



Praktické využitie dátovej analytiky v medicíne

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SAS INSTITUTE

47 YEARS OF

BUSINESS ANALYTICS



#1

WORLD'S LARGEST
PRIVATELY HELD
SOFTWARE COMPANY

96%

ANNUAL CUSTOMER
RETENTION RATE



14,021

SAS EMPLOYEES
WORLDWIDE



91%

OF THE TOP 100 COMPANIES
ON THE
FORTUNE[®]
GLOBAL 500 LIST

80,000+

CUSTOMER SITES IN
148 COUNTRIES

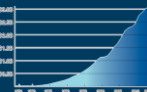


25%

ANNUAL REINVESTMENT
IN R&D



US \$3.16B
REVENUE IN 2015



ANALYST
VALIDATION



FORRESTER

Gartner

IDC
Analyze the Future

Artificial Intelligence

What is Artificial Intelligence

Artificial Intelligence (AI) is a **general-purpose technology** that has the **potential to improve the welfare and well-being of people**, to contribute to positive sustainable global economic activity, to **increase innovation and productivity**, and to help respond to key **global challenges**. It is deployed in many sectors ranging from production, finance and transport to healthcare and security.

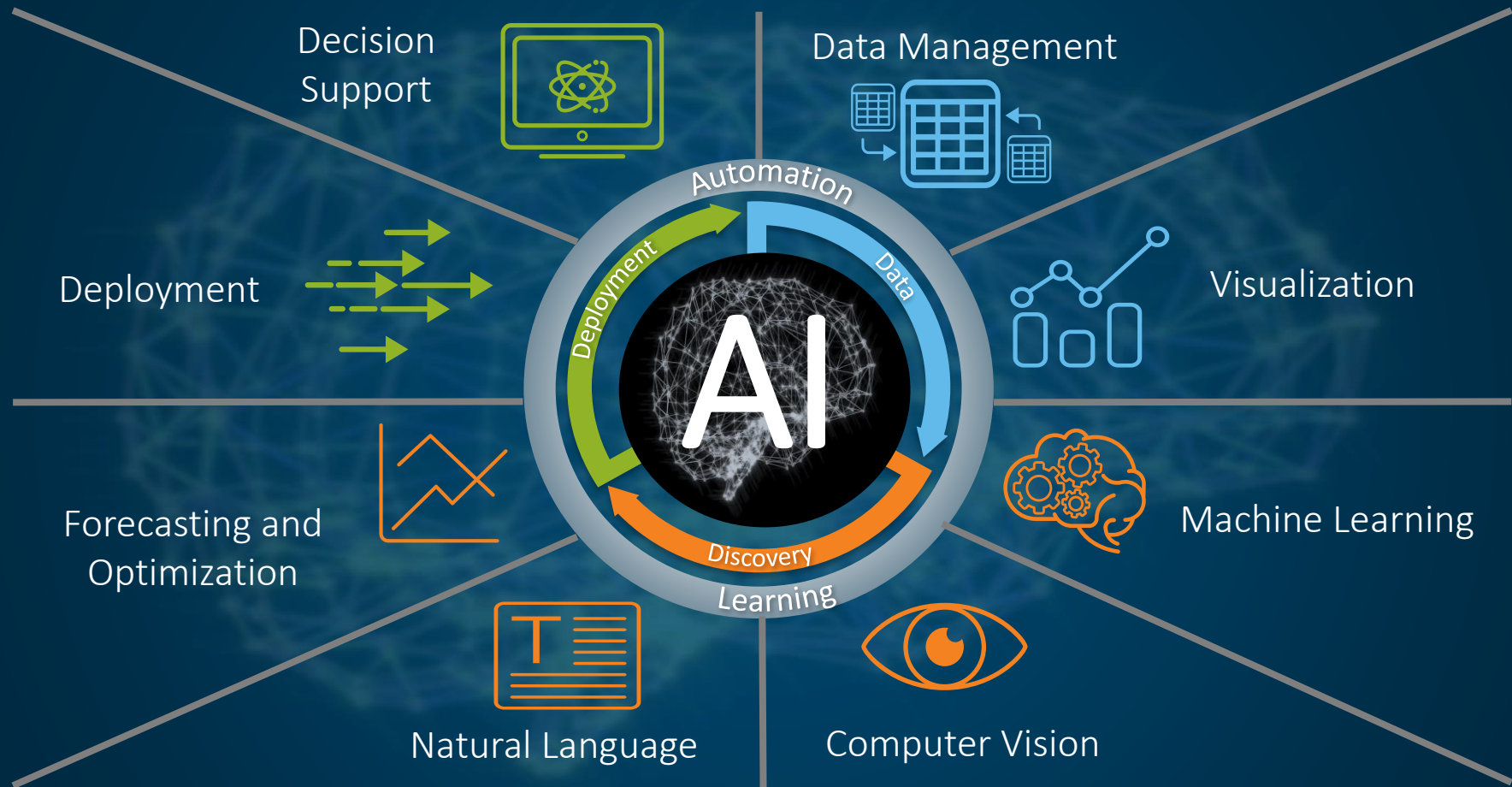
Alongside benefits, **AI** also **raises challenges** for our societies and economies, notably regarding economic shifts and inequalities, competition, transitions in the labour market, and implications for democracy and human rights.

What is the goal with Artificial Intelligence

The OECD AI Principles:

The Recommendation identifies **five** complementary values-based **principles** for the responsible stewardship of trustworthy AI:

- 1) **AI should benefit people and the planet** by driving inclusive growth, sustainable development and well-being.
- 2) **AI systems should** be designed in a way that **respects the rule of law, human rights, democratic values and diversity**, and they should include appropriate safeguards – for example, enabling human intervention where necessary – to ensure a fair and just society.
- 3) There should be **transparency and responsible** disclosure around AI systems to ensure that people understand AI-based outcomes and can challenge them.
- 4) AI systems must function in a **robust, secure and safe way** throughout their life cycles and potential risks should be continually assessed and managed.
- 5) **Organisations** and individuals developing, deploying or operating AI systems should be **held accountable** for their proper functioning in line with the above principles.



Existing uses cases

INFECTION ANALYSIS

Screening tool based on CDC definitions on:

- Sepsis
- Urinary Tract Infection
- Pneumonia
- Total Hip Arthroplasty (Prosthetic Joint Infection)

RISK OF INFECTION

Patient Individual Risk Score of acquiring a Hospital Acquired Infection:

- Urinary Tract Infection
- Sepsis

ANTIBIOTIC STEWARDSHIP

Monitoring the use of antibiotics on admitted patients

Overview of administered antibiotics

Guidelines compliance

48 hours revisit alert

Duration alert

Microbiology results

Indication...

RISK OF READMISSION IN PSYCHIATRY

Screening tool on readmission, restraint episodes and use of specific psychiatry meds.

Risk of readmitted

Planned use cases:
Risk of Restraint
Risk of Suicide

PATIENT-SAFETY

Audit and screening tool based on 56 Patient Safety episodes from international recognized quality model:

- Pressure ulcers
- Patient Fall
- In-hospital stroke
- Transfusion
- ...

DeSeRT
Diagnostics **E**xpert **S**upport System in **R**eal Time –
Faster diagnostic based on blood samples

CLINICAL CODING

Identifying diagnostic codes and procedures in EMR-notes based on the ICD10 taxonomy covering:

- Orthopedic surgery
- Organ surgery
- Most frequently used diagnosis

INTRODUCTION

Patient safety – Analytics for Infections

According to WHO 2016 some important numbers are:

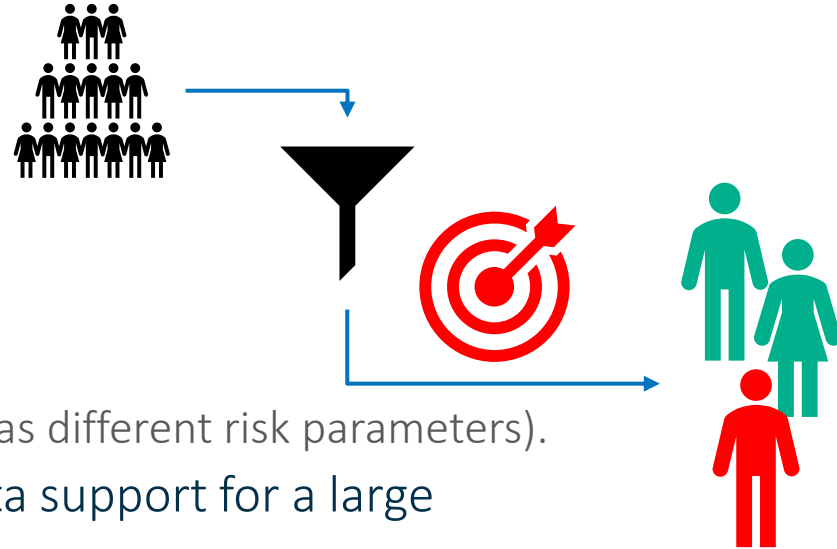
- Europe: 4.1 million patients/year, 37 000 deaths/year/7.49 billion USD
- US: 1.7 million patients/year, 99 000 deaths/year
- In Sweden, this leads to 750.000 additional hospital days at an annual cost of 772 million USD.



Sepsis model

Definitions

- Using Bloodstream Infection (BSI) as target
 - HAI BSI algorithm
 - CAI BSI algorithm
 - BSI algorithm
 - Post surgery BSI algorithm



(Because the doctors think HAI BSI and CAI BSI has different risk parameters).

- Investigating if Sepsis III definition can be data support for a large patient group (not all patients get the necessary tests)
- Patients > 18 years
- Broad algorithms to ensure early interventions via patient segmentation on all admitted patients

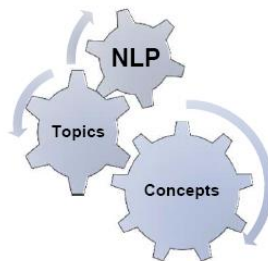
Text Analytics HOW TO BUILD A TAXONOMI

“Example” text from a EMR-note (**unstructured data**)

Doctor Status Note:
Deg juj to koiukelk pert kəhgsmos opoper æpwer mim, sjsæjakeek
Juuk moweri jej keek māgdafufa **fever 38.9** and **pain when urinating**.
Figh babe 20 jyj, kelal'ek ukiukjuin **patient preveiusly had catheter** nandneftge

Trigger-algorithm “**fever**”

Trigger-algorithm “**UTI pain**”



Transforming **unstructured** text into **structured** data (triggers) by **text analytics algorithms**

PID (unique person ID)	Date	Trigger 13 (= fever)
PID (unique person ID)	Date	Trigger 8 (= uti pain)

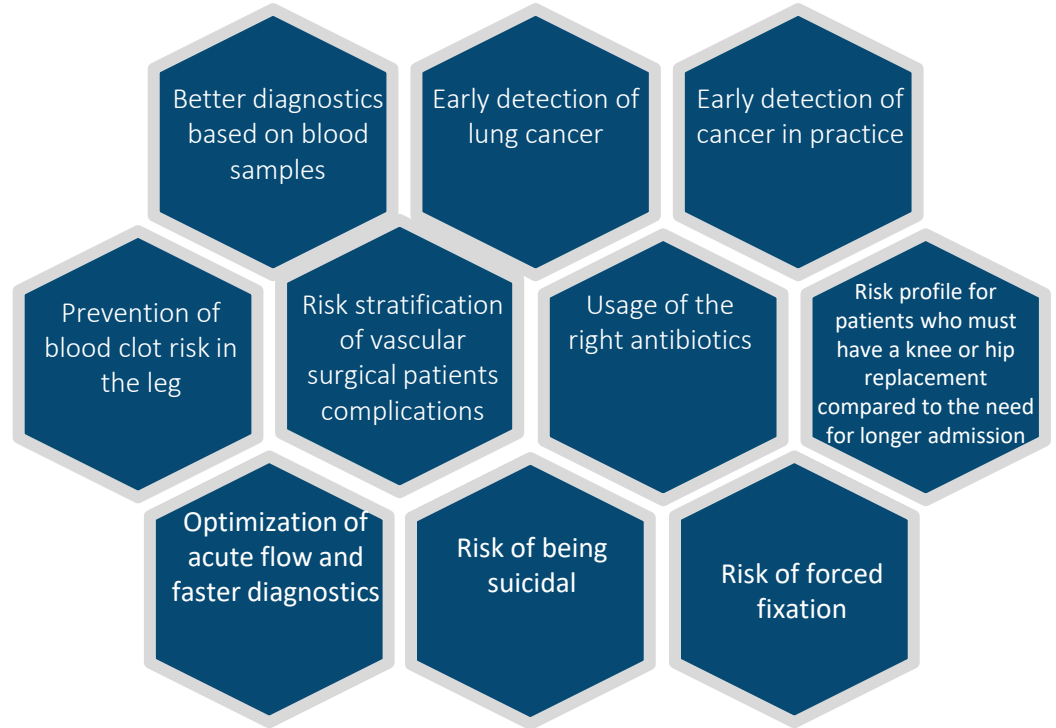
Structured data




AI Innovation generates more innovation



Upcoming AI projects





Thank you
Comments, questions
or feedback?