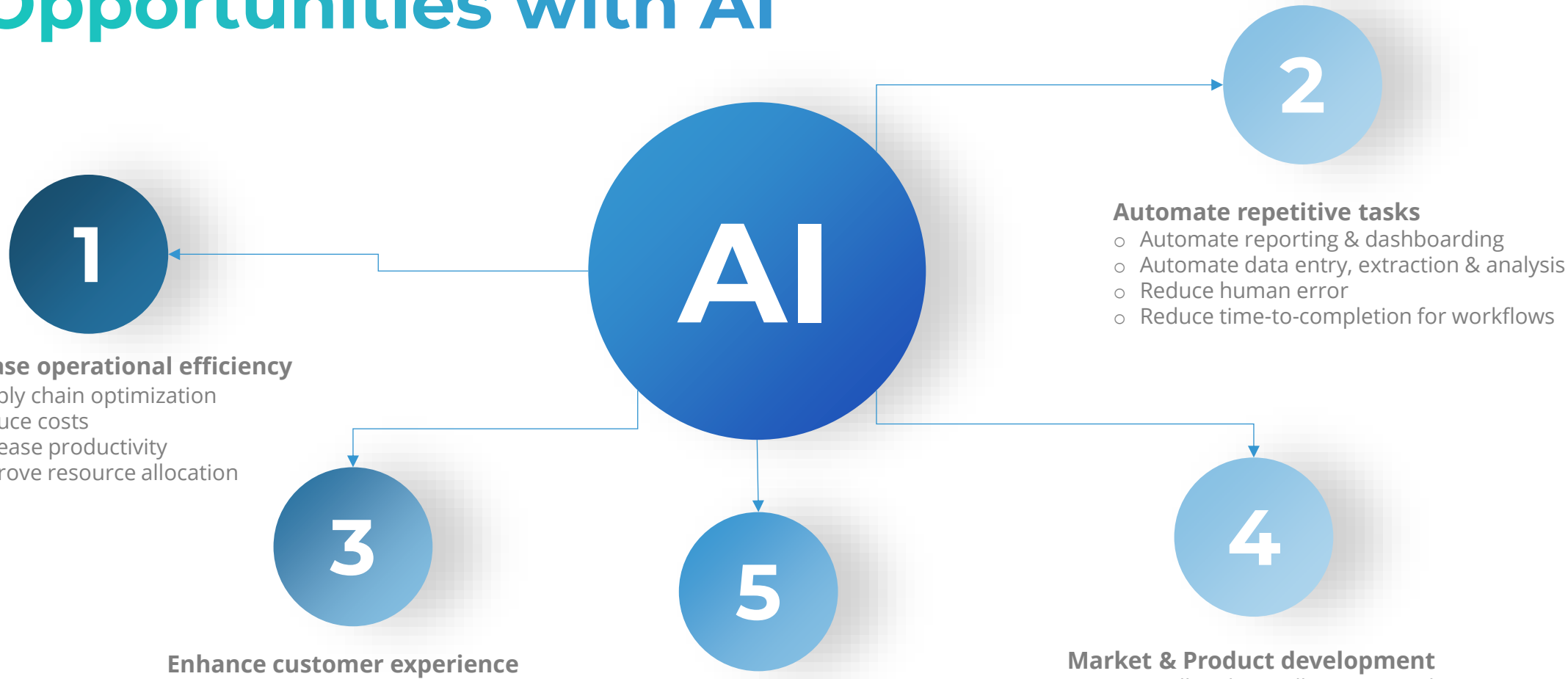
AI in business

AI – is like Internet — general purpose technology

Best suited for tasks that involve **large amounts of data**, complex patterns, and repetitive processes



Opportunities with AI



Increase operational efficiency
- Supply chain optimization
- Reduce costs
- Increase productivity
- Improve resource allocation

Automate repetitive tasks
- Automate reporting & dashboarding
- Automate data entry, extraction & analysis
- Reduce human error
- Reduce time-to-completion for workflows

Enhance customer experience
- Personalized recommendations
- 24/7 customer service
- Sentiment analysis

Make smarter decisions
- Advanced analytics and predictive modeling
- Dynamic optimization & real time insights

Market & Product development
- Cross-sell and up-sell recommendations
- Optimize new products and services
- Automatic prospecting
- Market segmentation

AI tools examples:

OCR technology allows machines to read and extract text and digits from scanned documents, images, and videos, enabling automation of data entry processes.

Example: Automatically extracting information from invoices, forms, identity documents for data entry purposes

Computer vision allows machines to perceive, analyze and interpret visual data from images, videos enabling automation of inspection and monitoring tasks.

Example: Automated defect detection on assembly lines, vision-based quality control, automated monitoring of processes

ML models can analyze large datasets, identify patterns, and make predictions, enabling automation of analytical and decision-making processes.

Example: Automated demand forecasting, predictive maintenance schedules, real-time dashboard updates based on predictions.

Cognitive Search uses AI to provide comprehensive search capabilities across a range of structured and unstructured data sources.

Example: Search and get insights from hundreds of documents with business data.

LLMs are advanced NLP systems capable of understanding context and generating human-like text, providing insights or creating content.

Example: generate reports, summarize data, or assist in decision-making by providing detailed explanations of complex topics.

Speech Recognition allows to convert spoken language into text and understand spoken commands.

Example: Teams Audio recording and summarizations

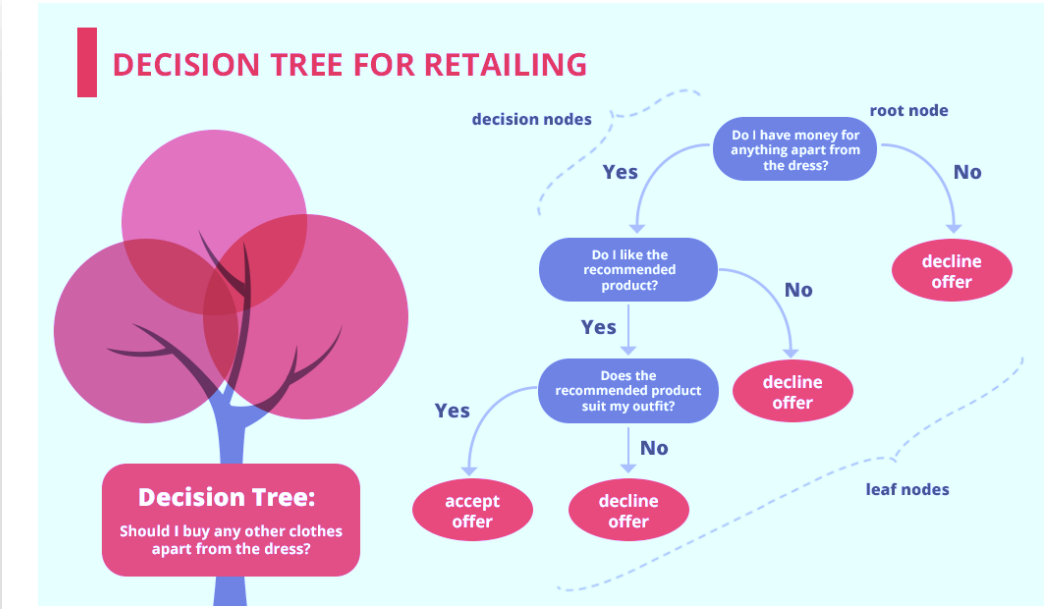
AI technologies
Machine Learning

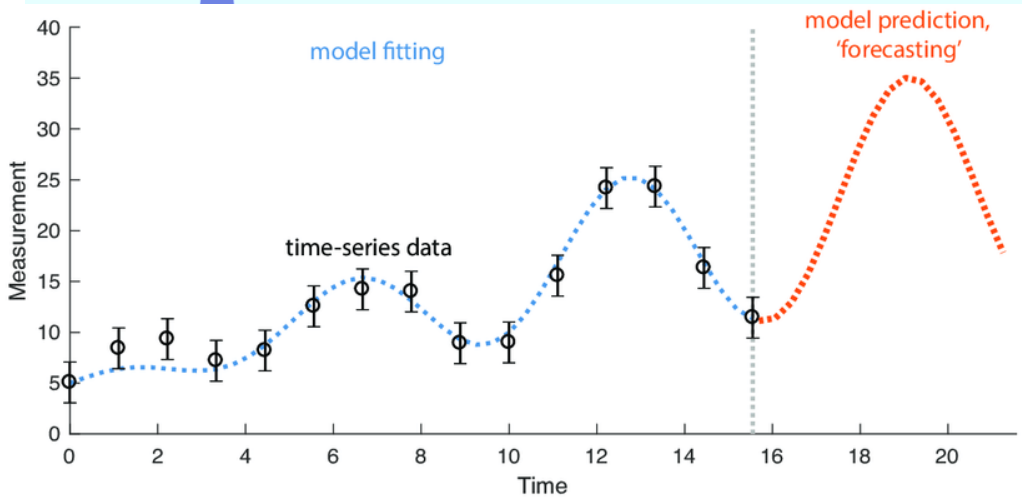
- **ML models** that can learn from data and make predictions without being explicitly programmed

Simple, effective, reliable. Ideal for structured data

Applications like **recommendation systems, predictive analytics, fraud detection**, and process optimization

Algorithms examples: Decision Trees, Regression, Time-Series analysis, Clustering, SVM etc





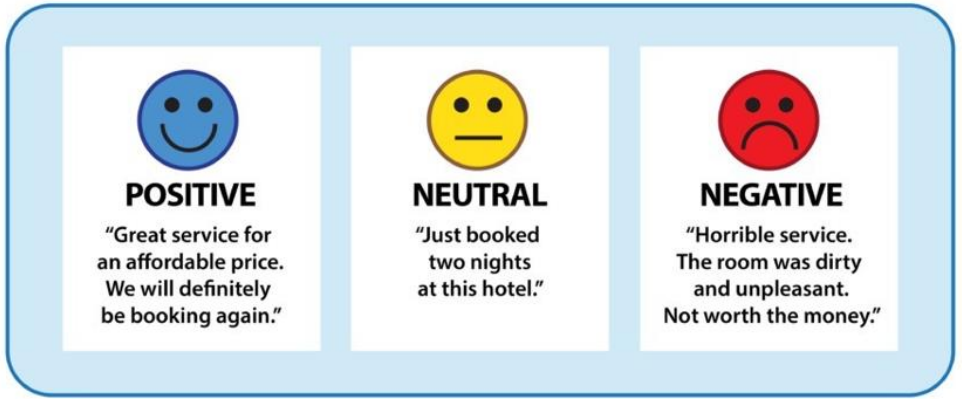
AI technologies
DeepLearning

- **Natural Language Processing (NLP)** — process, understand, and generate human language data

Applications like: smart document search, customer sentiment analysis, documents translations, virtual assistants, text summarization.

- **Computer Vision** — process and analyze visual data like images and videos

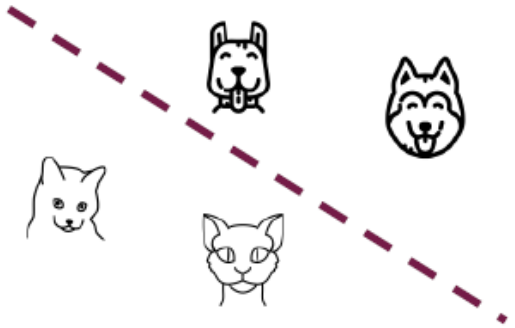
Applications like: Optical Character Recognition (OCR), Quality Inspection, object detection, facial recognition



AI also includes Reinforcement Learning, Expert Systems, Robotics, Fuzzy Logic etc.

Since recently:
Generative AI

Discriminative models



Features Class

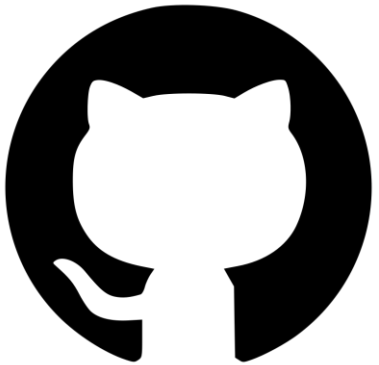
$$X \rightarrow Y$$

Generative models

Noise Class Features

$$\xi, Y \rightarrow X$$

Since recently:
Generative AI

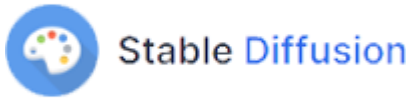


Gen AI strategic session at Davos

Widespread applicability:

- Marketing content
- Personalized customer emails
- Audio and music generation
- Audience-specific product details
- Automated business analytics and reporting
- Design
- Business assistant
- Video generation

IIElevenLabs



+ over 300 other tools

Large Language Models (LLMs) in business

Autocomplete ‘on steroids’. Trained on massive amounts of data

During training each word is represented by vector.
The closer the words in training data – the closer vectors they will have.

Input (prompt) does matter.
Context does matter.

LLMs in business

FOUNDATIONAL LLM — SWISS ARMY KNIFE FOR BUSINESS:

- Content generation & summarization
- Customer service
- Data analysis
- Personalization

FINE-TUNED LLM'S FOR BUSINESS — A GREAT WAY TO PROCEED FOR SPECIALIZED TASKS

CUSTOM LLM'S — EXTREMELY EXPENSIVE, BUT VERY EFFICIENT

Foundational LLM akin General Practitioner

Fine-tuned LLM akin Specialized doctor

Quick recap:

Artificial Intelligence (AI) is a **computer system** of intelligent agents that **takes information from an environment (data)** and uses it to **take actions** that affect that environment.

Data Science or AI or both?

AI > Machine Learning > Deep Learning > Generative AI

AI is used in business for:

- Automation
- Optimization
- Personalization
- Predictive analytics

Questions?

Quick Interactive Game

AI vs ML vs DL vs Data Science

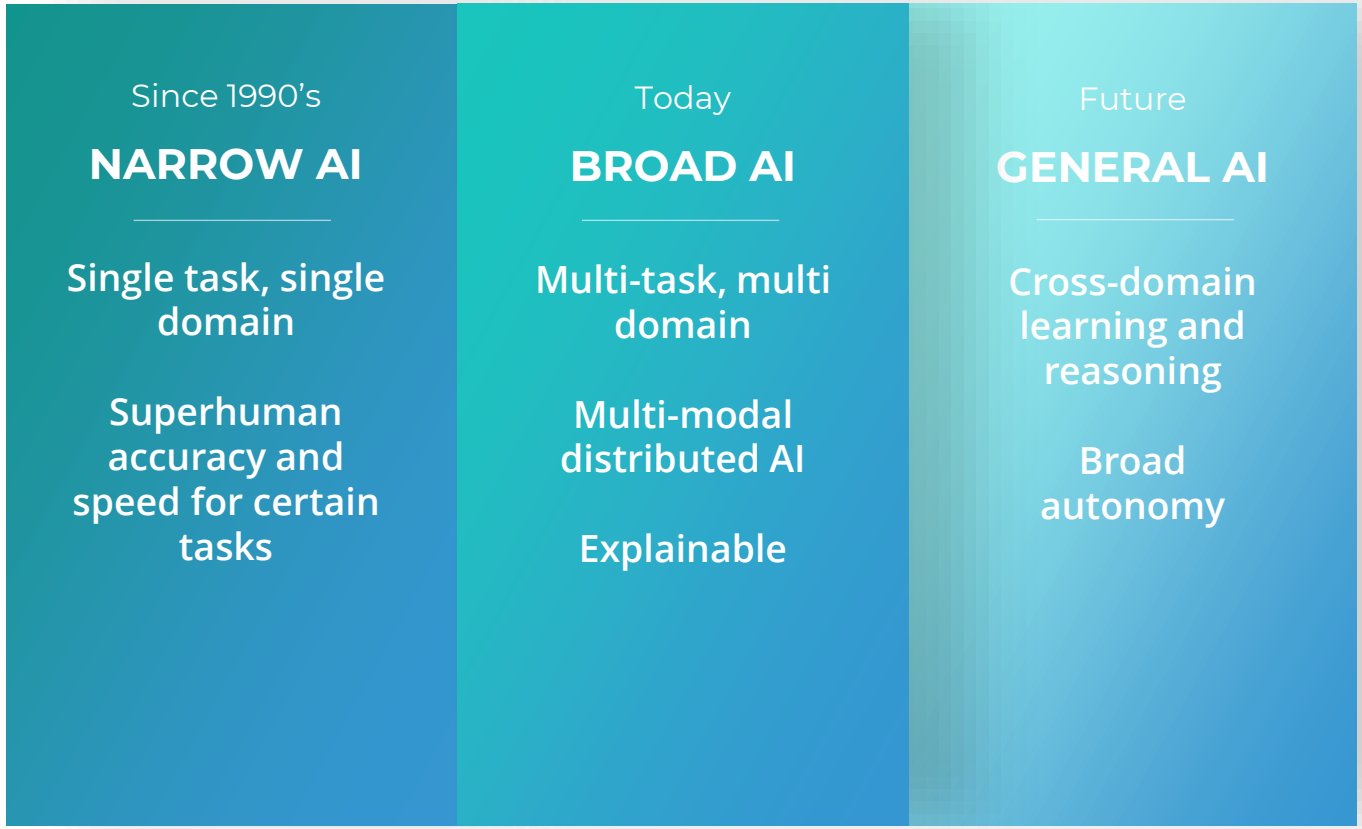
- Analyzing vast amounts of genetic data to identify disease markers
- A computer program that recommends movies based on your past viewing habits
- A digital assistant that can schedule meetings and respond to emails like a human
- A system that allocates memory resources efficiently as different applications are opened and closed Identifying objects and people in real-time through a video feed
- Optimizing energy consumption in smart homes by learning from residents' habits
- Creating new recipes by combining millions of flavor profiles and ingredients
- Forecasting stock prices using historical market data and trends
- A calculator that determines the monthly payments on a loan based on the principal, interest rate, and loan period
- A system that translates spoken language in real-time during a conversation
- A chatbot that provides customer support and answers FAQs on a website
- Fraud detection system that learns from transaction patterns to flag anomalies

DS
ML
AI
Other
DL
ML
AI
DS
Other
DL
AI
ML

- Enjoy the silence
- Have some coffee or tea
- Catch up on any urgent calls or messages
- Write down any ideas or insights that came up during the workshop
- Or take a power nap if you need it.

Artificial Intelligence
Market Today

- Industry moves with unprecedented speed
- Still on early stage of adaptation (akin Internet in mid 90's)
- Narrow AI –> Broad AI –> AGI



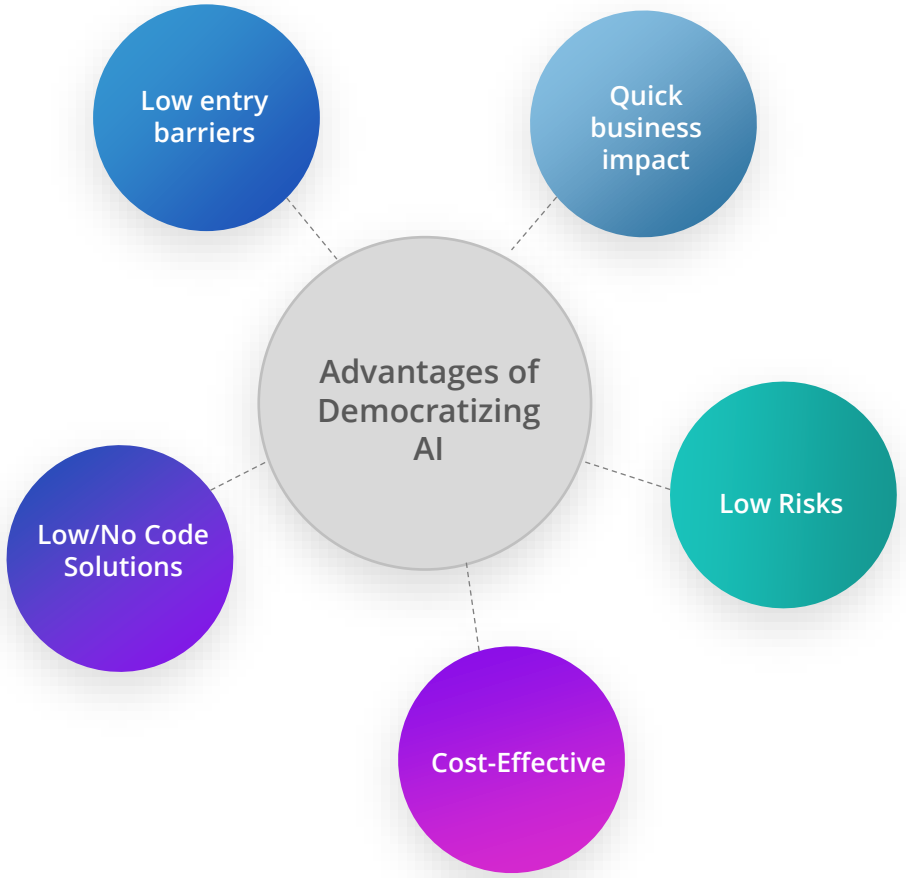
Trends (1/2)

- **More industries use AI**
- **Democratization of AI/M**

Example: Small businesses using no-code AI platforms for marketing and sales analytics.

- **Tailoring AI solutions to business needs**

Example: Custom-built AI tools for personalized healthcare diagnostics.



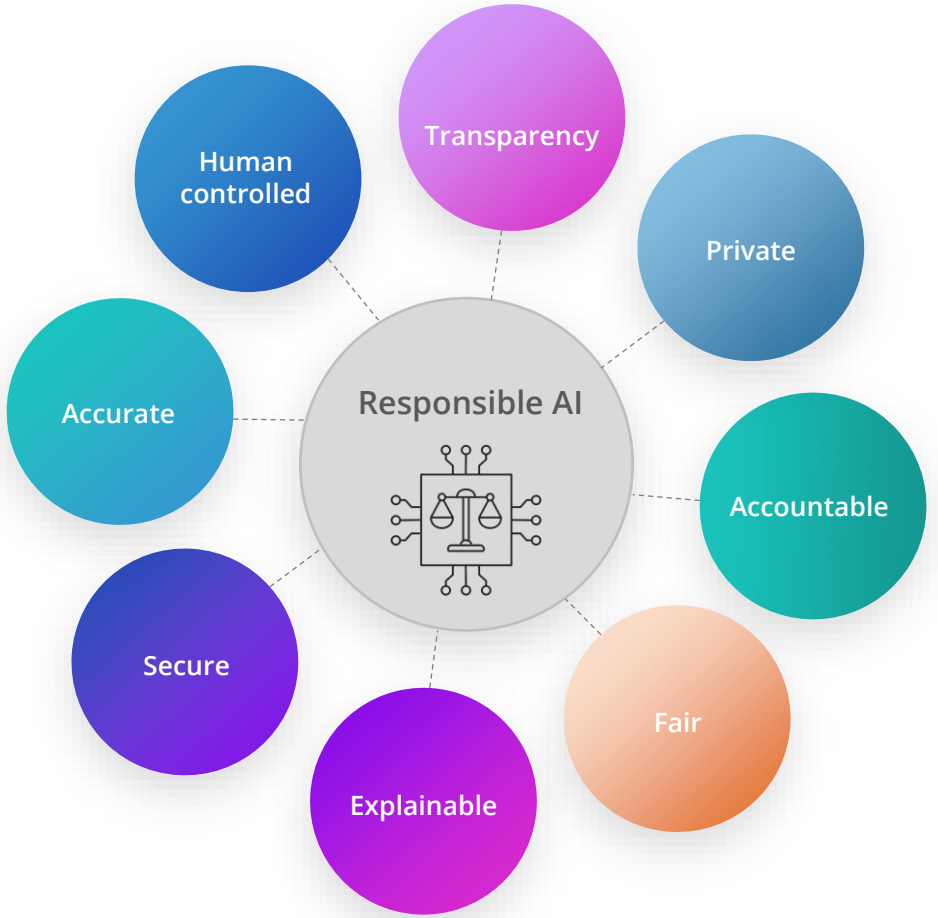
Trends (2/2)

- **Focus on ethical AI development and use:**

Example: Implementing AI ethics guidelines in HR for fair recruitment practices.

- **Increasing regulatory requirements and guidelines use impact use of AI.**

Example: Compliance with data protection regulations in AI-driven customer data analysis.



Industries adaptation

- **Healthcare Impact**: AI boosts diagnostics and patient care, projecting a massive market growth.
- **Financial Services**: AI adoption linked to revenue increases through improved analysis and customer service.
- **Construction Efficiency:** AI's potential in project management promises significant cost savings.
- **Energy Optimization:** AI improves demand forecasting and grid management, reducing operational costs.

FUNCTION	ALL INDUSTRIES
Human Resources	11%
Production	8%
Marketing & Sales Development	5%
Product & Service Development	10%
Risk	19%
Service Operators	19%
Strategy & Corporate Finance	19
Supply Chain Management	9%

Industries adaptation

OIL & GAS (Example)

Predictive Maintenance at Gas Stations

Approach: Use machine learning to analyze sensor data, identifying potential equipment failures early.

Customer Experience Enhancement

Approach: AI segments customers for personalized marketing, improving loyalty and sales.

Inventory management

Approach: AI algorithms for inventory management leverage predictive analytics to forecast demand for products based on various factors such as historical sales data, seasonality, promotions, and local events.

Limitations of AI today

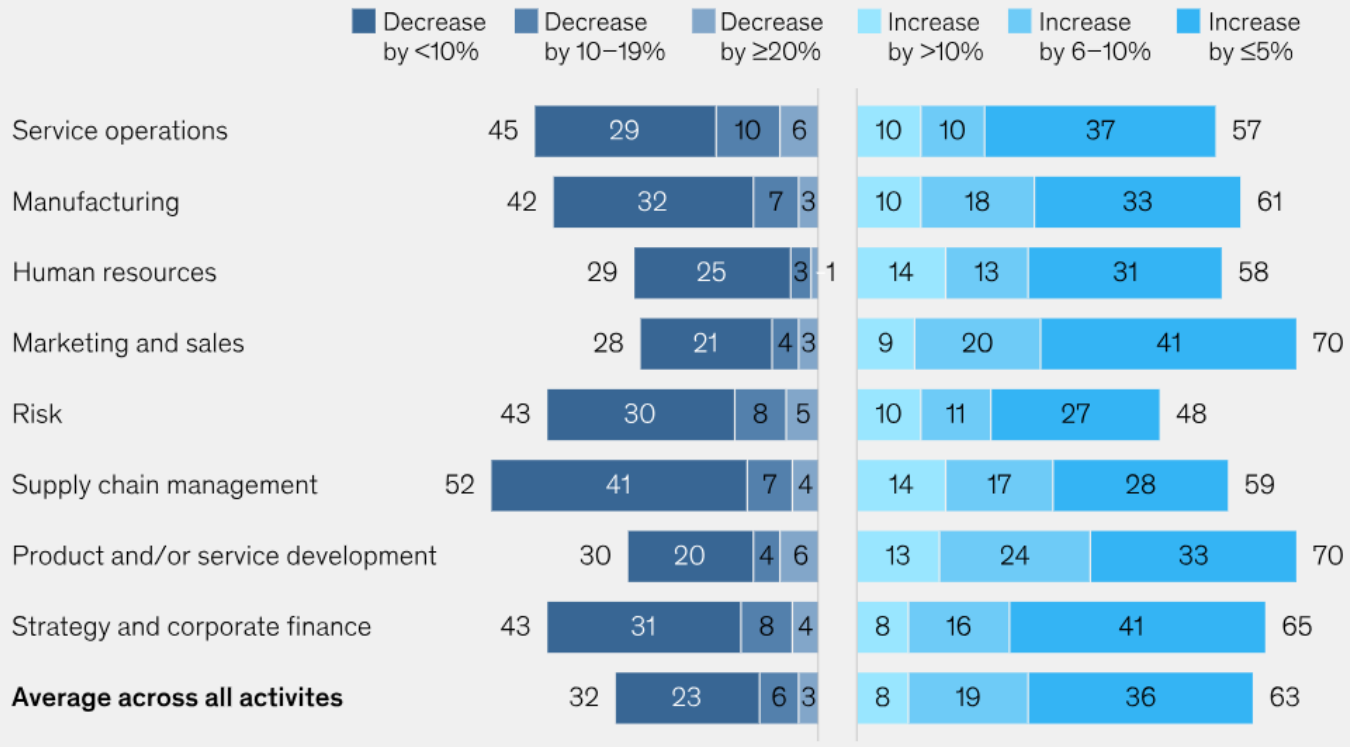
- Filter: hype vs practical use
- Still narrow AI
- Requires good data
- Adaptability is still relatively low
- Need for maintenance & update
- Many other limitations & risks

Key takeaways & hints

- Rapid acceleration in AI/ML market growth and adoption across industries
- Key technologies driving innovation: computer vision, NLP, generative AI
- Focus areas: efficiency via automation, data-driven decisions, personalized experiences
- Balancing transformative potential and ethical risks are critical

AI in organization

Cost decrease and revenue increase from AI adoption in 2021, by function, % of respondents[1]



[1]Question was asked only of respondents who said their organizations have adopted AI in a given function. Respondents who said "no change," "cost increase," "not applicable," or "don't know" are not shown.

McKinsey&Company

*In 2021 at least 5% of EBIT was achieved via AI integration**

AI is used across all organization

Sales & marketing

AI in Sales and Marketing is used to **personalize customer experiences**, generate data-driven insights for optimizing marketing spend and **forecasting demand, analyze customer** sentiment, and identify revenue opportunities through **upsell/cross-sell** recommendations and retention strategies

SAAS & VENDORS EXAMPLES:

- Salesforce: **Comprehensive CRM, Einstein Predictive Analytics**
- HubSpot: **CRM for Inbound Marketing, Sales and Support**
- Drift: **Conversational AI Chatbots for Sales**

ARTIFICIAL INTELLIGENCE IN SALES	ARTIFICIAL INTELLIGENCE IN MARKETING
Take over mundane tasks — let sales reps focus on more important work	Hyperpersonalization
Provide meaningful and valuable assistance to sales teams	Generate brand specific content that appeals to the end consumers
Process more data and churn out better insights	Assist marketers in making timely decisions
Help business in exploring all areas of opportunity	Better communication between consumers and businesses
Improve sales without onboarding and train more sales personnel	Predictive customer service

Sales & marketing

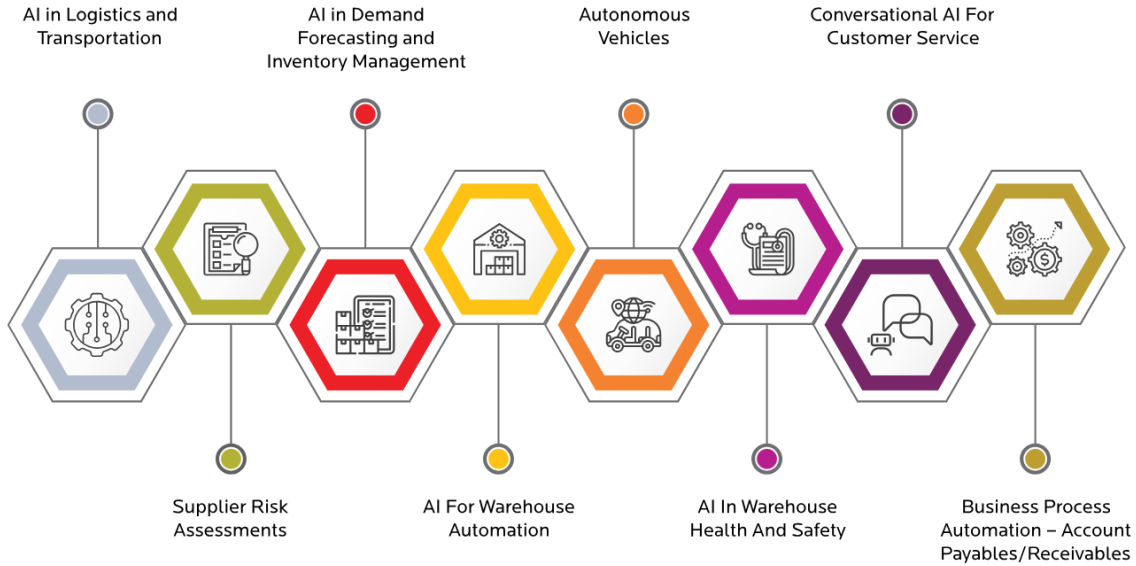
- Marketing: **Tailoring marketing content** and product recommendations based **on individual** customer data.
- Marketing Automation: AI-powered systems analyze customer data and behaviors to automatically send **personalized marketing communication at optimal times.**
- Sales forecasting: Using historical data to **predict future sales trends and customer demand.**
- Cross-Sell and Upsell Recommendations: Based on historical transactions, product affinities, demographics ML models provide personalized product recommendations driving revenue.

Supply chain & operations

AI optimizes routing, **forecasts demand, automates warehouses**, mitigates risks, and drives data-driven inventory management for **efficient logistics** operations and resilient supply chains

SaaS & Vendors examples:

- Amazon Web Services: Broad Supply Chain AI Services
- Blue Yonder: AI-Driven Demand Forecasting, Logistics
- Project44: Real-Time Supply Chain Visibility, Predictions



Use Cases of AI in Supply Chain Management

Supply chain & operations

Warehouse Automation: AI algorithms **analyze inventory levels, predict replenishment needs, and automate ordering processes.**

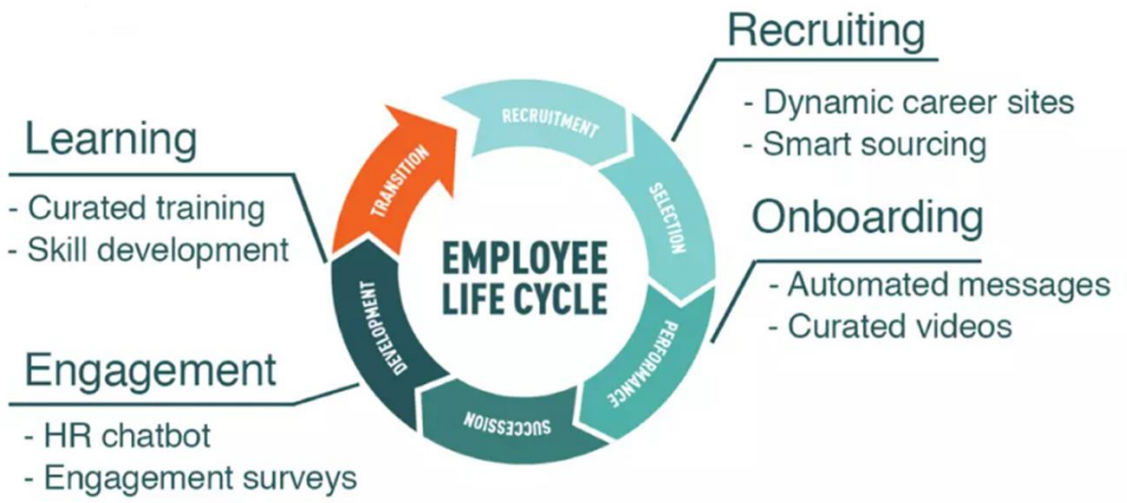
Route optimization: AI determines the most **efficient routes for transportation**, considering factors like traffic, weather, and delivery windows.

Supplier Selection: **Analyzes supplier performance** and risk for better sourcing

Amazon robot costs 3 $/h to operate

Organization & HR

AI simplifies the recruitment process, from **screening resumes** to identifying the best candidates, and supports **personalized employee development programs**. It also plays a role in performance management and analyzing employee engagement and sentiment**.**



SaaS & Vendors examples:

- ADP: Major HR platform using AI for time tracking, compliance, payroll and other workflows.
- Eightfold: Talent intelligence platform with AI matching candidates to jobs and advising on skills gaps.

Organization & HR

- **Employee Onboarding:**

  Application: Using AI to streamline the recruitment process by screening resumes, identifying suitable candidates, and even conducting initial interviews.

- **Talent development:**

  Accenture: Employs AI-driven platforms to customize learning paths for employees, facilitating skill development and career growth based on individual strengths and company needs.

- **Workforce Planning and Optimization:**

  Siemens: Implements AI for predictive workforce planning, using data analytics to forecast future talent needs and optimize workforce distribution across global projects.

- **Automated HR Assistance and Support:**

  Cisco: Integrates AI-powered chatbots to provide employees with 24/7 HR support, answering questions and guiding them through HR processes and benefits information efficiently.

Quick Fun Interactive

VOICE GENERATION

Let’s try it now!

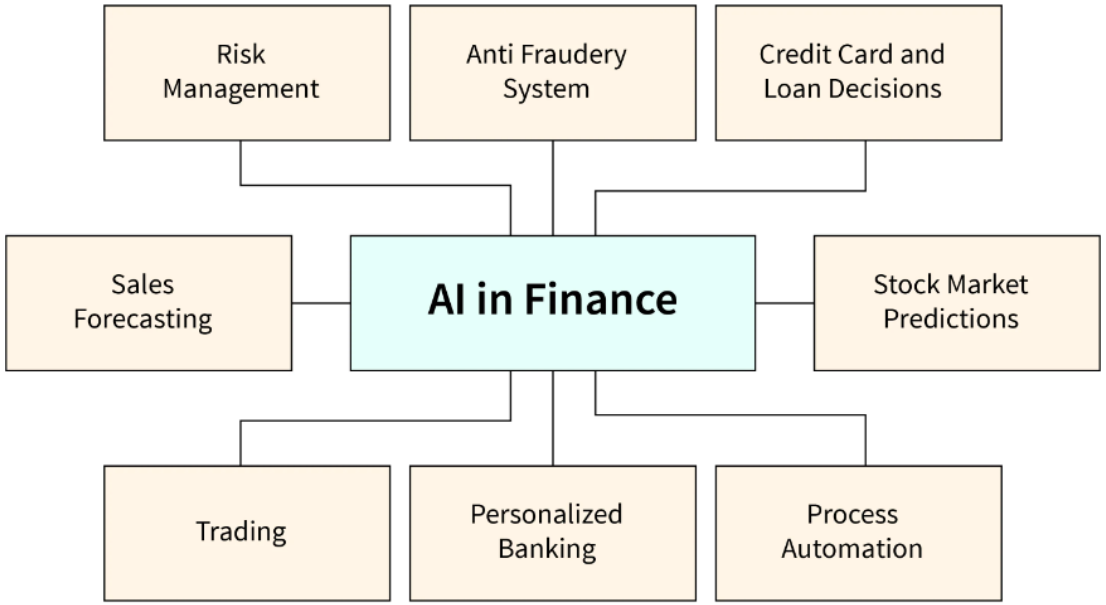
ElevenLabs

Finance & Accounting

AI enhances finance and accounting processes through **automation of data entry** and enhancing **fraud detection** capabilities. It supports more accurate cash flow forecasting and risk management, leading to better financial decision-making.

SaaS & Vendors examples:

Too many to list. From IBM to AWS and Azure



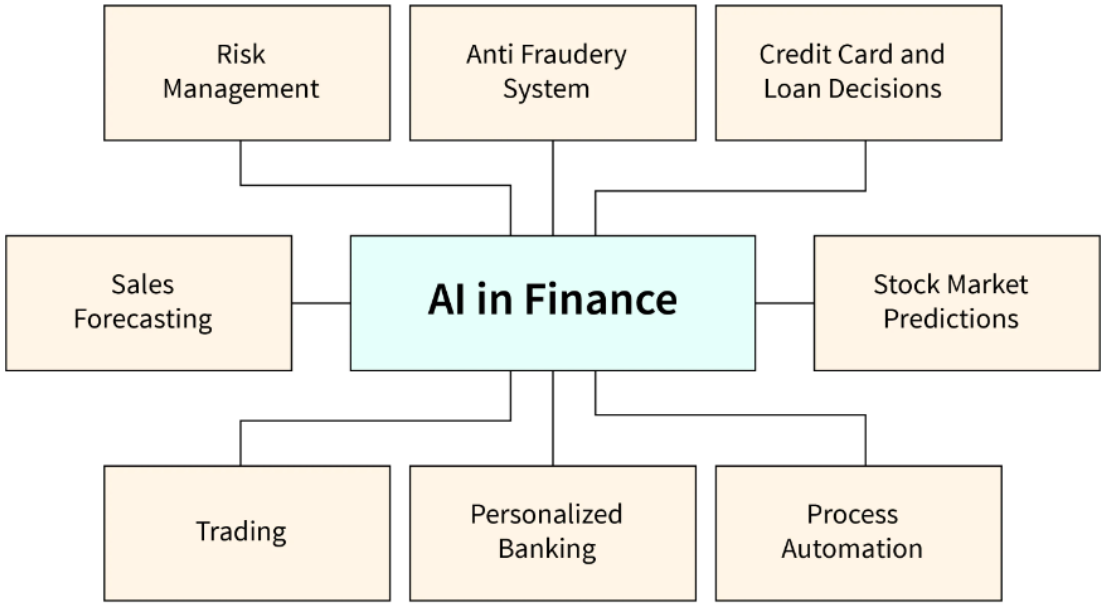
Finance & Accounting

- **Fraud Detection and Prevention:**

  Mastercard: Utilizes AI algorithms to analyze transaction data in real-time, identifying and preventing fraudulent activities,

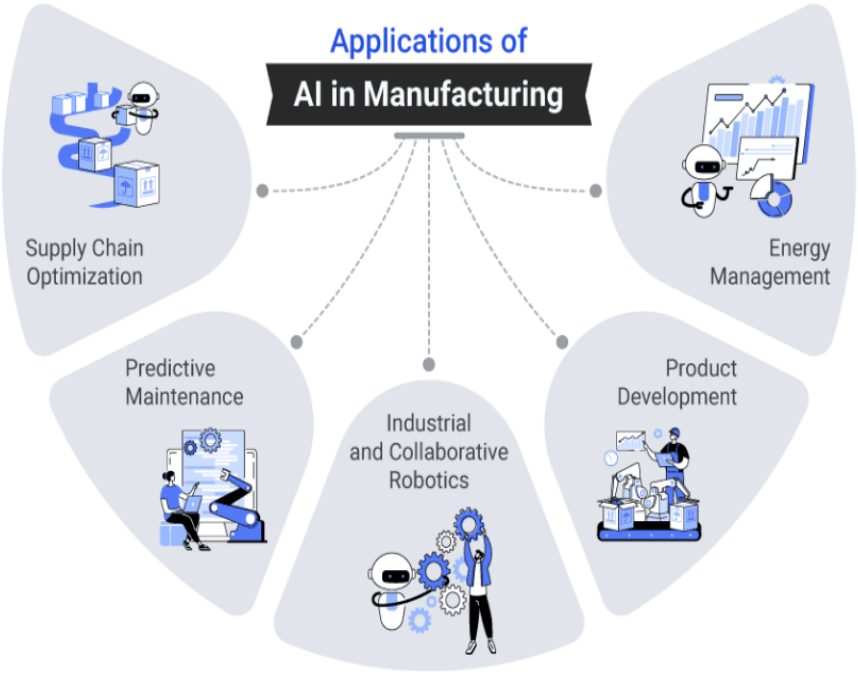
- **Automated Financial Reporting and Analysis:**

  J.P. Morgan: Implements AI to automate the creation of complex financial reports and conduct in-depth analysis



Manufacturing & production

In manufacturing, AI **optimizes production planning, predicts maintenance needs, and automates quality control**, leading to higher productivity and reduced costs

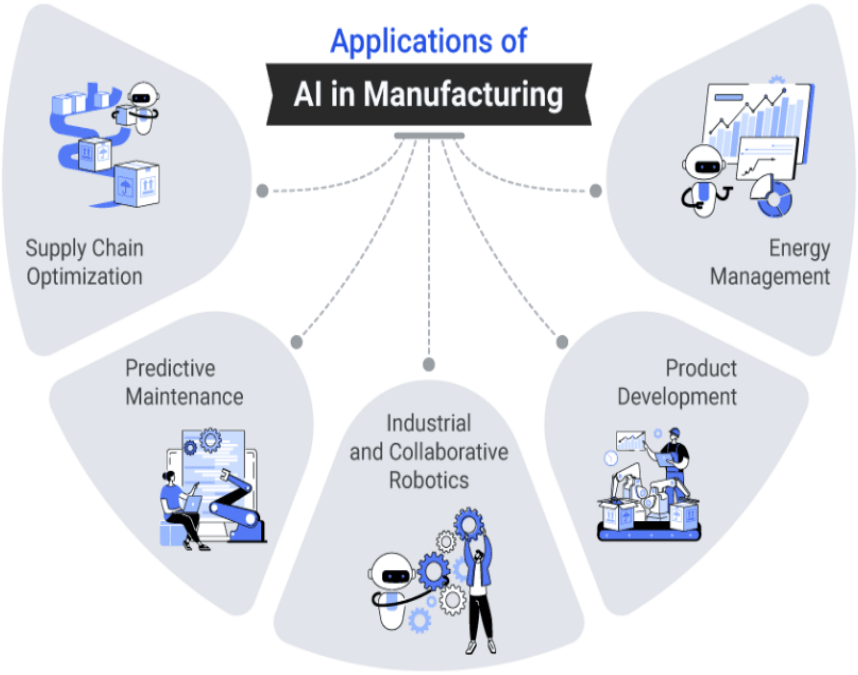


SaaS & Vendor examples:

- Siemens: Industrial AI for Quality, Supply Chain, Manufacturing
- Rockwell Automation: Manufacturing Automation with ML
- Hitachi Lumada: IoT Data Analytics Optimizes Production
- GE Digital: Asset Optimization and Predictive Insights

Manufacturing & production

- **Predictive Maintenance**: Predicts equipment failures to schedule maintenance, minimizing downtime.
- **Quality Control**: AI algorithms analyze product images in real-time to detect defects and ensure quality standards.
- **Real-time Adaptation**: AI systems can adjust forecasts in real time based on changing demand signals, new orders, and supply chain disruptions.



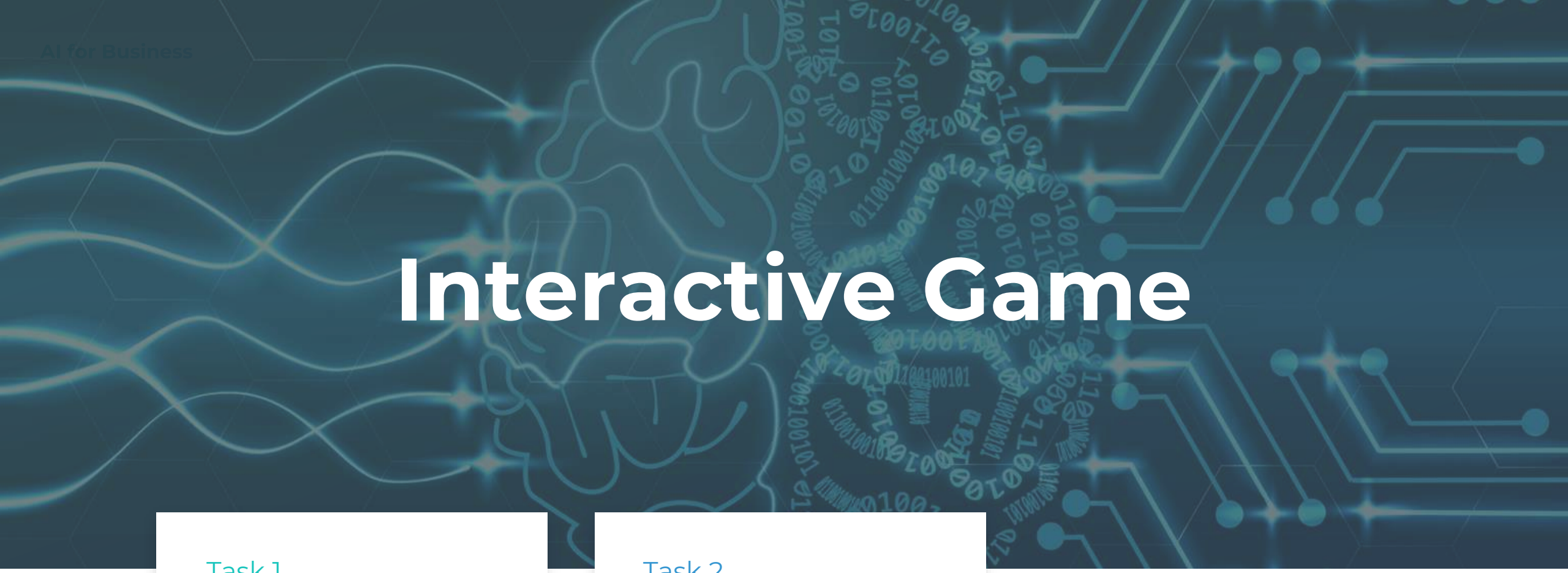
Key takeaways & hints

- **Sales & Marketing:** Forecasting, segmentation, personalization
- **Organization & HR:** Talent acquisition, performance management, employee engagement
- **Supply Chain & Logistics:** Optimization, predictive analytics, real-time tracking
- **Finance and Accounting:** Fraud detection, automated bookkeeping, risk assessment
- **Production & Manufacturing:** Predictive maintenance, quality control, process optimization

Questions?

Mid-Workshop
Lunch break!

45-60 minutes



Interactive Game

Task 1

How could AI be applied in your function to optimize operations, costs or the customer experience?

Task 2

Try to think of 1 example of ‘classic’ AI (like machine learning models) and 1 example of Generative AI (like LLM’s).

Aligning AI/ML to Business Strategy

- AI ‘magic wand’ vs ‘overhyped technology
- AI is business co-pilot, not objective
- AI strategy shall fit into Business strategy

Identify AI + business opportunities

STEP 1

Clearly formulate your business objectives (NOT AI objectives)

STEP 2

Understand AI technology, its capabilities and limitations.

STEP 3

Brainstorm **why and how** AI can support and enhance your business's objectives.

- Identify how AI can be leveraged to gain a competitive edge.
- Look for opportunities where AI can augment and enhance existing capabilities.
- Determine how AI can be integrated with current technologies and processes without causing major disruptions.

STEP 4

Develop an AI vision that aligns with your business goals

Identify business opportunities

Business domains that can be enhanced with AI:

Financial impact: Increased revenue, reduced costs, improved return on investment (ROI), cost savings per unit.

Operational efficiency: Increased productivity, reduced processing time, improved resource allocation, faster decision-making.

Customer experience: Increased customer satisfaction, reduced churn rate, improved loyalty, higher lifetime value.

Product/service improvement: Increased sales, higher adoption rates, improved product quality, reduced defects.

From Vision to Action

- Decompose strategy with AI to operations with AI
- What exactly you want to achieve?
- How to measure success or failure?
- Who will take charge? Who will benefit from it?
- When you want AI to be implemented?
- Business KPI's! = AI KPI's

Cost/Benefit Analysis

Focus on financials & ROI. Is AI project worth it?

Understanding costs:

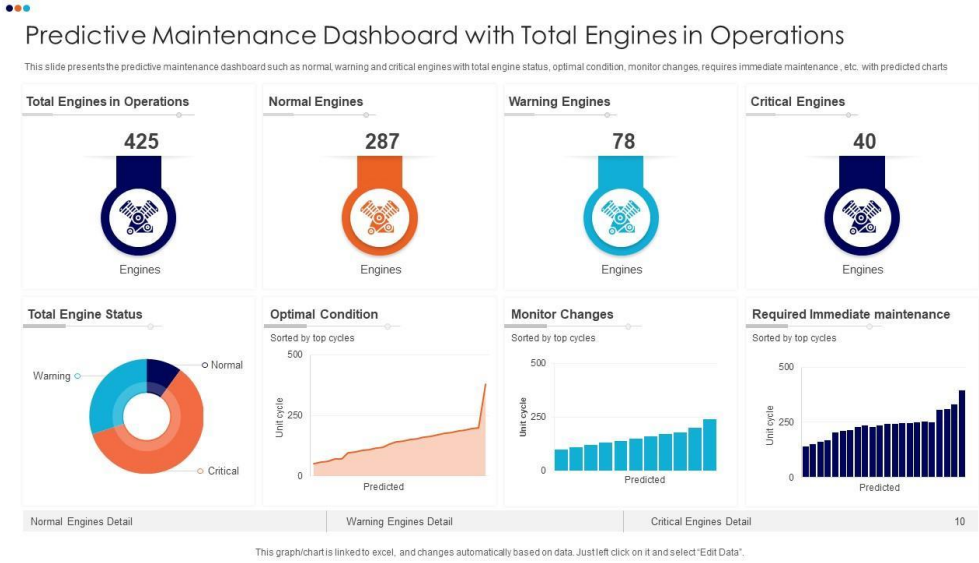
- **Direct:** software development, data acquisition, integration & team costs, maintenance, IT infrastructure etc.
- **Indirect:** workflow disruption, change management, employees time utilization
- **Opportunity costs:** alternative projects, risks
- **Capex vs Opex**

Cost/Benefit Analysis

Small vs complex projects analysis

Cost examples for AI Projects:

- **Prototype or MVP**: 5.000 – 30.000 EUR
  Example: Simple chatbot with company database for Q-A: 5000 EUR; Basic customer segmentation & churn prediction models – 20.000 EUR
- **Moderate**: 30.000 – 200.000
  Example: predictive maintenance model – 80.000 EUR, time series model for sales forecasting – 40.000
- **Complex**: 200.000 EUR plus

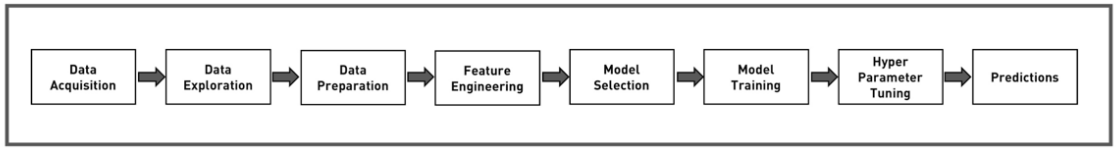


Ways to reduce AI costs

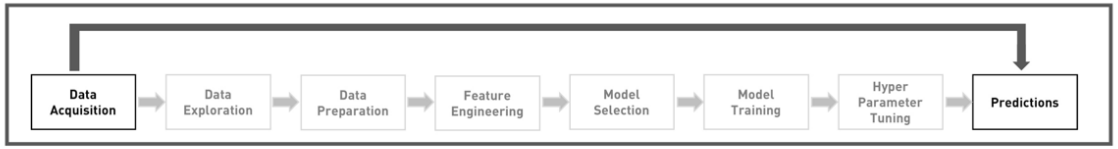
- **Know what you are doing.**
- Prioritize building minimum viable products first rather than overengineering.
- Use cloud services like AWS, or Azure
- Utilize open-source AI/ML frameworks and tools
- Use pre-trained models and transfer learning to speed up development and reduce data requirements.
- Explore AI model marketplaces for pre-built solutions that can be customized
- Consider AI solutions as a SaaS model.

H2O.ai

Azure No-Code AutoML



Traditional Machine Learning Workflow



AutoML Workflow

Challenges

- AI poses significant risks
- Ongoing discussion among top business leaders & ai researchers
- Rise of Responsible AI & Ethics
- Direct risks to Business

Challenges

- **Technical Challenges:** LLM hallucinations, Model Performance, Complex systems.
- **Integration Challenges:** Incorporating AI into existing business processes, aligning it with organizational goals and culture.
- **Organizational challenges**: Adapting job roles and functions to use AI, managing the transition for employees, and addressing skill gaps.
- **Data Management and Security**: Ensuring the quality, privacy, security of data used in AI systems.
- **Regulatory Compliance**: Emerging regulations and ethical considerations in AI usage

AI risks

AI/ML Technical risks

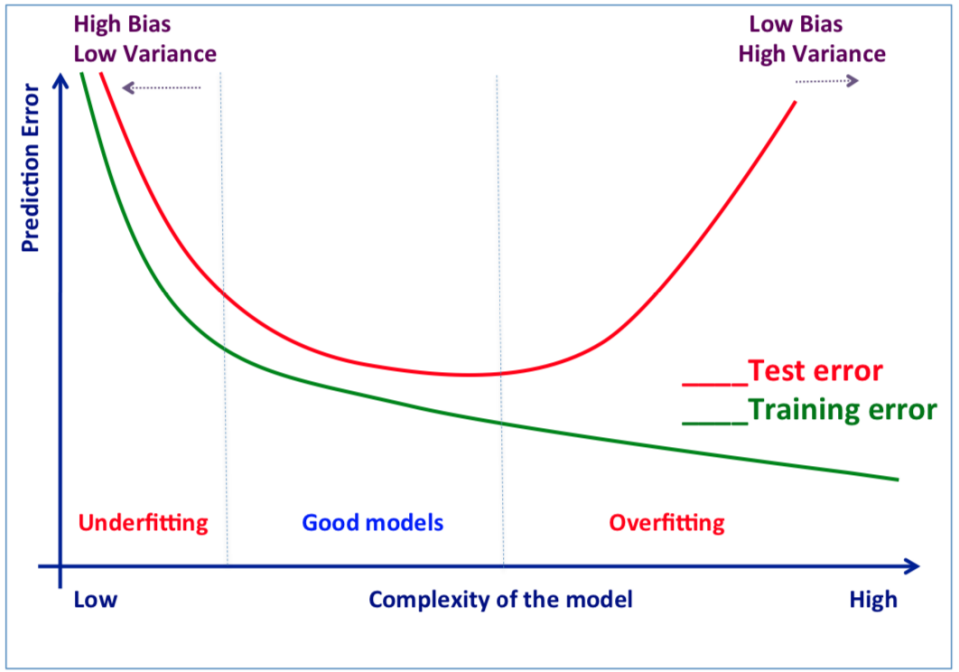
Directly related to AI/ML solution like model accuracy & other metrics, data quality, 'black box', model robustness, hallucinations etc.

Managed by: Data Scientists, ML Engineers

IT/Operational risks

Challenges in integrating AI into existing business processes, model performance & monitoring

Managed by: ML Engineers, MLOP's specialists



Model is overfitting here. Like a student who memorizes answers for a test instead of really understanding the subject.

AI risks

Business risks

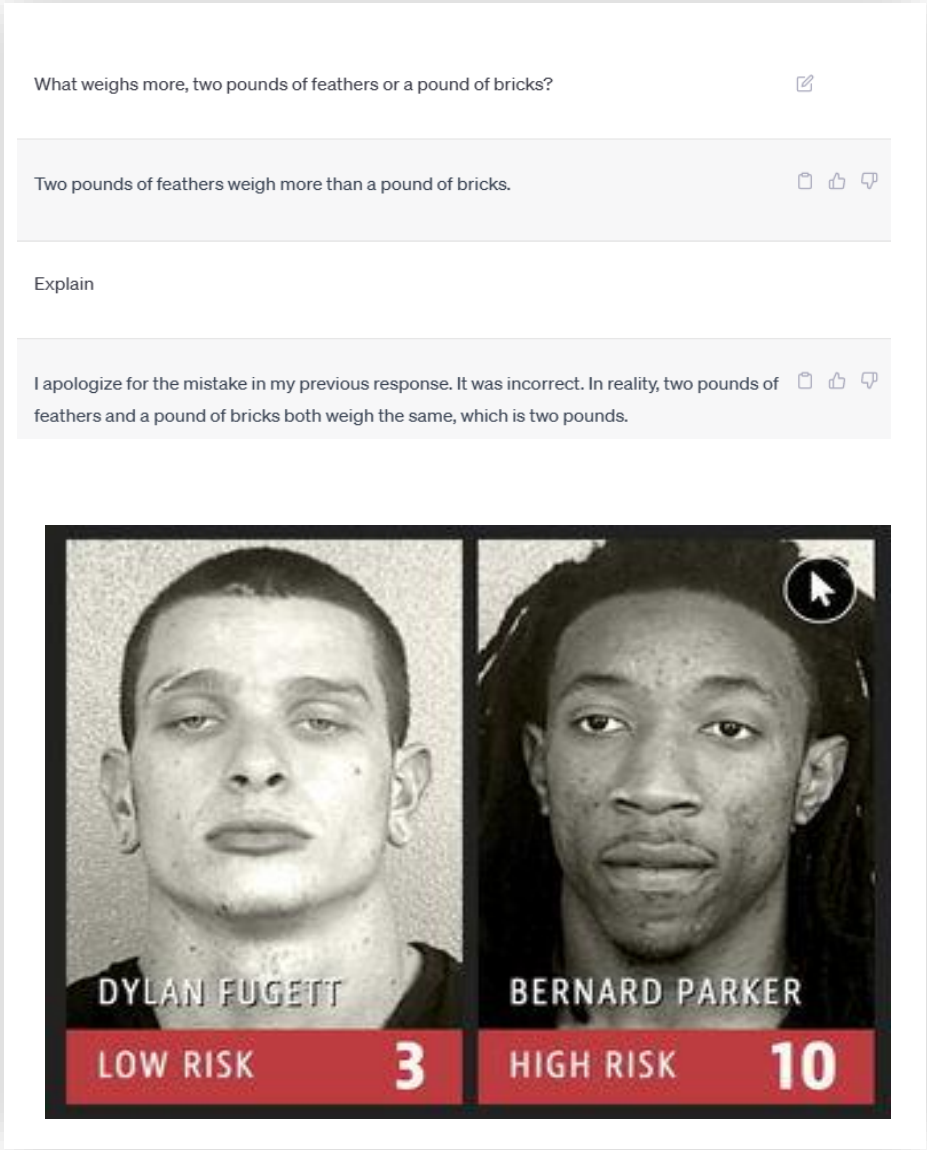
- Incorrect business to AI metrics
- Workflow disruption
- Data leakage
- Cost Overruns and Project Delays
- Over-reliance on AI

Managed by: AI/Project manager, Data Scientist

Legal/Compliance risks

- Bias & Fairness
- Intellectual property risks
- Regulatory risks

Managed by: AI/Project manager, Legal, Data Scientist



Interactive Game

Task 1

Case: Company builds an ML model to predict which patients are healthy, and which is not. From previous experience we believe that we have 95 healthy patients and 5 ill ones. The reported ML accuracy (number of all predictions made correctly vs all predictions made) is 95%.

Question: does the ML Model serve the purpose and why?

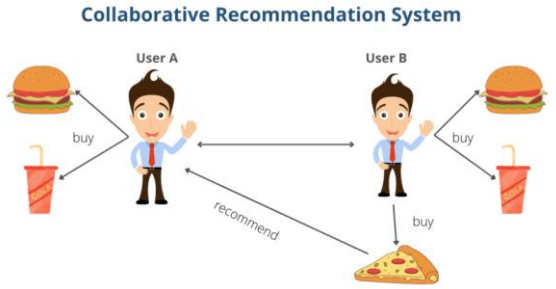
Hint: Technical AI/ML metrics

Task 2

Case: A company's AI system has a 95% success rate in recommending products buyers love. However, profits aren't increasing, and product diversity in sales is low.

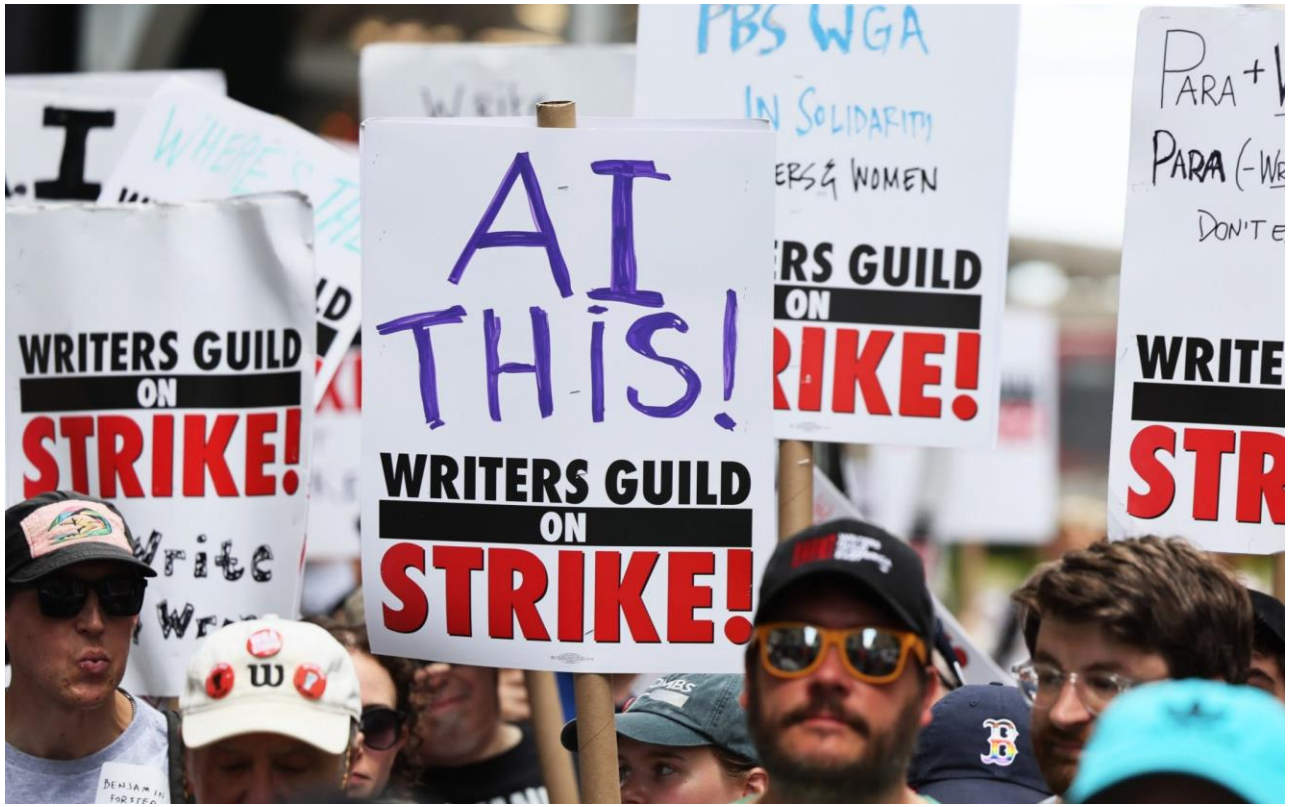
Question: Is the recommendation system effectively supporting the company's overall business goals? Why or why not?

Hint: Consider the balance between customer satisfaction, profitability, and product exploration.



Change management

- **Resistance to change**
- Breaking silos mentality
- Encouraging engagement
- Adapting and learning



Key takeaways

- AI follows business objectives. Not another way around
- Set ‘SMART’ goals and KPI’s, both for business and AI objectives
- Focus on business and financial impact. Perform cost-benefit analysis
- Make AI work. Make it into operations. Make it better
- Consider technical, business and legal risks of AI

Questions?

Interactive Game

AI Troubleshooting

Task

Objective: Explore the potential challenges organizations face when integrating AI/ML into their business operations.

Split into Teams: Participants are encouraged to divide into small teams (2-4 members per team)

Presentation: Each team is tasked with identifying potential challenges a company may encounter during the AI/ML integration process.

Think Broadly: Consider challenges across various dimensions, including organizational, technical, cultural, and operational aspects.

Interactive Game

AI Troubleshooting (Answers)

Task

- Lack of AI/ML understanding
- Incorrect/delusional expectations
- Not enough trust from management
- Absence of data
- Poor quality data
- Lack of capabilities
- Explainability and business impact
- Lack of sponsorship / alignment

Data for AI/ML

- **Data is the foundational** material from which insights, predictions, and actions are derived for AI/ML
- In real world **Data is often the KEY bottleneck**
- Unstructured, incorrect, noisy, missing, inconsistent data etc.
- **Data quality is more relevant than data quantity**

Data for AI/ML

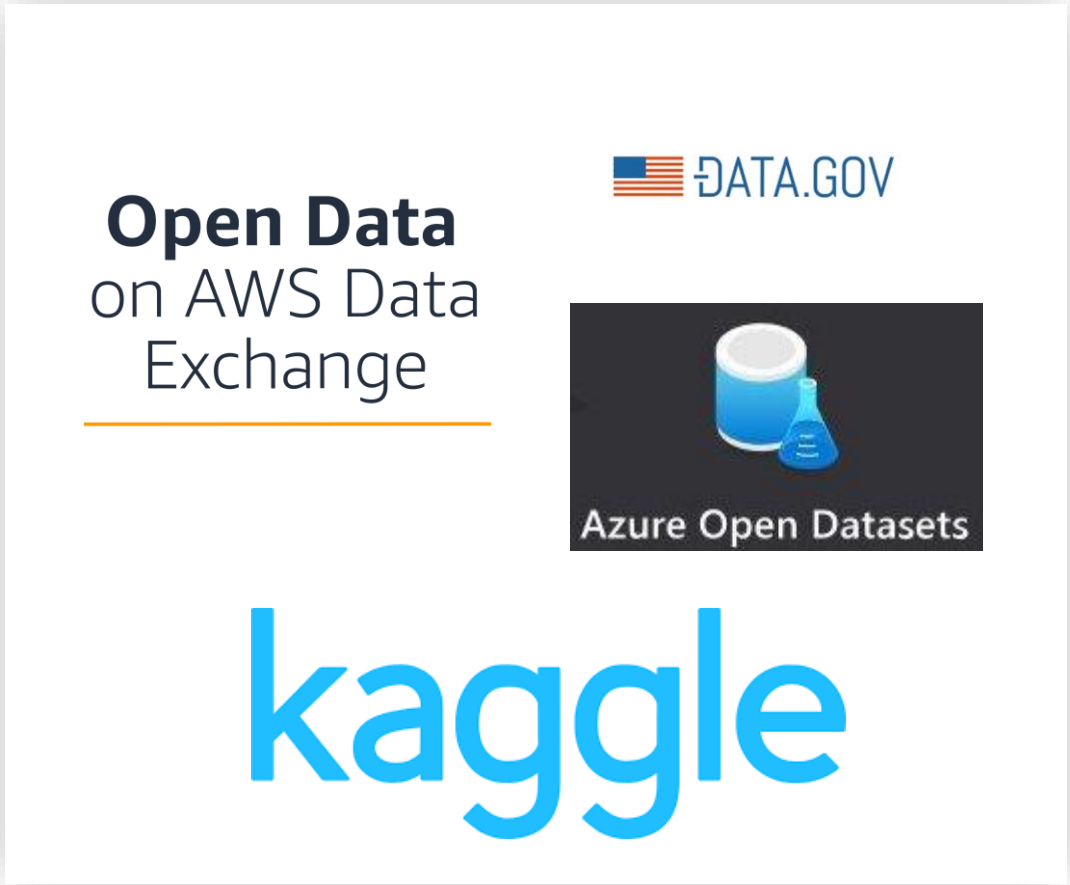
- **Know your data:** Data landscape, sources and meaning to contextualize analytics
- **Bias and Fairness:** Historical biases in data propagate unfair model skews.
- **Data Licensing & IP:** Access controls, encryption safeguard proprietary data assets
- **Adhering to data regulations**: Laws mandate consent-based collection and privacy by design

Bias and Fairness

Historical injustice	Historical bias as reflected in our data
Proxy variables	Model features that are highly correlated or assiciated with protected features
Unbalanced samples	Model parameters are skewed towards the majority
Algorithm choice	Models maximize accuracy at the expense of fairness
Feedback loop	Biased models lead to more biased data

Data hints

- Identify **internal and external data sources** relevant to business objectives:
  - Conduct an audit of existing internal data sources
  - Explore external data sources. Ensure data diversity and volume to feed AI/ML models effectively.
  - Assess the variety and representativeness of the data to avoid bias
  - Ensure that the volume of data is sufficient to train robust AI/ML models
- **Establish partnerships** or use public datasets to enhance data collection.
- Ensure data governance, privacy and security.



- Enjoy the silence
- Have some coffee or tea
- Catch up on any urgent calls or messages
- Write down any ideas or insights that came up during the workshop
- Or take a power nap if you need it.

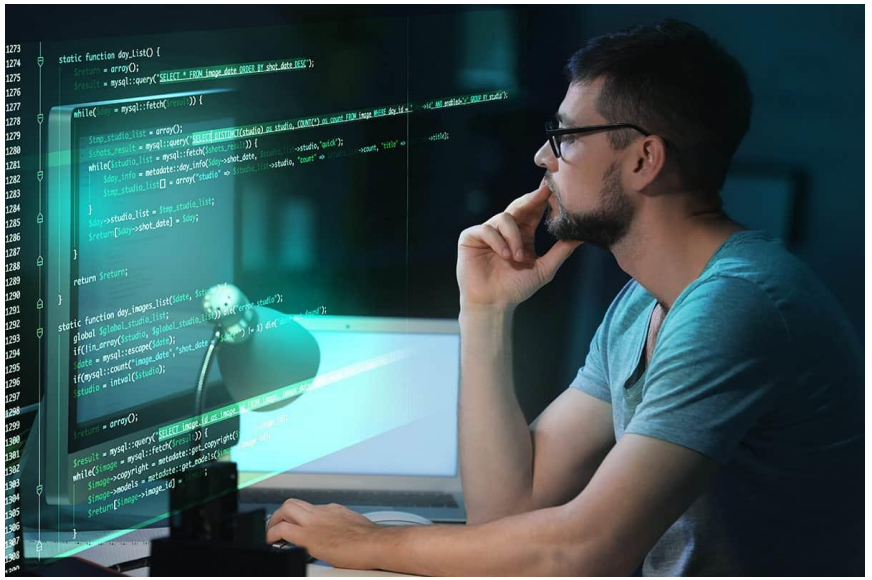
AI/ML: Practical integration

"If you don't know where you are going, every road will get you nowhere," — *Henry Kissinger.*

- AI/ML initiatives should align with broader business goals
- Business shall lead the way
- Set specific, measurable business KPI’s and metrics

Balancing Business KPIs and AI/ML Metrics

- Model Practicality over Complexity
- Model Performance vs. Cost vs User Adoption
- Model Explainability vs. Performance
- Risk and compliance considerations



Balancing Business KPIs and AI/ML Metrics

- Integration and compatibility
- Speed and complexity of deployment
- Cost of Maintenance

Internal build vs. buy options

Crucial decision to take based on many factors

Cost-Effectiveness and Resource Availability

Building In-House:

- Significant upfront investment in technology, tools, and personnel training.
- Continuous development, maintenance, updating algorithms, and possibly scaling the team.
- Requires access to a pool of talent capable of developing, deploying, and maintaining AI solutions

Buying from External Vendors:

- Recurring subscription fees, more predictable and easier to budget for than the variable costs of in-house development.
- Lower initial costs, but consider costs of integrating the external solution with existing systems.

Internal build vs. buy options

Customization

- In-house: highest customization
- Vendor: limited customization

Control

- In-house: complete control, including data security, algorithmic decisions, and future adaptations
- Vendor: limited control

Maintenance

- In-house: requires constant resource allocation
- Vendor: less resource intensive

Scalability

- In-house: requires specific design for scalability
- Vendor: typically scalable by default

Open-source vs. Vendor

OPEN-SOURCE

PRO's:

- Cost Efficiency
- Flexibility and Customization
- Community Support

CON's:

- Resource Intensity
- Security and Reliability
- Maintenance & Infrastructure

VENDOR

PRO's:

- Ease of Integration
- Ongoing Support and Maintenance
- Proven Solutions

CON's:

- Recurring Costs
- Limited Customization
- Vendor lock-in Risk

- *Open source offers flexibility and cost savings, vendor solutions provide ease of use and support*
- ***Hybrid Approach***

Vendor/solution assessment

All standard vendor/procurement assessment, PLUS:

- Historical Performance and Solution Robustness
- Quality of customer support is a critical
- Integration with IT Infrastructure
- Evaluating Solution Flexibility and Future-Proofing
- Scalability and Adaptability
- Deep tech vs. shallow tech (!)

Global vs. local solutions

GLOBAL

PRO's:

- Advanced Technology
- Proven Solution
- Extensive Support
- Easy to find Talent

LOCAL

PRO's:

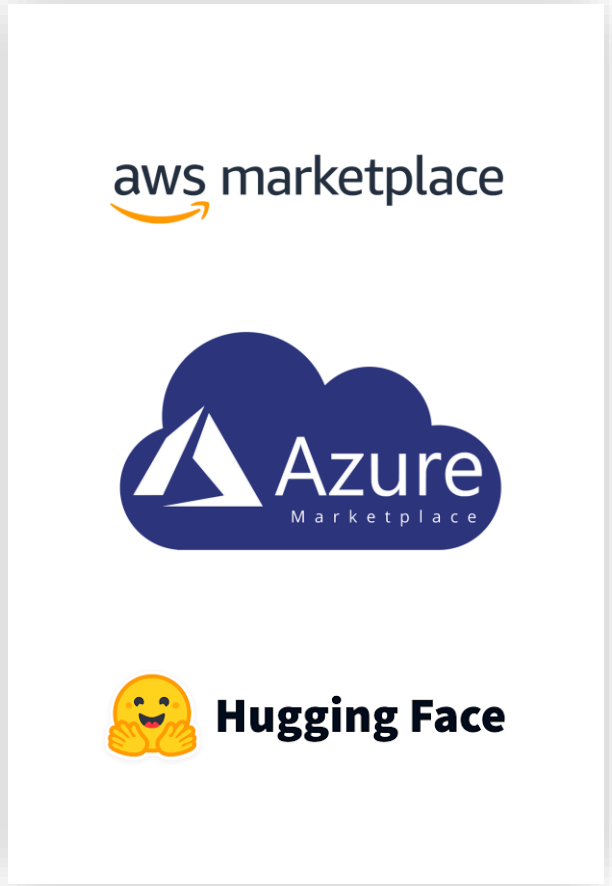
- Better local/regional Fit
- Local Compliance & Regflations Fit
- Integration with other local Solutions
- Local Language & Support

AI/ML marketplaces

- AI/ML Marketplaces — online hubs where companies can find, download or buy AI and ML models and tools.
- Make AI/ML more accessible with pre-built solutions and models
- AWS, Azure, Google Vertex AI, Huggingface, DataRobot, Kaggle etc.

EXAMPLE: **GCP AI-ML, AutoML**

AI/ML Expertise is still needed.



Quick Fun Interactive

Training a Neural Network

Let's try it now!

Google Machine

Key takeaways & hints

- Link AI KPI's to specific business/project objectives
- Business KPI's can be different to AI KPI's
- Consider: Build vs buy; Open-source vs Vendor; Global vs Local
- AI Marketplaces is a good way to start.
- Prioritize Business Value Creation
- Start small & scalable

Questions?

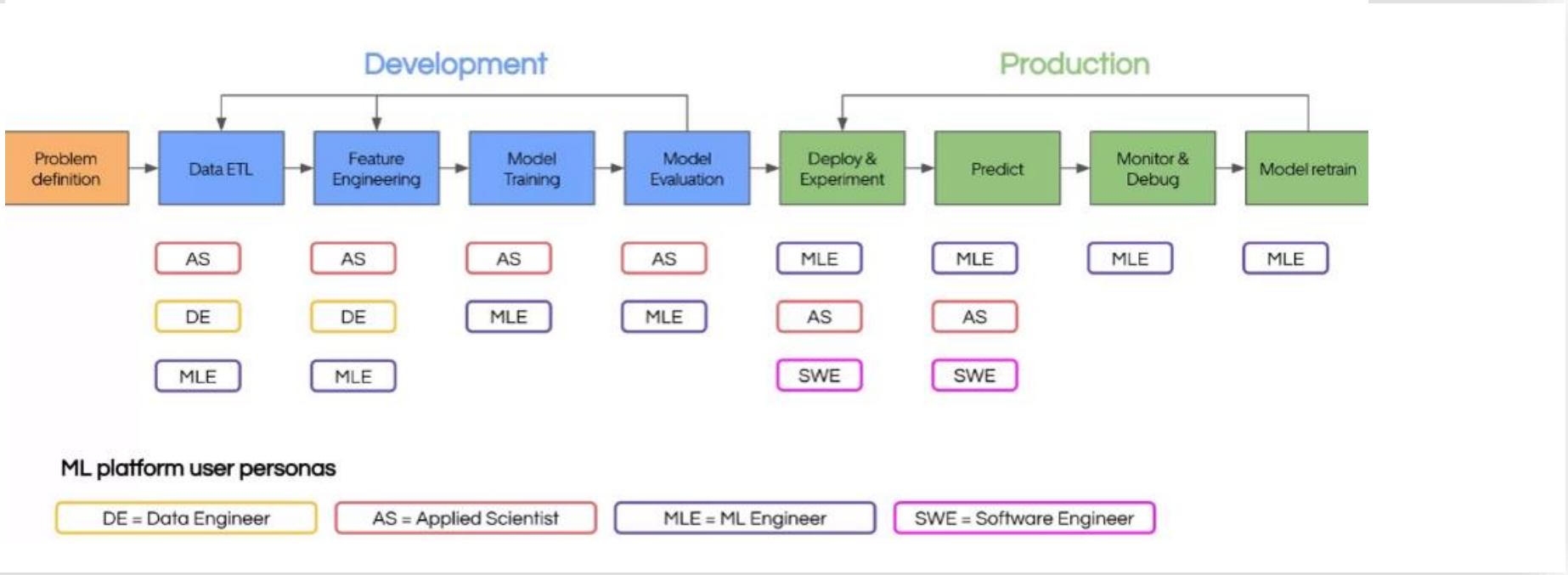
Building an Effective AI Team

Cross-functional collaboration and mix of skills

No unified approach to Data Science teams.

Product focused or Center of Excellence approaches

External vs. internal: renting out as a solution



Building an Effective AI Team

NON TECHNICAL TEAM

Project owner / AI Manager: oversees the entire AI operation, sets goals, allocates resources, and ensures smooth functioning. A bridge between non-technical and technical teams.

Business Stakeholder
Product Owners
Define business problem, business KPIs, and make business decisions

TECHNICAL TEAM

Data Engineer: designs and manages databases, data warehouses, data pipelines that are critical for sourcing, cleaning, and formatting data for analysis

Data Scientist: transforms business objective into data and/or AI/ML objective and prototypes solution.

Data Engineer
Prepare & Ingest data building ETL pipelines

Data Scientist
Create the best ML models to solve business problems

Building an Effective AI Team

TECHNICAL TEAM

ML Engineer: converts prototype to deployable ML model, ensures they run efficiently, and optimizes performance.

MLOps: monitors deployed models, handles infrastructure, and automates processes for smooth operation.

As well as: Business analyst, Data annotation engineer, Domain expert, Backend developer and more

ML Engineer
Collaborate with DS to productionize ML

POSSIBLE COMPOSITION:

Easy, typical projects: ML Engineer + DS

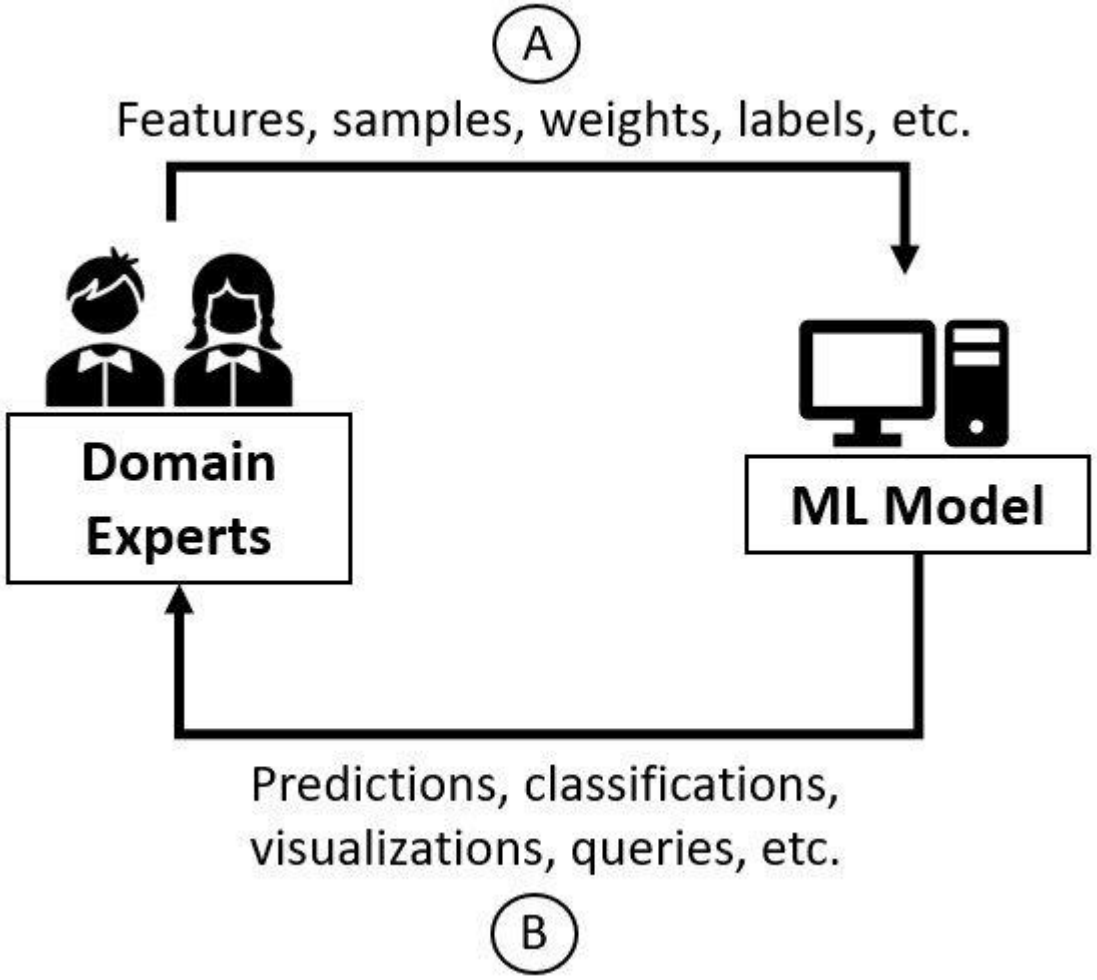
Moderate complexity projects: 1-2 DS, ML Engineer + MLOPs (optional)

Complex projects: several data science teams (tens to hundred employees)

MLOps Engineer/Admin
Standardize CI/CD, user/service role, model consumption, testing and deployment methodology

Domain expertise

- Enriches data with context
- Insights beyond AI/ML technology
- Model relevance and explainability
- Input-Output with context
- Incorporate AI/ML into business operations



Organizational Considerations

- In smaller teams — there is no roles, but ‘personas’
- External teams --> In-house teams
- Talent market vs Cost vs Performance.
- Start small, expand when needed
- Continuous education: Google Example

Big Interactive Games

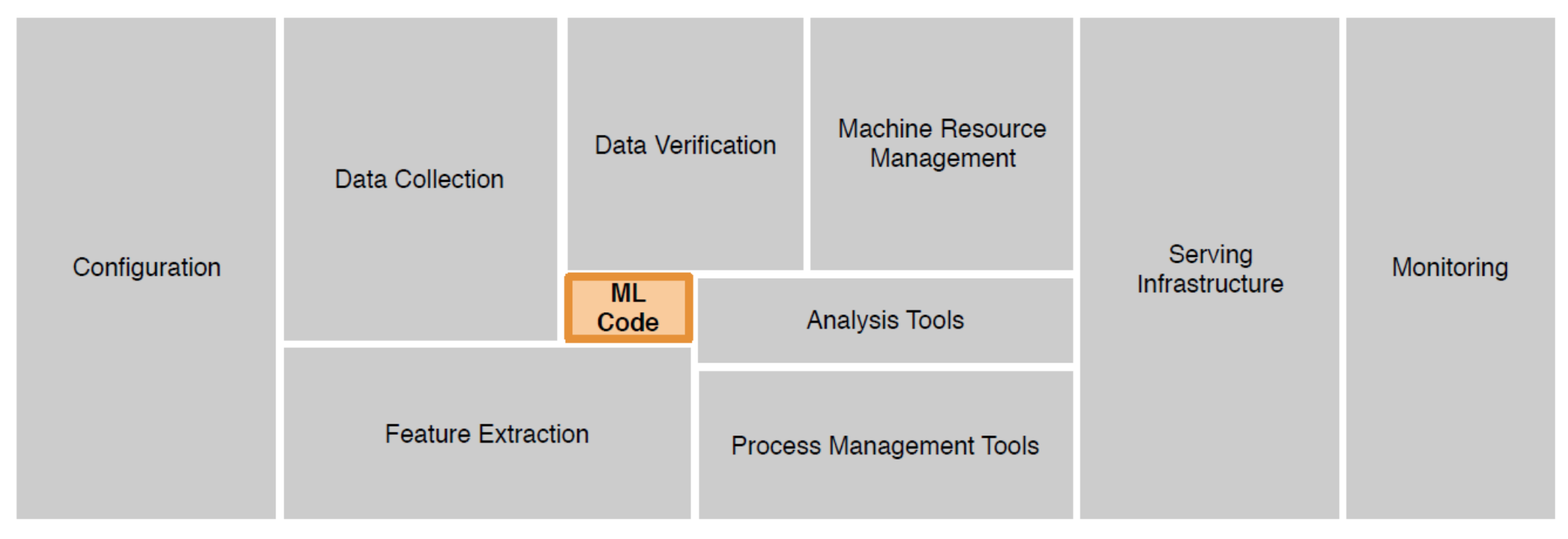
Practical business case

Task

- Recap on what we've covered so far.
- Recap on AI/ML projects you idealized before
- Split into 2-3 teams
- **Consider how AI/ML can be incorporated into your business. Develop at least 1 short-term + 1 long-term (transformational) concept**
- Shall cover consider: identify opportunities, set business KPI's, be clear on business impact, cost-benefit, risks, challenges, integration type, team etc.
- Each team presents their propose AI/ML integration.
- Another team challenges the solution. Switch roles.

Understanding AI/ML lifecycle

Understanding practical steps between theory and tangible business result

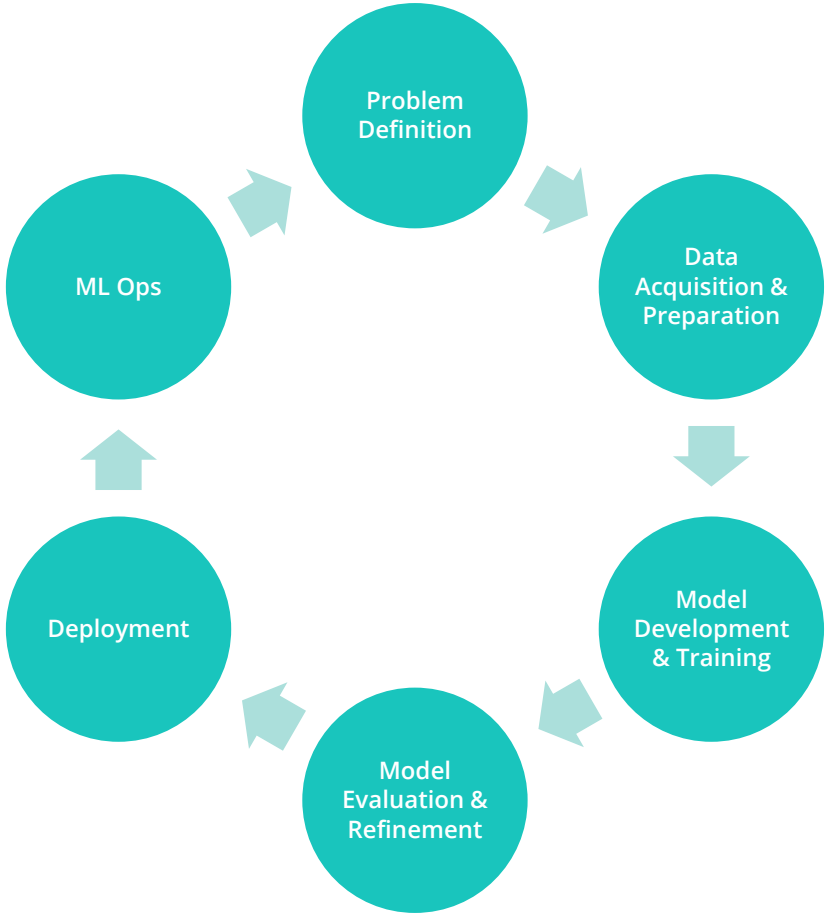


- Set KPI's, allocate resources, manage risks, coordinate and direct the complex efforts required to deliver AI/ML solutions

AI/ML lifecycle

- **Problem definition**: Set your business goals and start planning the AI project.
- **Data & Development**: Dive into the AI challenge, prepare data, and create the model.
- **Testing & Evaluation**: Check if the model works well and is reliable with new data.
- **Deployment Phase**: Put the model to work within your business operations.
- **Running & Maintenance** (MLOP's): Keep an eye on the model, updating it to stay effective and relevant.

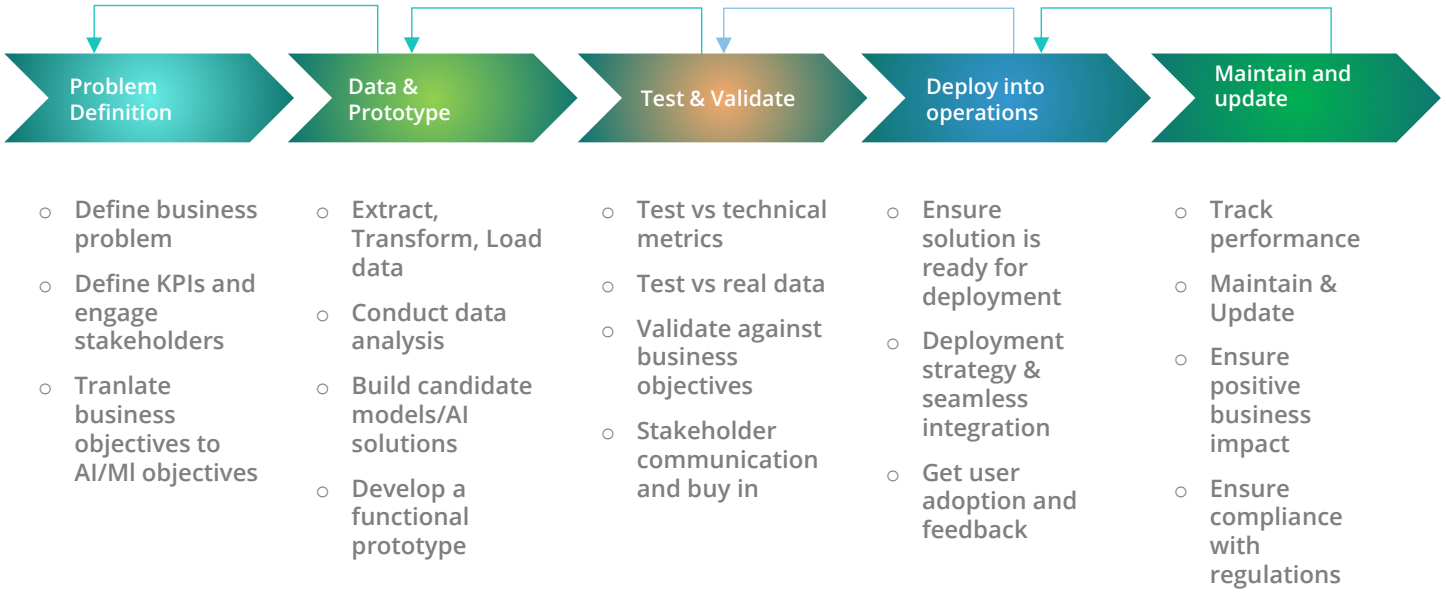
Each stage of the lifecycle must align with overarching business objectives, ensuring that the AI/ML solution effectively addresses the problem it's intended to solve.



PD & Development phase

Align AI/ML initiatives with business goals, selecting the appropriate approach based on resources and objectives

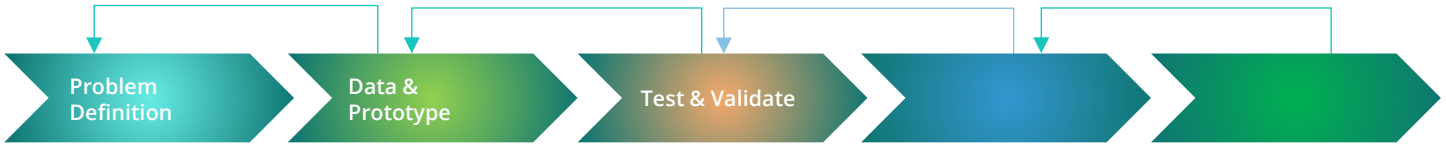
- Align with Business Goals
- Assess scope and feasibility
- Engage Stakeholders and Set Expectations
- Choose the right approach
- Prototype and Validate
- Iterate and Refine
- Plan for Scalability and Integration



Testing & Evaluation

Ensure models perform reliably in real-world scenarios, aligning outputs with business objectives and incorporating stakeholder feedback

- Model Validation: technical metrics
- Real-World Testing
- Validation Against Business Objectives
- Feedback Loop
- Risk Assessment
- Business stakeholders feedback & buy in



- Define business problem
- Define KPIs and engage stakeholders
- Tranlate business objectives to AI/Ml objectives

- Extract, Transform, Load data
- Conduct data analysis
- Build candidate models/AI solutions
- Develop a functional prototype

- Test vs technical metrics
- Test vs real data
- Validate against business objectives
- Stakeholder communication and buy in

Deployment

Integrate AI/ML solutions into existing workflows with minimal disruption

- Confirm AI/ML solution efficacy for broader integration.
- Choose cloud, on-premises, or hybrid based on scalability and security.
- Seamlessly embed AI/ML into existing workflows.
- Train and familiarize users to new AI tools.
- Monitor performance and obtain stakeholder buy-in for full rollout.

- Define business problem
- Define KPIs and engage stakeholders
- Tranlate business objectives to AI/Ml objectives

- Extract, Transform, Load data
- Conduct data analysis
- Build candidate models/AI solutions
- Develop a functional prototype

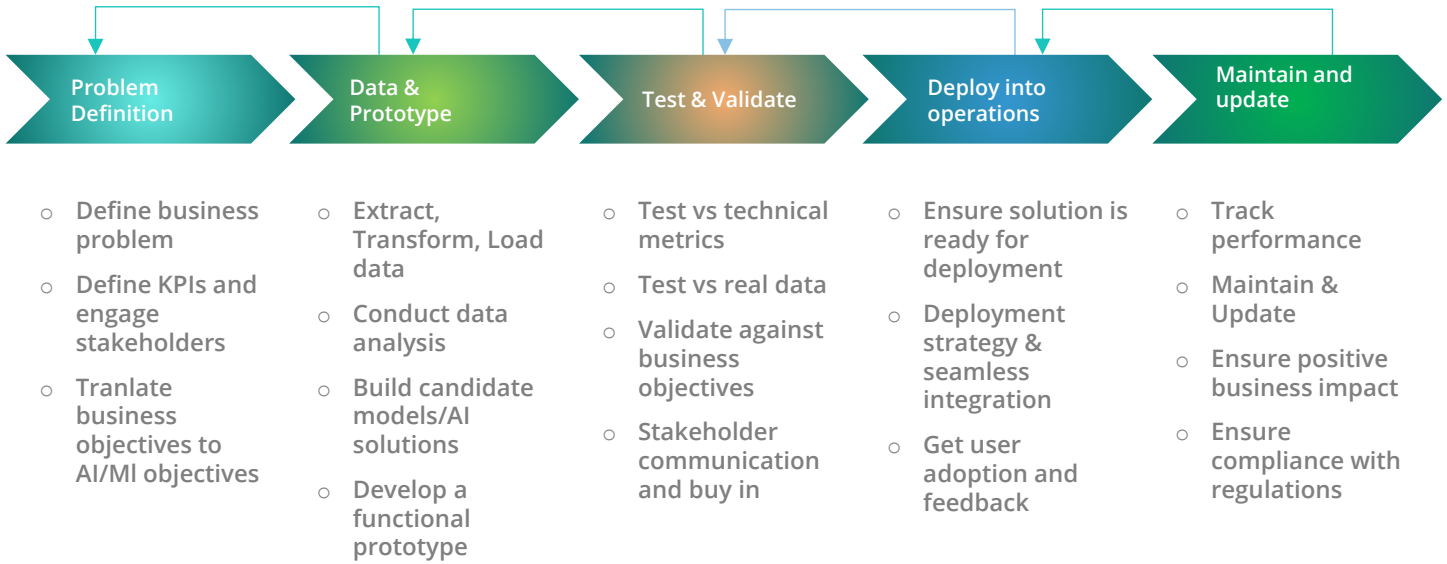
- Test vs technical metrics
- Test vs real data
- Validate against business objectives
- Stakeholder communication and buy in

- Ensure solution is ready for deployment
- Deployment strategy & seamless integration
- Get user adoption and feedback

Maintenance & Update

Automation and real-time monitoring to ensure system health and optimize performance

- Continuously track the performance of AI/ML systems to ensure they meet business expectations.
- Retrain and update model: when performance dips or business needs change, retrain or update your models with fresh data and potentially new algorithms.
- Regularly review AI/ML systems for compliance with business policies and security standards.



AI/ML lifecycle

Is something missing?

- Define business problem
- Define KPIs and engage stakeholders
- Tranlate business objectives to AI/Ml objectives

- Extract, Transform, Load data
- Conduct data analysis
- Build candidate models/AI solutions
- Develop a functional prototype

- Test vs technical metrics
- Test vs real data
- Validate against business objectives
- Stakeholder communication and buy in

- Ensure solution is ready for deployment
- Deployment strategy & seamless integration
- Get user adoption and feedback

- Track performance
- Maintain & Update
- Ensure positive business impact
- Ensure compliance with regulations

Business impact & communicating results

- Key aspect, often missed by AI/ML teams
- Quantitative business impact
- Qualitative business impact
- Short-term vs long-term
- Communicate business impact to stakeholders

Key highlights

- **Development Phase**: Align AI/ML initiatives with business goals, selecting the appropriate approach (custom model vs. SaaS) based on resources and objectives
- **Testing and Validation:** Ensure models perform reliably in real-world scenarios, aligning outputs with business objectives and incorporating stakeholder feedback
- **Production Deployment:** Integrate AI/ML solutions into existing workflows with minimal disruption, considering deployment strategies and emphasizing user training for smooth adoption.
- **Monitoring and Updates:** Maintain continuous oversight of AI/ML systems to adapt to business needs and market changes, ensuring compliance and security.
- **Measuring Business Impact:** Understand and communicate how Ai/ML solution drives result in your business case.

AI Principles & governance

- Moving from Corporate to Industry to Country/State AI Principles
- Not just ‘nice-to have’, but can directly impact business

AI PRINCIPLES

Fairness: AI must operate without bias, ensuring decisions do not discriminate across different user groups.

- Eliminates prejudiced outcomes; equal treatment for all users.
- Ensures equitable decision-making across diverse groups.
- Prevents perpetuation of historical biases.
- Protected attributes

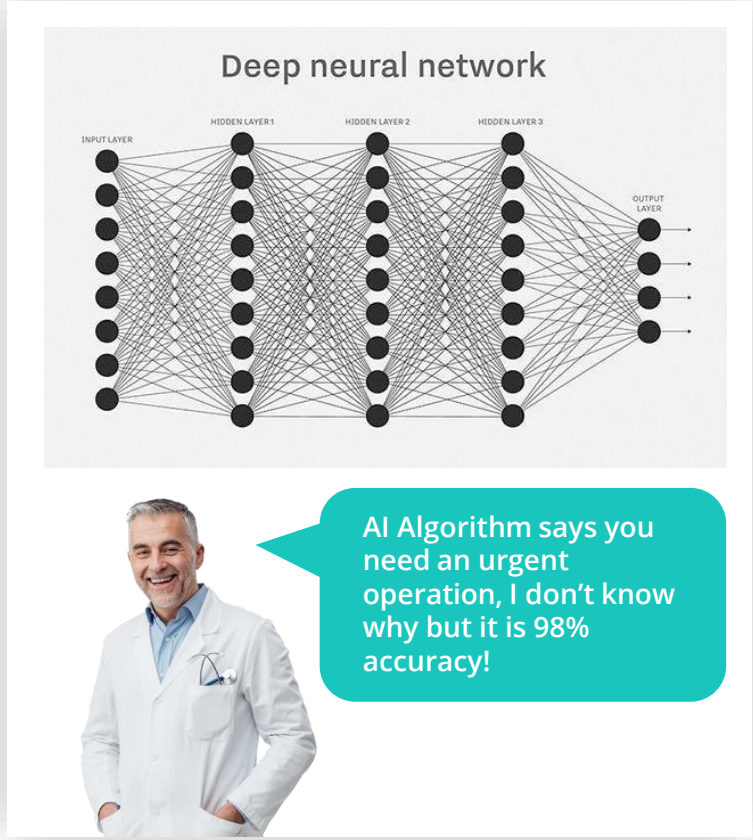
AI Principles

Transparency: Users and stakeholders should have insight into AI's decision-making processes.

- Clarifies how AI makes decisions; no "black boxes."
- Ensures understanding of AI processes by users.
- Promotes accountability in AI operations.

Explainability: how a model arrived to a particular decision

- Decisions by AI can be understood by humans.
- Facilitates transparency and trust in AI systems.
- Allows for meaningful interrogation of AI processes.



AI Principles

Robustness and Safety: AI needs to function reliably across various scenarios, handling unexpected situations securely

- AI operates reliably under diverse conditions
- Prevents manipulation or unintended behavior
- Ensures safety and security in AI deployment

Privacy and Security: AI must protect user data, ensuring confidentiality and integrity

- Safeguards user data against unauthorized access
- Ensures data is used ethically and responsibly
- Maintains confidentiality of sensitive information

Accountability: Organizations are responsible for their AI's actions and must mitigate any adverse effects

- Holds developers responsible for AI's impact
- Ensures mechanisms for redress in AI-related issues

AI & law

Regulation & policy

- Rapidly evolving field
- Standardizing AI Use by business and personas
- Mitigating Legal and Ethical Risks
- Guiding AI Development and Application
- Promoting Innovation within Legal Boundaries

AI & law

Legal & compliance

- Using AI/ML may incur various risks (in addition to direct business risks)
- Data Privacy and Protection: data protection laws exist in every country
- Bias and Discrimination: legal risks arise from discrimination
- Transparency and Accountability: legal risks arise from lack of
- Intellectual Property (IP) Rights
- Consumer Rights and Safety

Global regulatory **landscape**

USA: Segmented regulation

- Legislative Efforts: SAFE Innovation Framework; security, accountability
- Executive Order on Artificial Intelligence: Establishes national AI strategy, focusing on research, development, and ethical principles. Currently undergoing review and may be updated

European Union: Strict Control

- EU AI Act: Classifies AI by risk; bans certain uses. Exterritorial application
- AI Liability Directive: Uniform rules for AI-caused damages
- Focus: Human oversight, safety, non-discrimination

CHINA : Segmented regulation

- Generative AI Regulations: Content monitoring, data protection
- Industry-Specific Model: Various departments regulate AI

Rest of the world

Russia, France & UK have own laws & regulations

Key Takeaways (Executive summary)

- AI helps businesses to **increase revenue, improve operational efficiency, personalize customer management**, make better data-driven decisions overall.
- Identify strategic **AI/ML opportunities aligned to business goals** and success metrics
- Build or outsource multidisciplinary teams combining both domain expertise and technical skills

Key Takeaways (Executive summary)

- **Establish good data infrastructure** and governance as the foundation for reliable AI/ML
- Validate AI/ML benefits through rigorous **testing** and monitor for **continuous improvement**
- Proactively assess and address risks & opportunities

Make AI work -> Make it in business -> Make it better

Contact Us:

If you have questions or suggestions, please don't hesitate to contact us. We will be happy to consult you!

Jõe 7, Tallinn, Estonia
+372 5555 3621
hello@kittykat.tech
www.kittykat.tech

Thank You

For Your Attention