UMCS
Faculty of Economics
Department of Information Systems and Logistics

Business Analyst: A Career Path in Business and ICT

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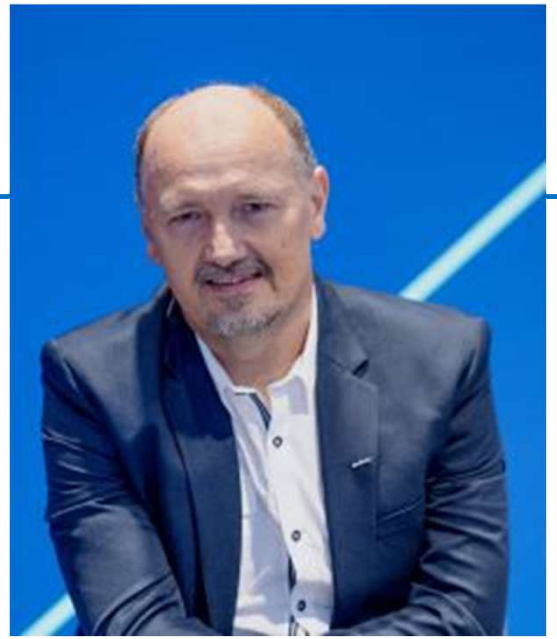
Foundation



1. **Pawłowski, M., & Walentek, D. (2023). BUSINESS ANALYST–A POSITION ATTRACTIVENESS AND MARKET REQUIREMENTS, A SAMPLE FROM POLAND**. Scientific Papers of Silesian University of Technology. Organization & Management, (177). [pdf] - job offers from 2023 (4.1T)
2. **New paper is coming** for 2025 (7.6 T)
3. **Courses, in program Business Analytics & Data Science, UMCS**
   - Programming for business analytics,
   - e-commerce analytics, blockchain in business
4. **>10 years experience in commercial analytics & ICT**
   - ICT, system ERP implementation manager
   - Management accounting and controlling manager
   - Business development manager,
   - e-commerce manager

https://mietwood.com/

Agenda

1. Analytics
2. What is business analytics?
3. Job titles for analyst position
4. Analyst responsibilities
5. Tools
6. Job market trends
7. Summary

The context

1. Classic management – planning, organizing, leadership, controlling → data-based management
2. Accounting → management accounting
3. Marketing → digital marketing, e-commerce
4. Digitalization → programming & computing,
5. Medicine / health care → remote health care, new tech in medicine, robots & new medicine
6. Financial services → bank applications
7. Etc ….

What is analytics

Data analytics is a systematic method of

1. ETL – extracting data or collecting data, transforming and loading to storage in databases
2. Data mining, drilling data, describe data, sort, compare, etc.
3. Statistics, collection of methods to describe data as indicators
4. Machine learning – algorithms that can modify their behavior based on new data
5. AI – algorithms that can recognize themselves patterns and rulers

Four types of analytics

descriptive analytics – processes historical data (or act) to describe phenomena, results, facts from the past,
called sometimes as **cognitive analytics** that uses advanced artificial intelligence and machine learning technologies to get knowledge from data
diagnostic analytics – answers the question about the causes (phenomena → events) based on historical data,
predictive analytics – deals with future modeling and forecasting,
prescriptive analytics – determines possible scenarios, options, and consequences of potential decisions,

Descriptive analytics

Descriptive analytics serves as the foundation for all analysis

- **examine historical data** to gain an understanding of past events. Answers the question, **"What happened?"**
- **summarize and visualize data trends**,
- **provide the context** to understand the current state of business
- **creates dashboards & reports** - to present a clear overview of past performance but with the link to current state

Decision-makers can identify patterns, outliers, and trends – its servers strategic and operational planning

Diagnostic analytics

2. Diagnostic Analytics

- while descriptive analytics looks at the past - “What happened?” - diagnostic analytics digs deeper - “Why it happened?”
- analysts try to uncover the root causes, the reasons of particular outcomes or issues.
- by identifying the factors that influence a specific result, managers can take corrective actions.

Diagnostic analytics utilize **statistical tech., hypothesis testing, and data mining to determine key relationships between variables.**

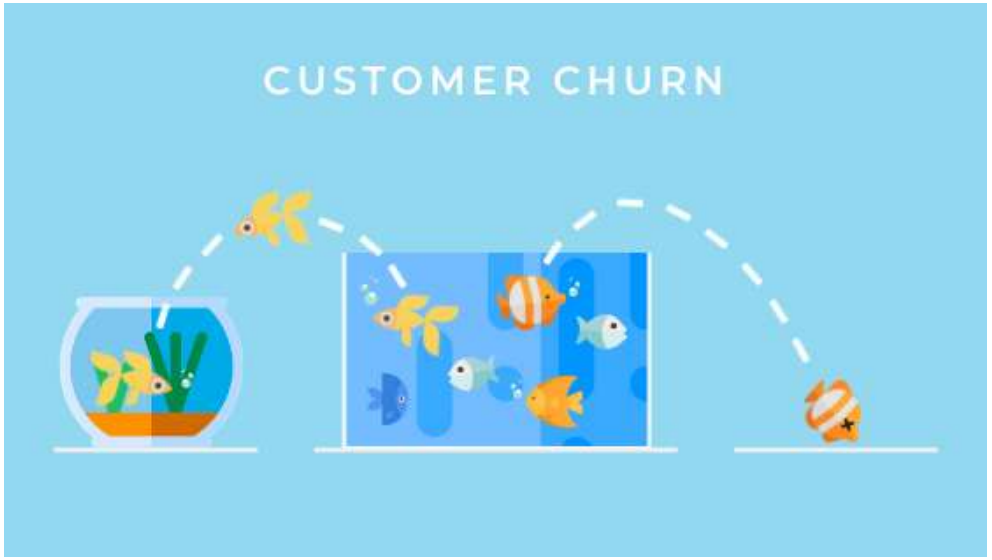
For example, diagnostic analytics can help identify **why sales declined in a particular region**, enabling a company to adjust its sales & marketing strategies accordingly. Data visualization create dashboards and visual representations of the data relationships.

Predictive analytics

- Predictive analytics **forecast future** events or trends.

  What if … what is going to happen?”

  - it builds models that predict, what is likely to happen – it is going to rain … engine is going to fail … people are going to purchase this for Christmas?
  - This type of analysis is an **essential tool for proactive decision-making.**
  - Machine learning algorithms and statistical modeling are commonly used.
  - Businesses uses predictive analytics to anticipate customer demand, **predict customer churn**, or detect fraud.



Prescriptive analytics

- Prescriptive analytics tells business

What to do to get fishes back to our aquarium

- In medicine the best possible treatment, medicine combination and composition
- In agriculture to calculate pesticide and plant changes
- In finance algorithms of effective investments
- Etc.

Prescriptive analytics in business

Prescriptive analytics **goes beyond predicting future events** and offers **recommendations** for actions that will achieve specific outcomes.

This type of analytics is **highly valuable in improving operational efficiency.**

Suggest **optimal pricing strategies** for a product or recommend the **most efficient supply chain routes**.

It help managers to empower organizations with decisions based on facts.

In medicine …. Remote diagnosis

(first products to buy, cross selling, up-selling).

Predictive Analytics in E-Commerce

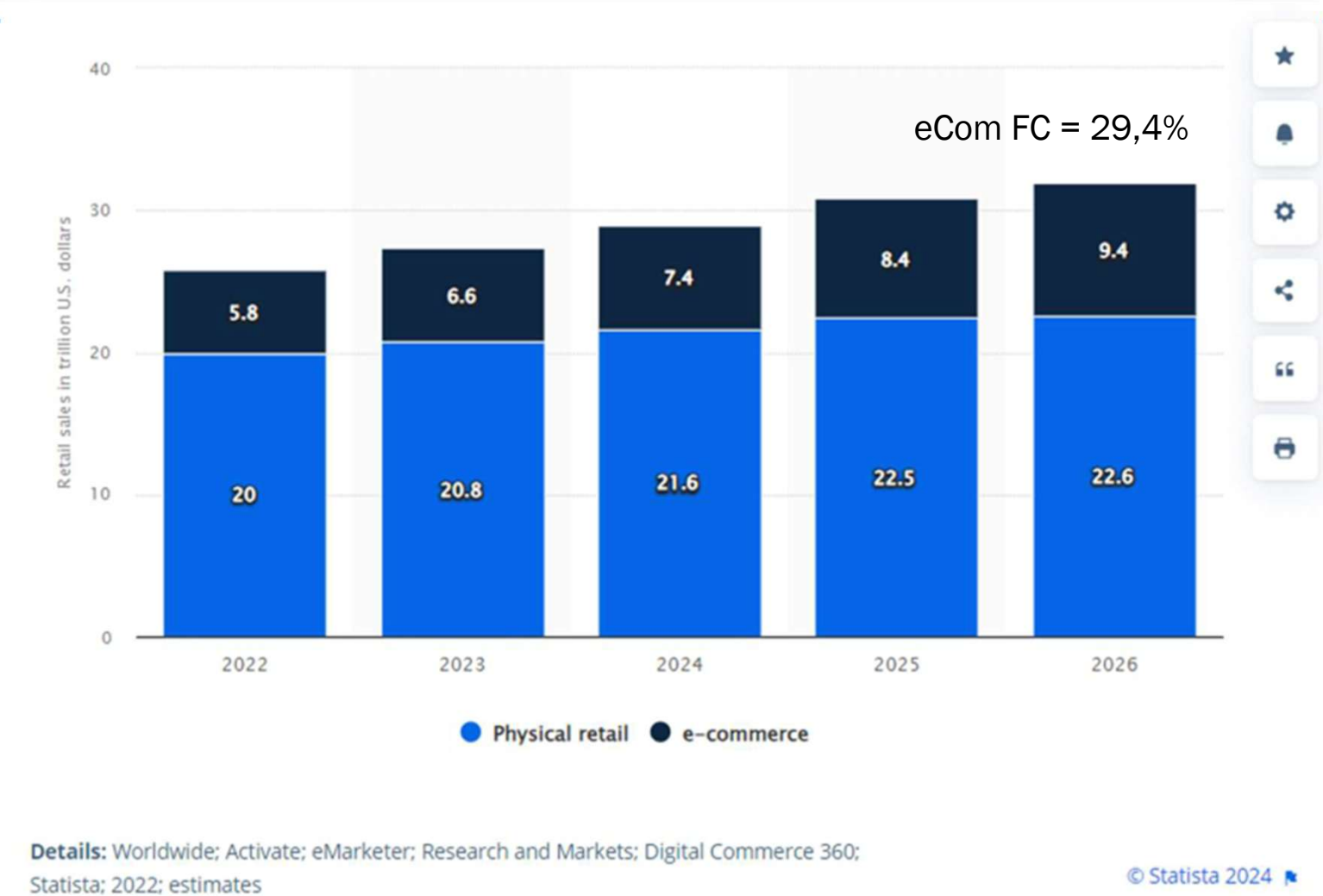
Predictive analytics' birth and quick rise in the e-commerce industry **reflect a dramatic shift in how companies use data to understand and forecast customer behaviour**, preferences, and market trends (Sharma, 2022).

In e-commerce, predictive analytics involves using complex algorithms to

1. examine **past transaction histories**, user interactions, browsing patterns, demographic information, and other relevant variables in order to predict future trends,
2. identify possible hazards, personalize marketing strategies, enhance inventory control, and improve overall customer experiences (Zhang, 2021).
3. forecast demand properly, eliminate inventory-related risks, customize product recommendations, optimize pricing tactics, and anticipate client needs (Zhang X. G., 2023).

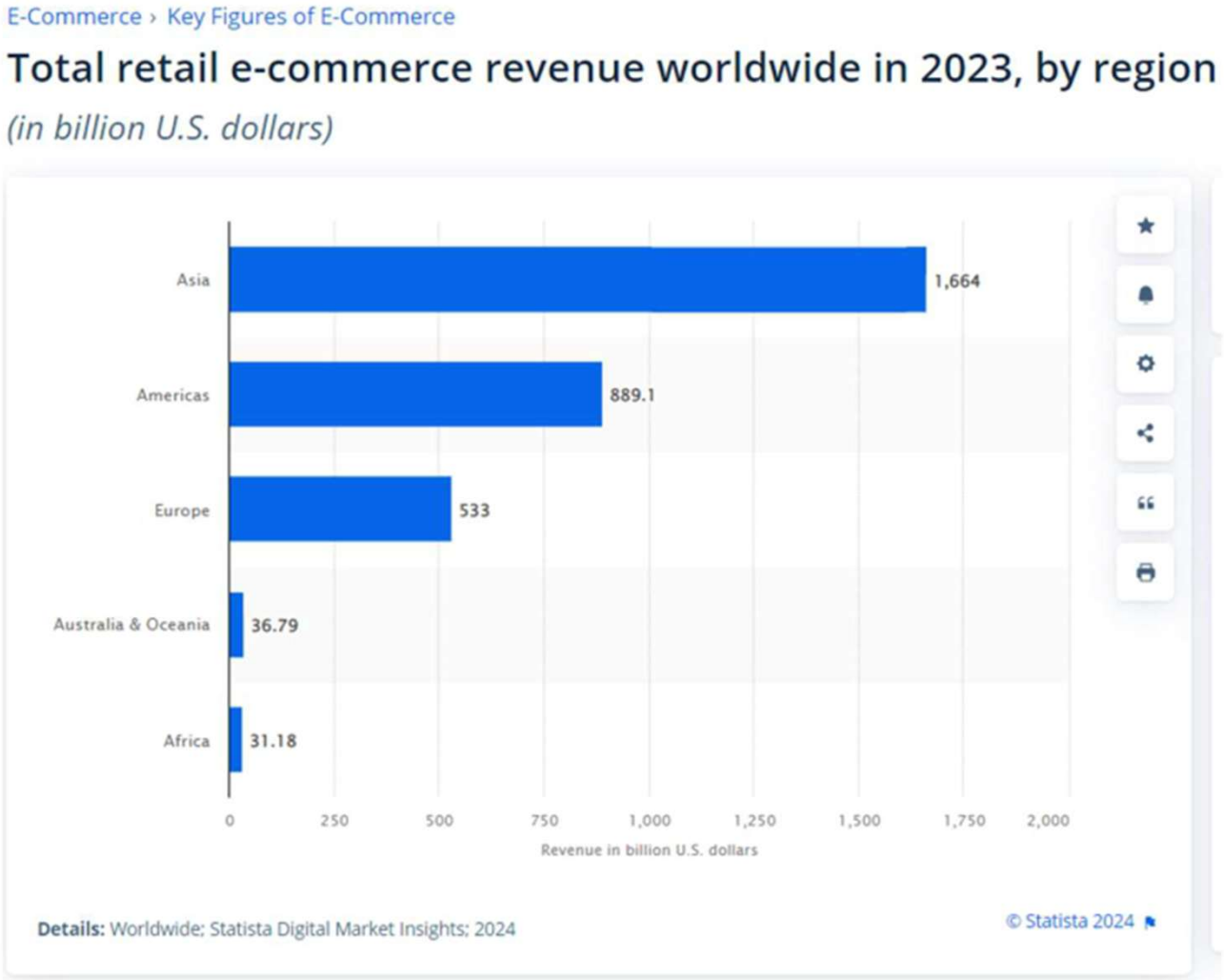

Predictive Analytics in E-Commerce
Best Channels of Contacts
Prospects With a High Propensity
Product Recommendation System
Customer Lifetime Value
Predicting the Intent of Contact

Demand for business analytics in e-commerce



Details: Worldwide; Activate; eMarketer; Research and Markets; Digital Commerce 360; Statista; 2022; estimates

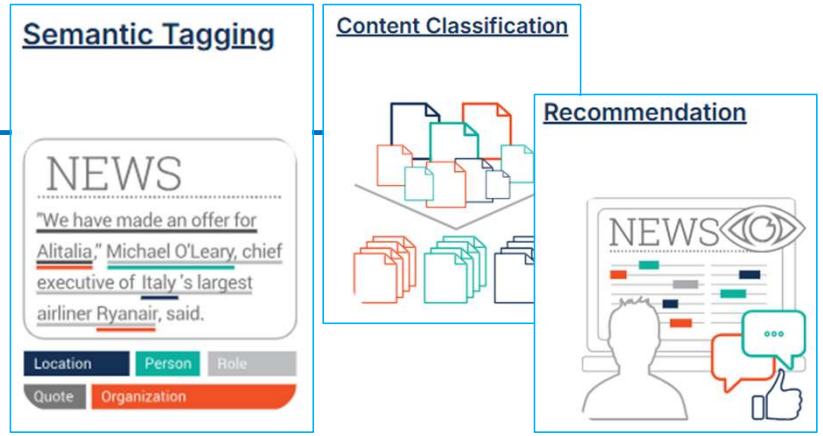
E-commerce by region

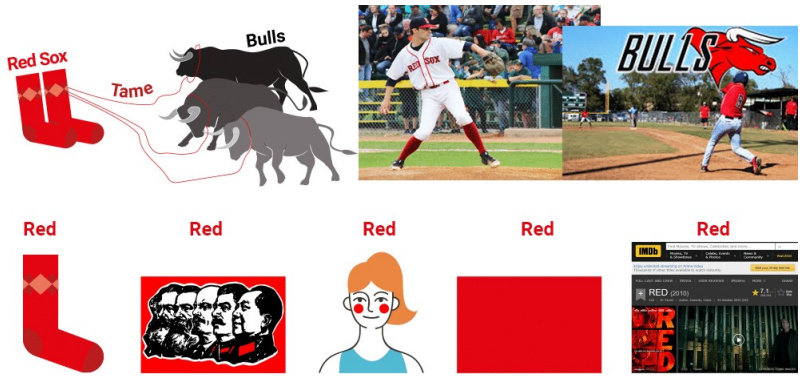


Retail e-commerce sales compound annual growth rate (CAGR) from 2024 to 2028, by country

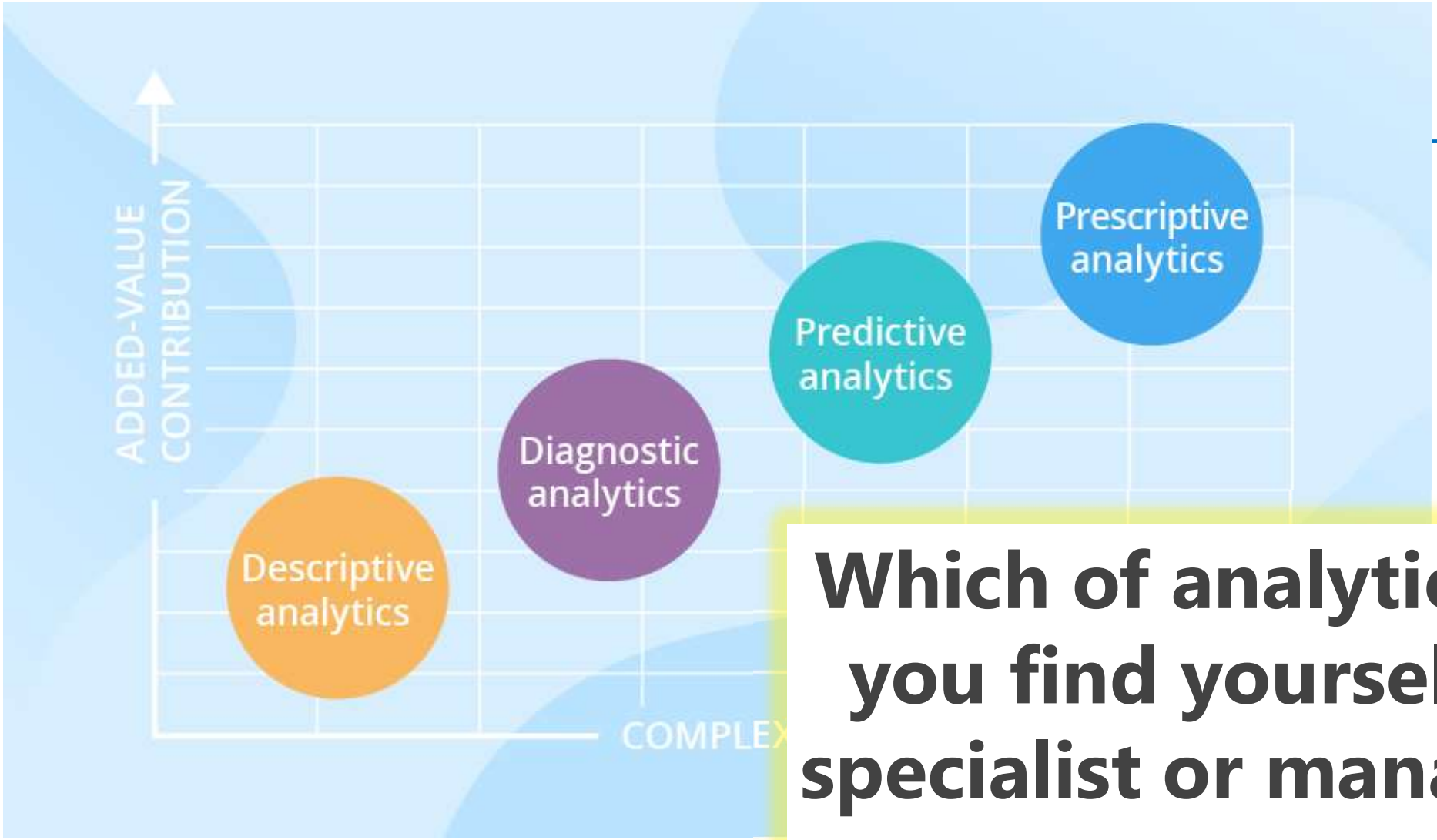
Text Analytics

- **Text analytics**, also known as text mining or natural language processing (NLP), is a specialized type of analysis that focuses on text as the data.
- In our world vast amounts of information are text documents, social media posts, emails, customer reviews, and people conversations.
- Text analytics can extract valuable insights from text like:
  - **sentiment analysis**, in customer feedback, social media → this suggest trends in market
  - **topic modeling & named entity recognition** → test understanding, text summation,
  - **text generation** - LLM (Large Language Model) → ChatGPT, etc., they can recognize inside text relationships and create the next text
- Businesses use text analytics to gain insights to business management, recognize trends in market and customer preferences, identify emerging issues, and guide managers to create better / suitable strategies.
- Thru text generation it can directly serve customers





"Red Sox Tame Bulls" refers to a baseball match

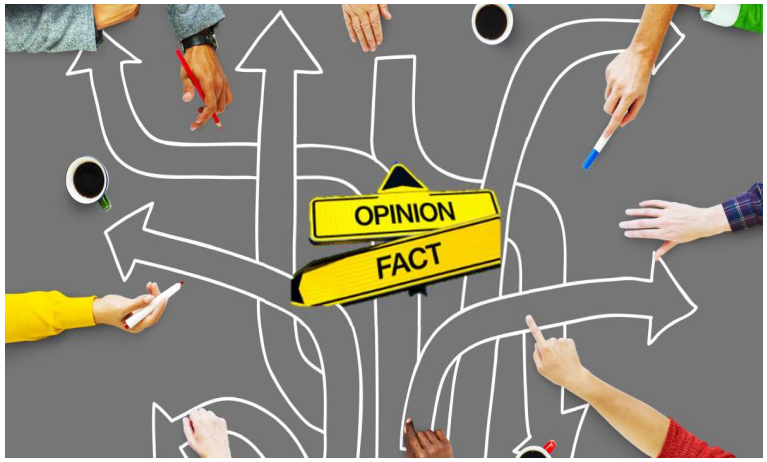


Which of analytics do you find yourself as specialist or manager?

Business analytics refers to activities performed to use existing data to make decisions based on facts.

Business analytics uses

1. skills – observation, problem def, syndrome drilling, etc.
2. methods, data collection, transformation, etc.
3. hardware and software to process data, transfer to collections of information, build reports, dashboards, advice, etc.



Analytical process

From question and ideas to projects and results

WORKFLOW ANALYSIS

01

Gather the data

02

Analyze the data

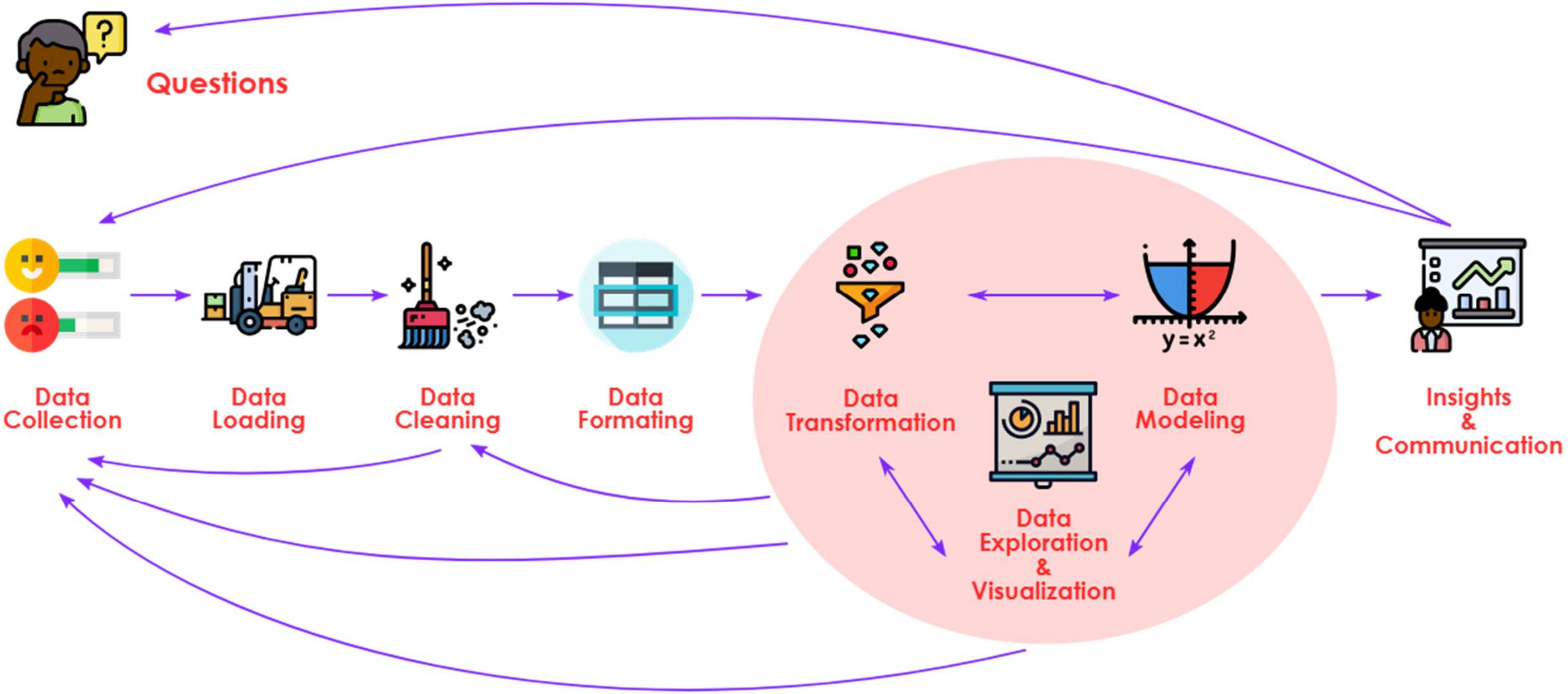
03

Brainstorm ideas

04 Implement the options

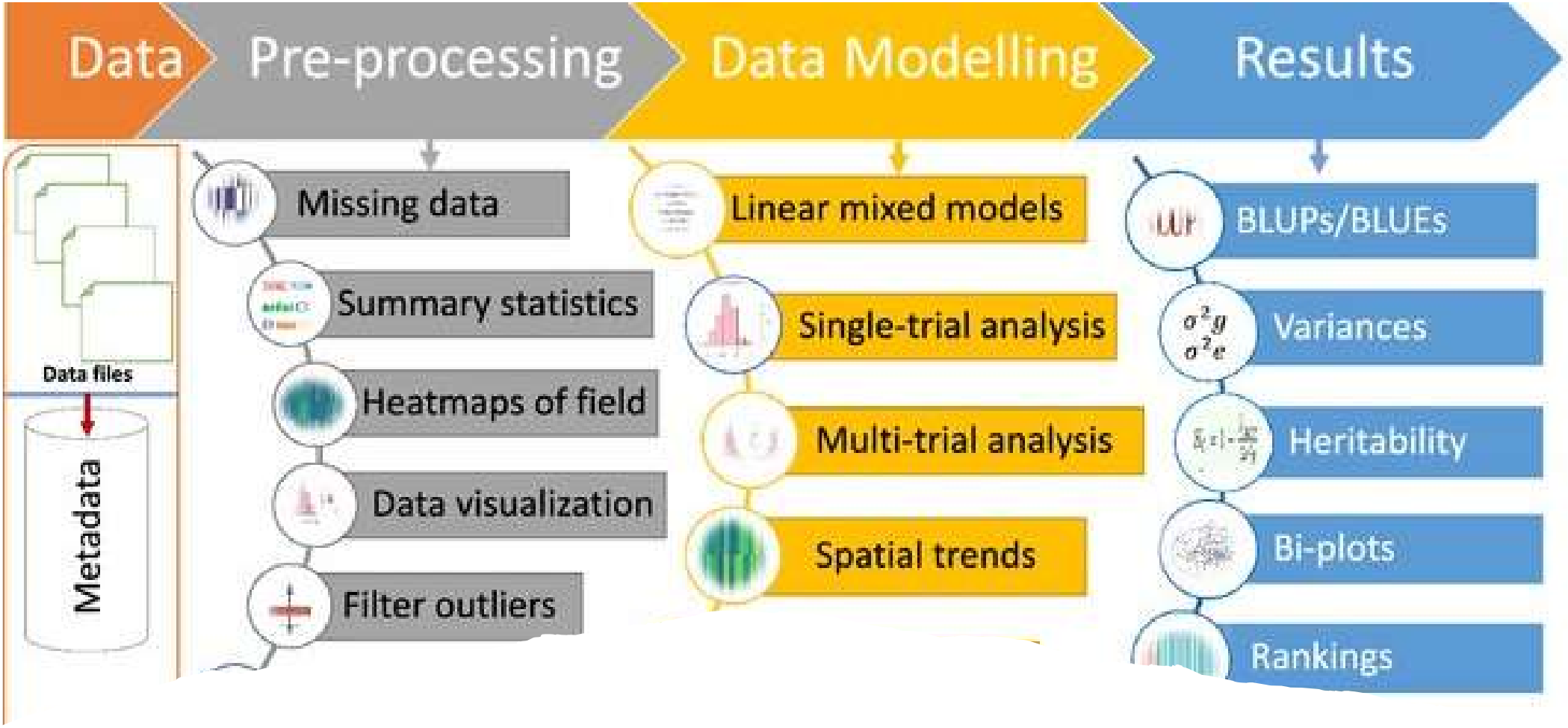
05 Monitor progress & adjust

Data Analysis Workflow



What takes the most time for an analyst?

Data cleaning NINJA


Data
Pre-processing
Data Modelling
Results
Data files
Metadata
Missing data
Summary statistics
Heatmaps of field
Data visualization
Filter outliers
Linear mixed models
Single-trial analysis
Multi-trial analysis
Spatial trends
BLUPs/BLUEs
Variances
Heritability
Bi-plots
Rankings

Roles in analytical process

1. **Project manager** – I would like to manage this process, facilitate, organize and report
2. **Advisor / expert** – I would like to be an expert of some field in this process
3. **System analyst** – I would like to recognize data and link them to business requirements
4. **System architect** – I would like analyze the business process and IT system to plan development
5. **Business owner** – I am manger or director in a company and this system is build for me.
6. **CEO / Supervisor** – I am the owner of managing direction of the company.

Which of this positions do you like as your future job?

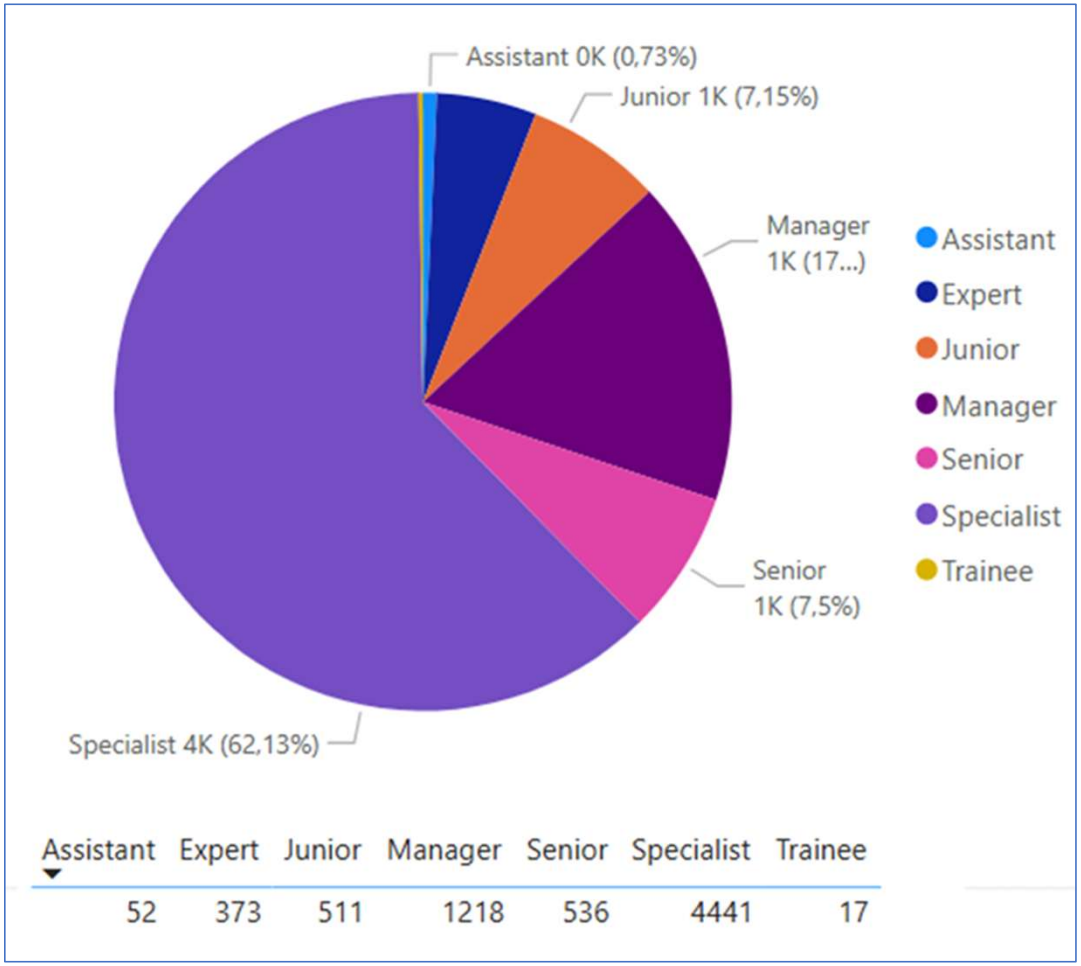
Job for analysts
The position & job titles

Based on dataset for analytics positions in Polish job market

Dataset

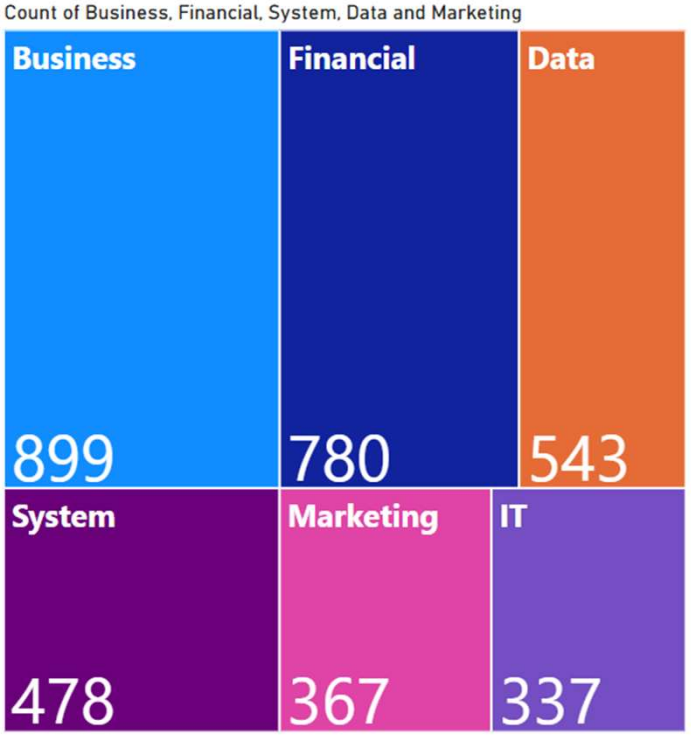
We have analyzed polish job portal pracuj.pl in 2023 and 2024-25

Position level	2023	%	2024-25	%
Specialist	2 361	57%	4 441	57%
Senior	740	18%	536	7%
Junior	687	17%	511	7%
Expert	169	4%	373	5%
Manager	113	3%	1 218	16%
Trainee	48	1%	17	0%
Assistant	23	1%	52	1%
Other			582	8%
Total	4 141	100%	7 730	100%



Job positions titles for keyword “analyst”

title_en	Count of title_en
Business Analyst	156
Financial Analyst	146
Business and system analyst	84
Financial Controller	80
System Analyst	77
Data Analyst	72
Marketing Specialist	66
Controlling Specialist	56
Key Account Manager	42
Production Manager	33
Junior Financial Analyst	31
IT Analyst	28
E-commerce Specialist	27
Marketing Manager	27
Project Manager	27
Store Manager	27
Sales Representative	26
Product Manager	25
Sales Manager	23
IT Business Analyst	21
Sales Analyst	21
Analyst	20
Chief Accountant / Chief Accountant	18
Deputy Store Manager	18
Total	**7730**

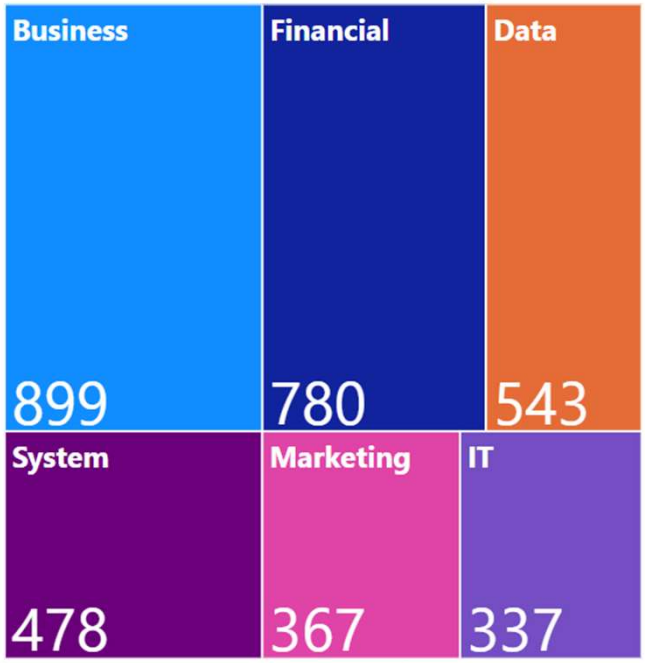


Data sample
Job portal:
pracuj.pl

Period	Count
2024-q4	1 840
2025-q1	4 605
2025-q2	1 285
Total	7 730

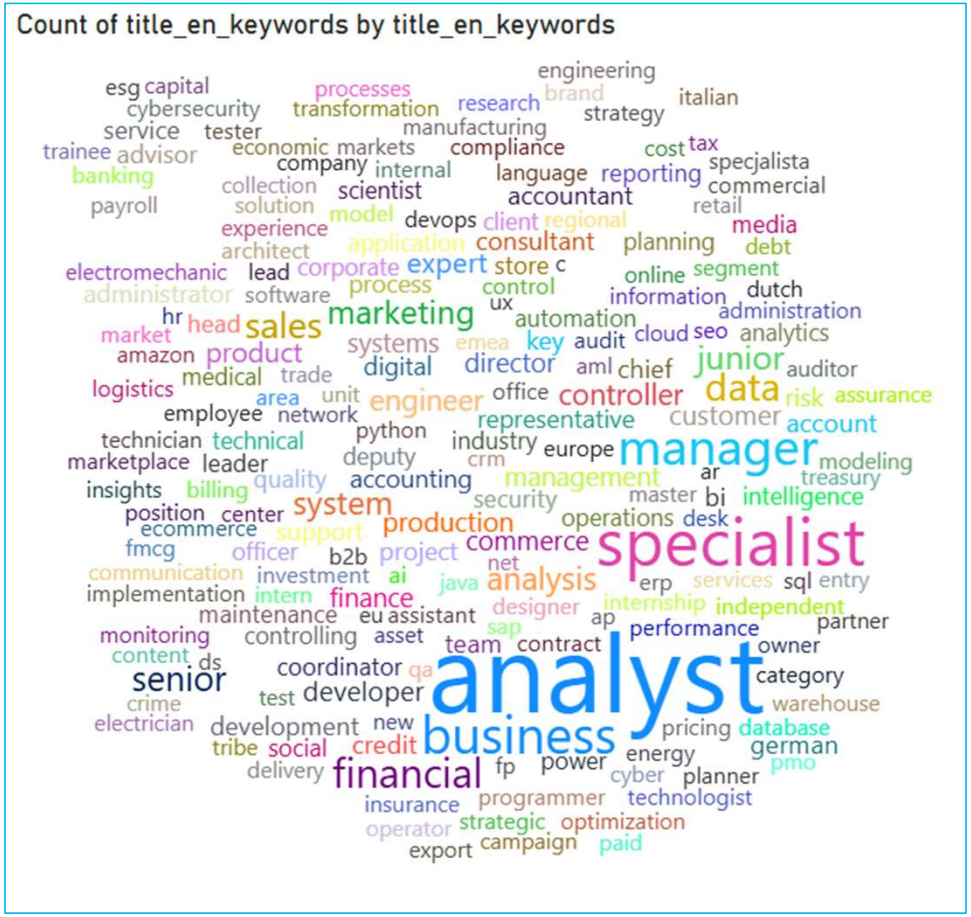
Top keywords in job title

Count of Business, Financial, System, Data and Marketing



Total	**3 404**
Share in grand total	**44%**
Grand total	7 730

Count of title_en_keywords by title_en_keywords



Tools

What skills are required from analysts and what tool they must know and use?

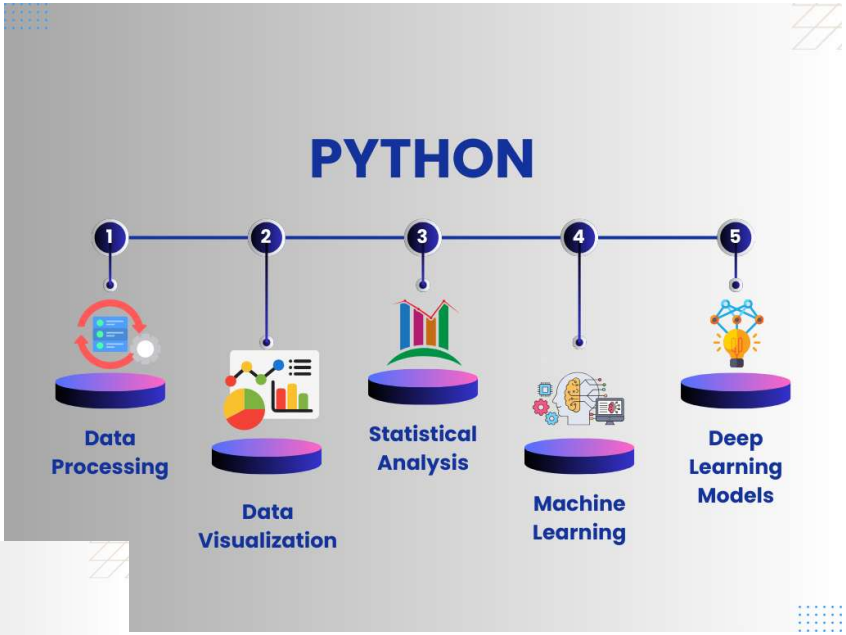
Tools for analyst / technical skills

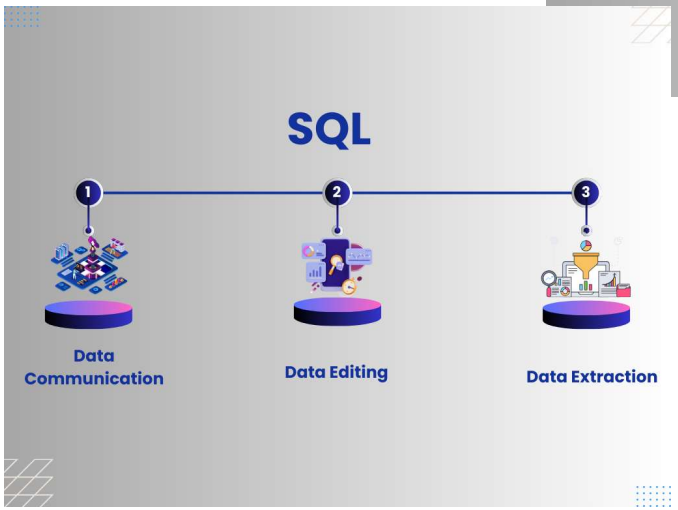
1. Data acquisition, data storage
    1. Files, txt, csv, pdf, xlsx, other… exported from reporting systems or monitoring devices, etc. – ETL (extract, transfer, load)
    2. Databases, ERP, CRM: database MS SQL Server, mySql, Postgres, DB2, SAP HANA, Oracle, MS Access
2. Access to data, direct query, Import, via API & data analysis
    1. Excel & VBA
    2. SQL
    3. Python, R, Julia, C++
3. Visualization & data storytelling – Inside for business
    1. Excel, Google shits
    2. Power BI, Tableau, Qlink
    3. Python + Flask/App
4. Project management tool
    1. Power Point, Jira, DevOps

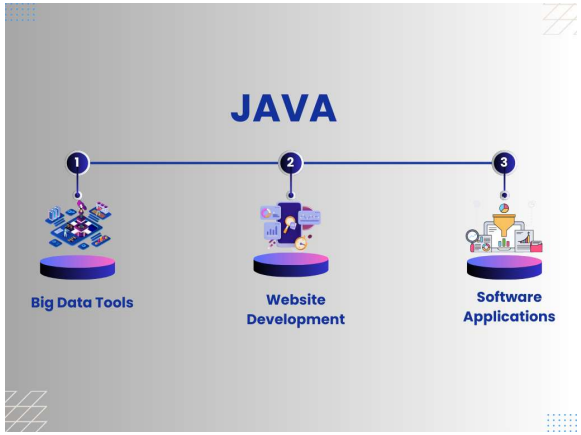
Magic Quadrant for Analytics and Business Intelligence Platforms.

Best Programming Languages for Data Science and Analytics

- 1. Python
- 2. SQL
- 3. R
- 4. VBA (Visual Basic for Applications)
- 5. Java
- 6. Julia



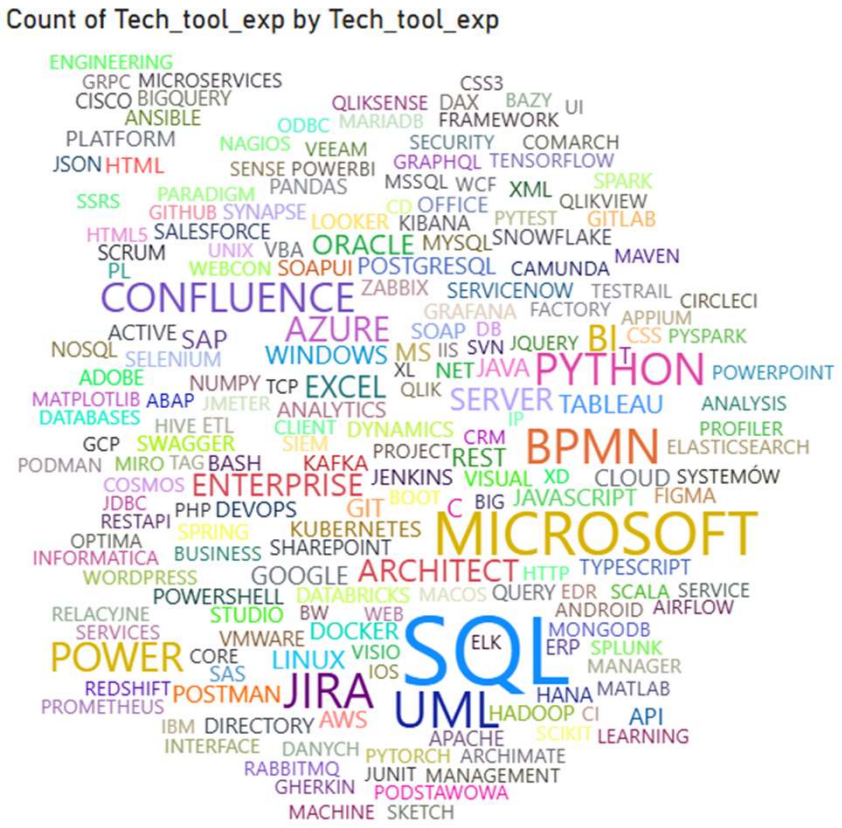




https://csweb.rice.edu/academics/graduate-programs/online-mds/blog/programming-languages-for-data-science#python

Pracuj.pl / our data

Tech_tool_exp	Count of Extract key phrases.KeyPhrase
SQL	622
UML	322
BPMN	294
JIRA	280
PYTHON	247
CONFLUENCE	218
MICROSOFT POWER BI	129
ENTERPRISE ARCHITECT	125
MICROSOFT EXCEL	90
ORACLE	75
LINUX	73
TABLEAU	72
GIT	66
MICROSOFT AZURE	63
JAVA	57
MICROSOFT SQL SERVER	51
POWER BI	47
AWS	46
DOCKER	44
JAVASCRIPT	44
WINDOWS SERVER	44
POSTGRESQL	42
POSTMAN	40
T-SQL	38
C#	37
SAP	37
KUBERNETES	36
Total	**5898**



For ICT

- SQL, Jira, Python
- Oracle, Linux, git, Java

For system analysts

- UML/BPMN
- Enterprise architect
- Confluence, Jira

For business analysts

- Power BI, Tableau
- Excel

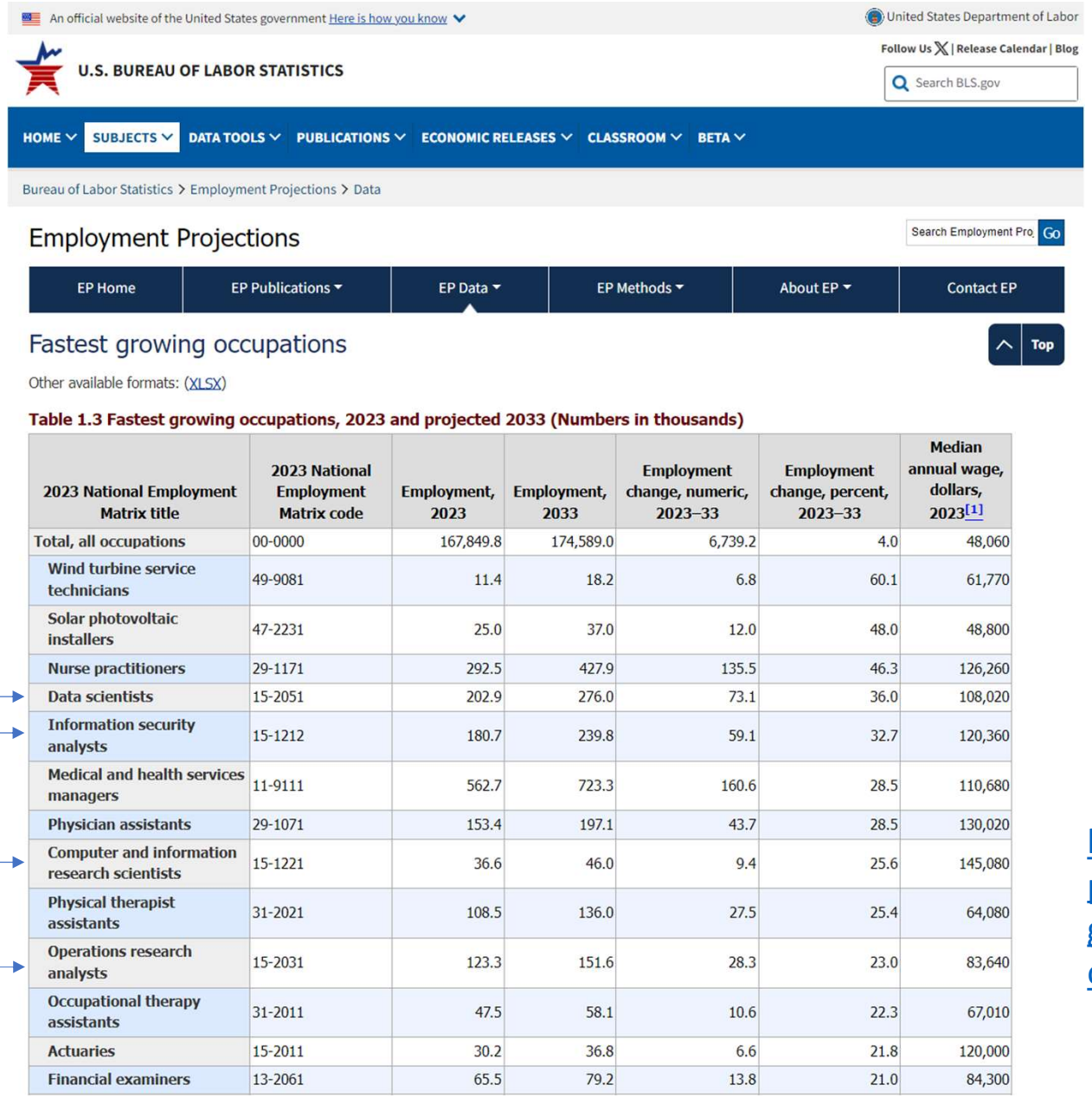
For project managers

- UML/BPML,
- Jira, Confluence

Job market

What are general market trends in jobs for analysts?

USA
Job market



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Fastest growing occupations

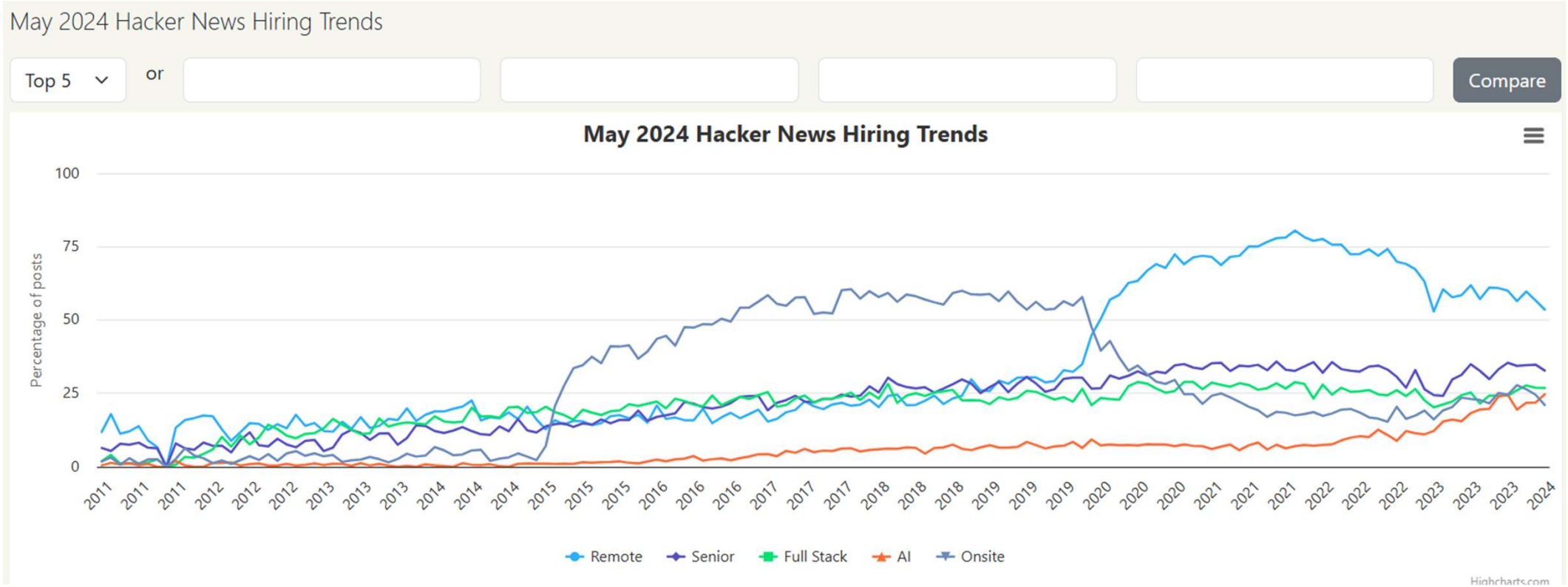
Top

Other available formats: (XLSX)

Table 1.3 Fastest growing occupations, 2023 and projected 2033 (Numbers in thousands)

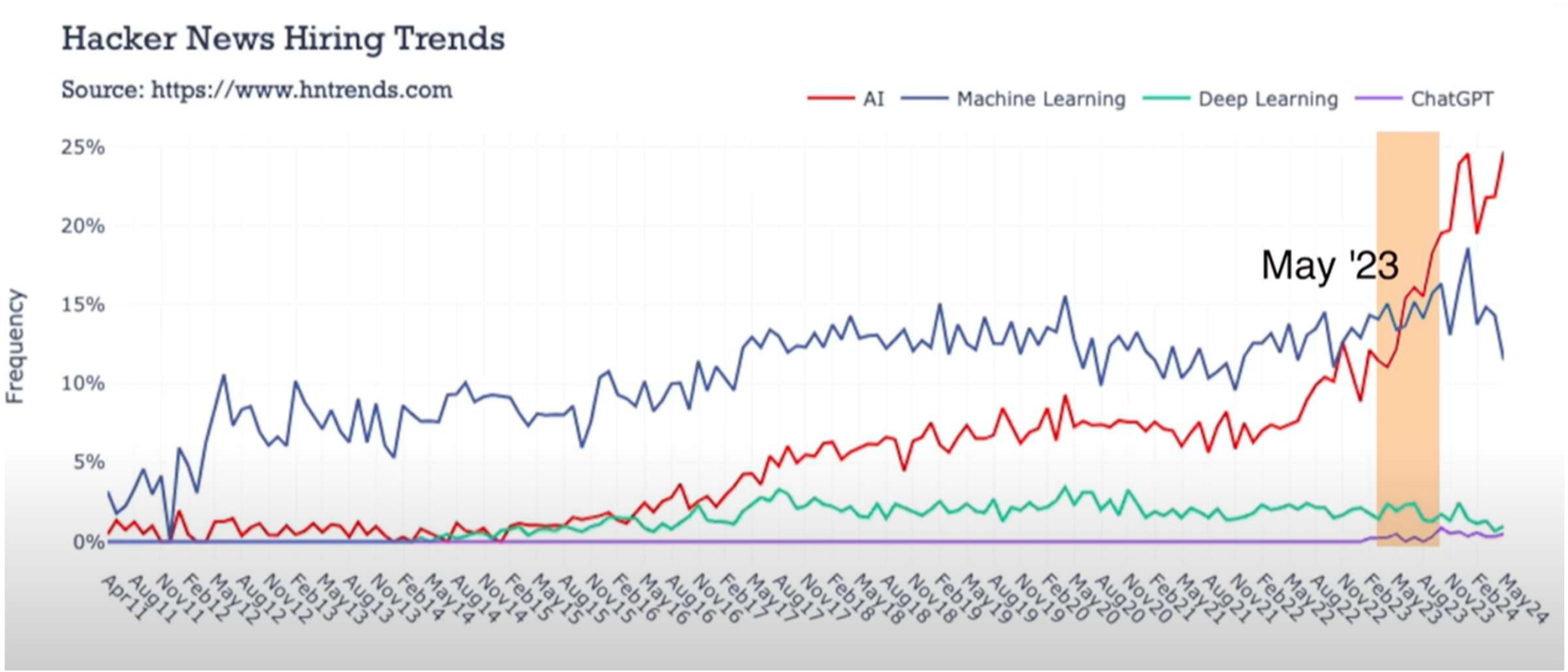
2023 National Employment Matrix title	2023 National Employment Matrix code	Employment, 2023	Employment, 2033	Employment change, numeric, 2023–33	Employment change, percent, 2023–33	Median annual wage, dollars, 2023[1]
Total, all occupations	00-0000	167,849.8	174,589.0	6,739.2	4.0	48,060
Wind turbine service technicians	49-9081	11.4	18.2	6.8	60.1	61,770
Solar photovoltaic installers	47-2231	25.0	37.0	12.0	48.0	48,800
Nurse practitioners	29-1171	292.5	427.9	135.5	46.3	126,260
Data scientists	15-2051	202.9	276.0	73.1	36.0	108,020
Information security analysts	15-1212	180.7	239.8	59.1	32.7	120,360
Medical and health services managers	11-9111	562.7	723.3	160.6	28.5	110,680
Physician assistants	29-1071	153.4	197.1	43.7	28.5	130,020
Computer and information research scientists	15-1221	36.6	46.0	9.4	25.6	145,080
Physical therapist assistants	31-2021	108.5	136.0	27.5	25.4	64,080
Operations research analysts	15-2031	123.3	151.6	28.3	23.0	83,640
Occupational therapy assistants	31-2011	47.5	58.1	10.6	22.3	67,010
Actuaries	15-2011	30.2	36.8	6.6	21.8	120,000
Financial examiners	13-2061	65.5	79.2	13.8	21.0	84,300

https://www.bls.gov/emp/tables/fastest-growing-occupations.htm

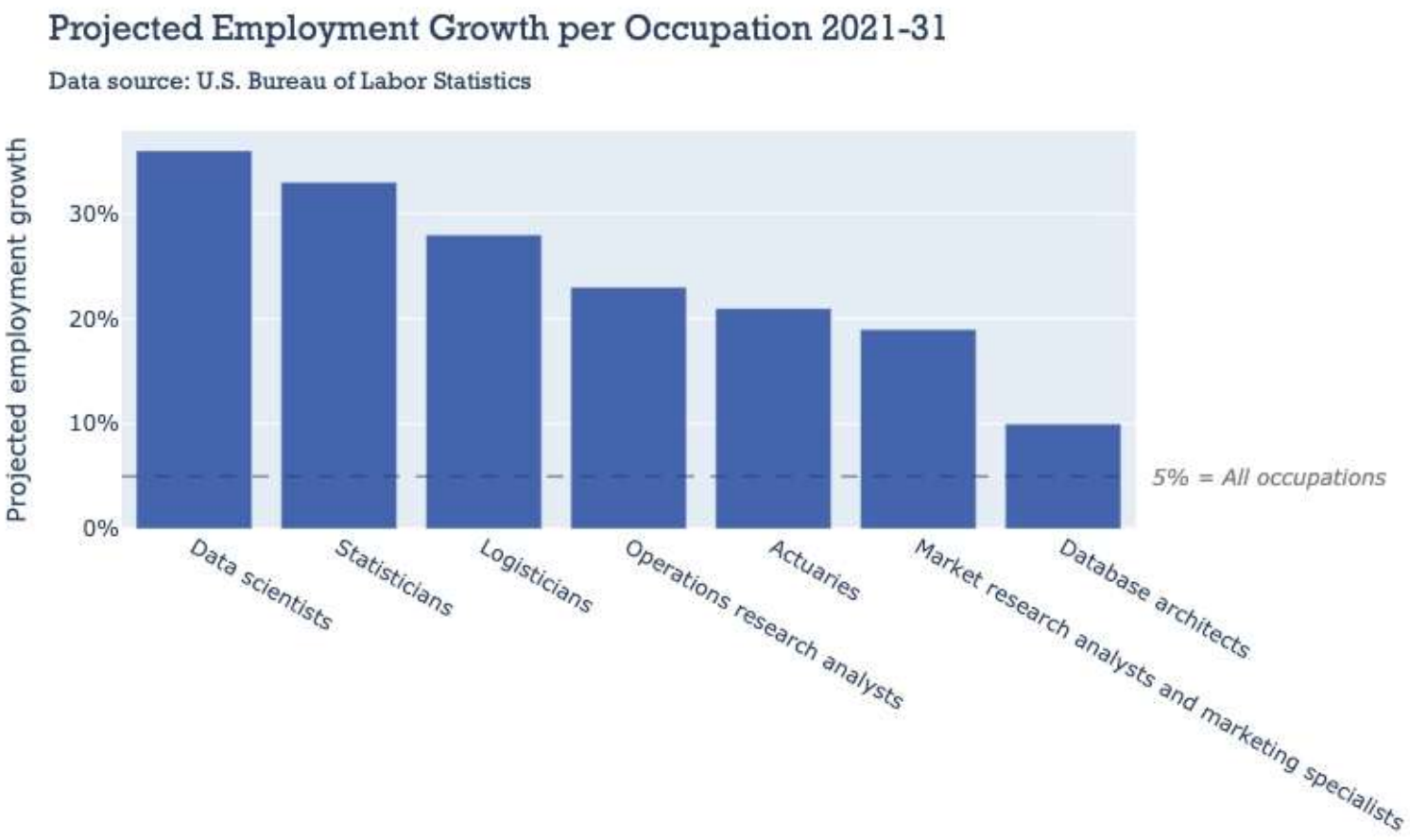


https://www.hntrends.com/2024/may.html?compare=AI&compare=machine+learning&compare=data+science&compare=business+analytics

AI jobs is growing fast!



Projected ?



https://blog.jetbrains.com/datalore/2024/07/11/5-emerging-data-job-trends-in-2024/

Low-code market

UMCS programs for analist

- Business analytics (EN) – bachelor study
- Data Science (EN) – master degree
- Business analytics (PL), I & II
- Erasmus

Thank U ☺

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