Artificial Intelligence (AI) and Machine Learning (ML) for cyber analytics

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Artificial Intelligence (AI)

It’s intelligence—perceiving, synthesizing, and inferring information—demonstrated by machines, as opposed to intelligence displayed by humans or by other animals

Long-term goal: General Intelligence

(the ability to solve an arbitrary problem)

AI fields:

- Reasoning
- Knowledge representation
- Planning
- **Machine Learning (ML)**
- Natural Language Processing (NLP)
- Perception

Why do we need AI?

Every AI field is a specialized “tool”. It’s a not a goal in itself, but is a means

- What does it do?
- What problem does it solve?

Important questions:

- What problems do I want to solve?
- What are the best tools to solve the problem?

- Problem -> Tools to solve it

- Many modern cybersecurity products use AI/ML
  - Intrusion detection
  - Suspicious behaviour

- Machine Learning (ML) important in cybersecurity

Data Science

Data science is the study of data to extract or extrapolate meaningful insights.

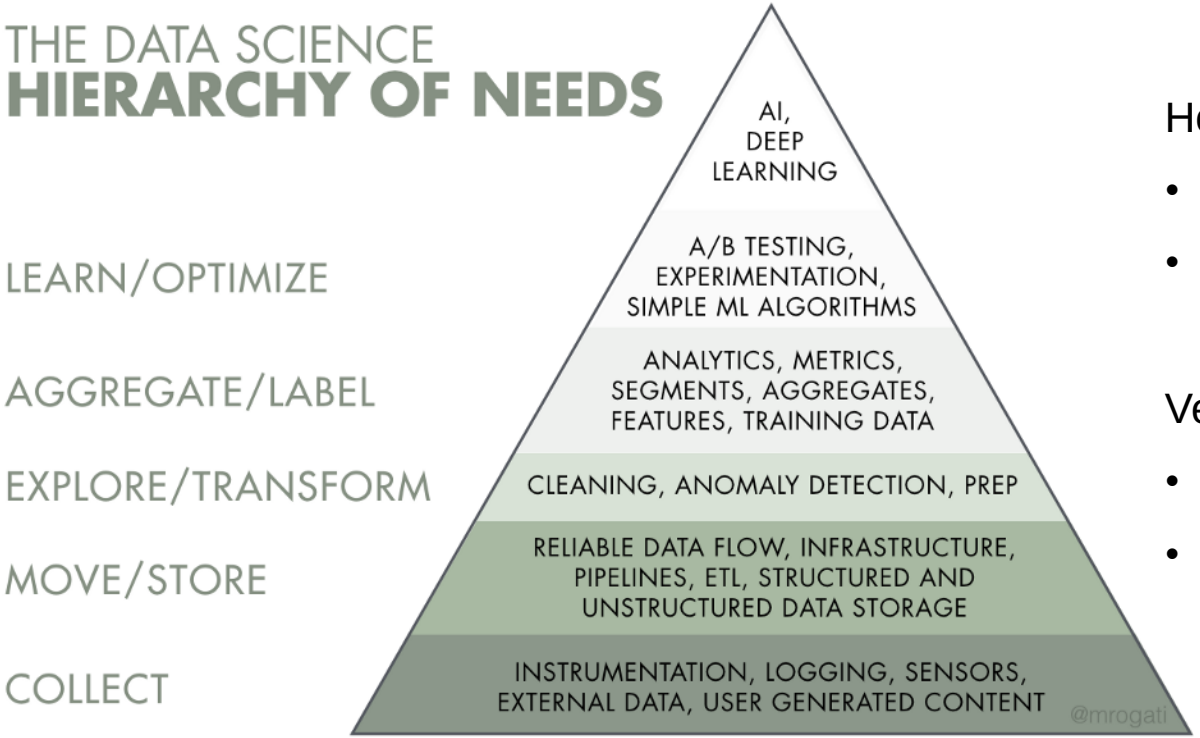
Also:

- multidisciplinary approach
- combines principles and practices from the fields of
  - artificial intelligence (emph. **ML**)
  - mathematics
  - statistics
  - computer engineering
- analyze large amounts of data

Related fields:

- Knowledge Discovery and Data Mining (KDD)
- Analytics

What is needed for Data Science?



Monica Rogati, The AI Hierarchy of needs - Hacker Noon

Horizontal:

- ML libraries
- ETL/Storage tech

Vertical:

- Splunk
- Elastic Search

Data Science in cybersecurity: skillset

Data Scientist

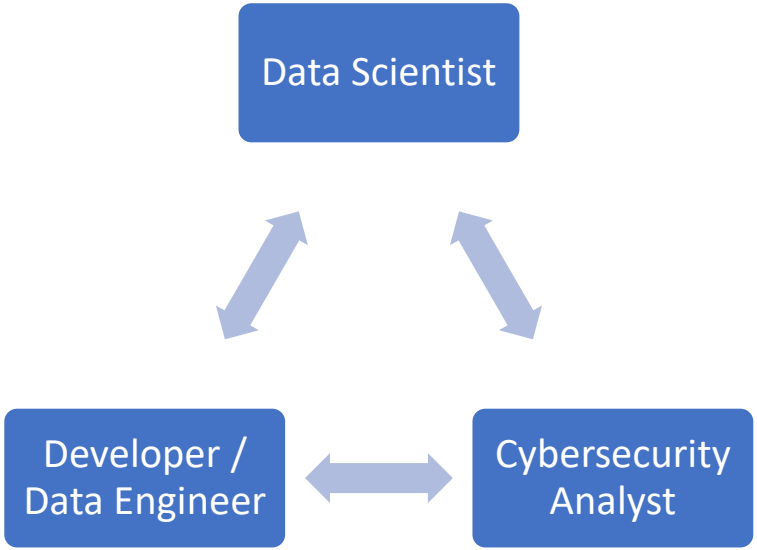
- Data analysis, preparation
- Model creation, training and tuning

Cybersecurity Analyst

- Domain (cybersec) knowledge

Developer / Data Engineer

- Development, Integration
- Data and CI/CD Pipelines



Cybsersecurity uses

Threat hunting

- Data mining / exploration
- Large temporal windows

Create new detectors

- Specific usecase detectors
- Anomaly detection
- Intrusion detection
- Insider abuse

User/Entity Behaviour Analytics (UEBA)

- User and entity (devices) models
- Forensics
- Anomaly detection

Summary

- ‘AI’ is used as a marketing term. It’s a very broad field of research
- Focus on goals/problems first. Then on the tools to solve them (like AI)
- The goal of Data Science is to extract meaningful insights from data
- Implement Data Science Pyramid. Can’t skip steps
- Chose the best / simplest tool for the problem. You will not need AI for everything
- Skillset Trio: Data scientists + Cybersecurity Analysts + Developers **+ Communication**

- Know your users (and devices), know your data, learn from it

Thank you

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