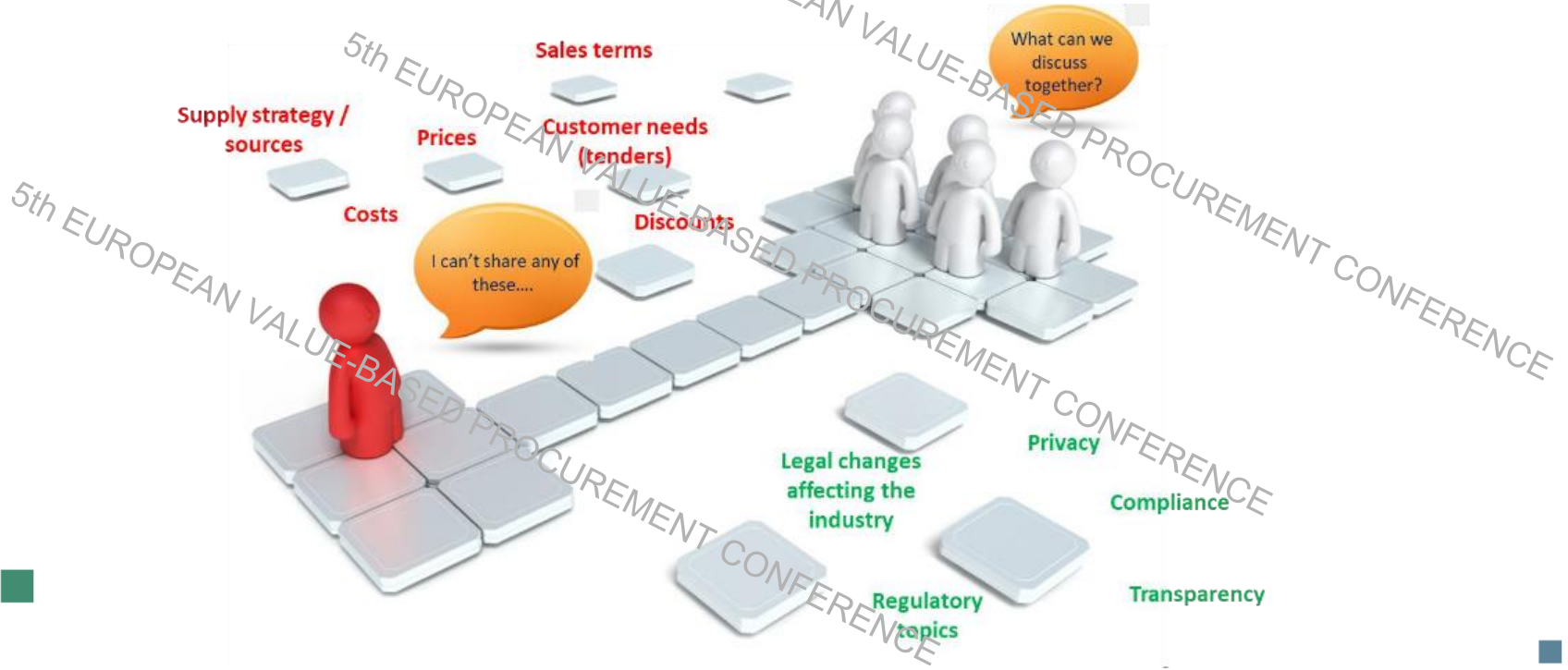


Collecting Value Impact Evidence with Artificial Intelligence

Praful Mehta – CEO, Vamstar

Competition law reminder



Pulse Check

Survey

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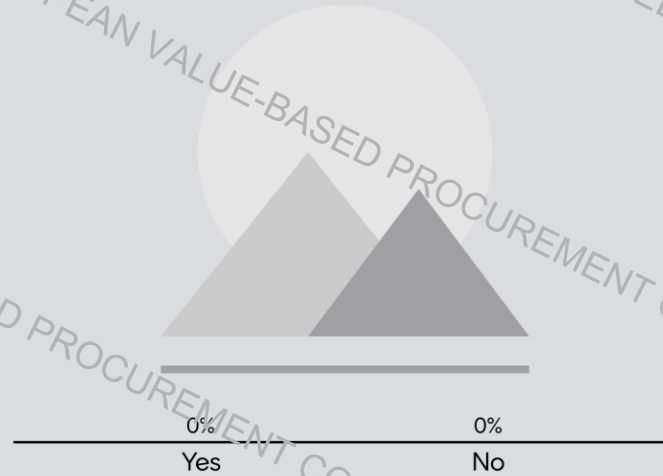
How would you describe the current advent of AI in three words?



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 Mentimeter

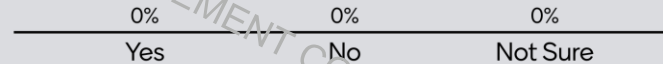
In the past year, have you used or tried out AI and ML techniques for evidence development or collection or analysis?



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 Mentimeter

Are you considering using AI and ML for evidence development or collection or analysis in the next year?



Concepts

Building Blocks

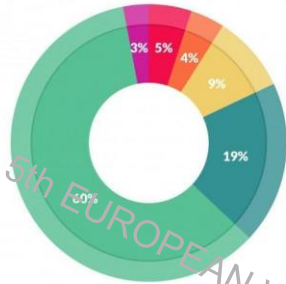
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Data is crucial for effective decision-making, yet it often remains isolated within departmental silos

80% of the job involves collecting, organising, joining, and cleaning data



What data scientists spend the most time doing

- Building training sets: 3%
- Cleaning and organizing data: 60%
- Collecting data sets: 19%
- Mining data for patterns: 9%
- Refining algorithms: 4%
- Other: 5%

SILOS ARE ALL TOO COMMON*

80% of companies report high or moderate degrees of data silos



2/3 experience some degree of shadow (or rogue) data depositories



69% are unable to provide a comprehensive, single customer view



* Big Data Insights and Opportunities, CompTIA



Structured Data VS Unstructured Data

Can be displayed in rows, columns and relational databases

XY	1	2
A	A1	A2
B	B1	B2
C	C1	C2
D	D1	D2

Numbers, dates and strings



Estimated 20% of enterprise data (Gartner)



Requires less storage



Easier to manage and protect with legacy solutions



Unstructured Data



Cannot be displayed in rows, columns and relational databases

Images, audio, video, word processing files, e-mails, spreadsheets



Estimated 80% of enterprise data (Gartner)



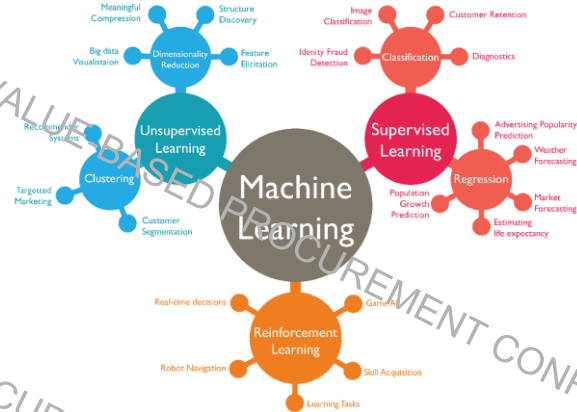
Requires more storage



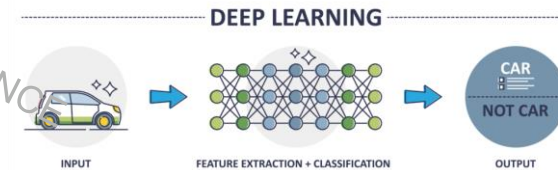
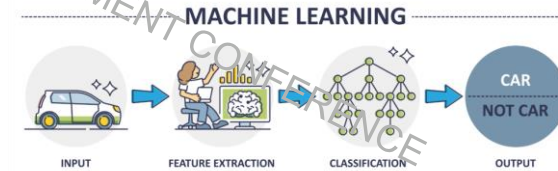
More difficult to manage and protect with legacy solutions



Algorithms serve as the foundation for training models, making predictions, and extracting insights from data



An algorithm is a step-by-step procedure or a set of rules to solve a particular problem



AI is the study and implementation of computer-based systems that mimic or perform tasks requiring human intelligence

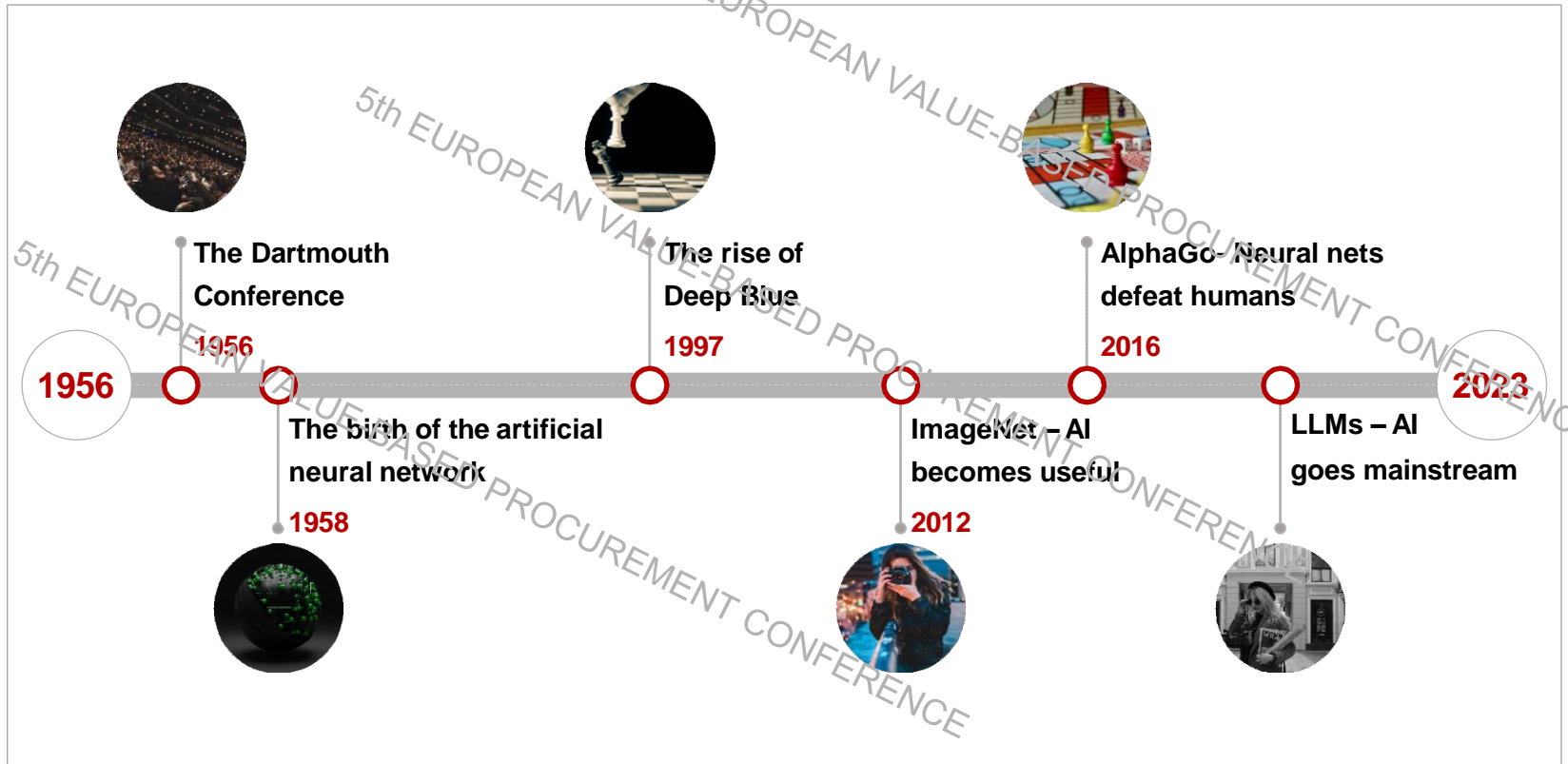
- The study of how to make programs/computers do things that people do better
- The study of how to make computers solve problems which require data, knowledge, and intelligence
- The exciting new effort to make computers think ... machines with minds
- The automation of activities that we associate with human thinking (e.g., decision-making, learning...)
- The art of creating machines that perform functions that require intelligence when performed by people
- The study of mental faculties through the use of computational models
- A field of study that seeks to explain and emulate intelligent behavior in terms of computational processes
- The branch of computer science that is concerned with the automation of intelligent behavior

Thinking machines or machine intelligence

Studying cognitive faculties

Problem Solving and Computer Science

AI has been around for some time, but its development has recently accelerated



Applications of AI

Past, Present, and Future

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Traditional AI was already impactful in healthcare, but LLMs have significantly expanded its applications

Traditional AI

Advent of LLMs

	Detection		Multi-disciplinary synthesis
	Predicting disease progression		Diagnosis
	Diagnosis		Research

Traditional AI and deep learning faced challenges with extensive training data requirements and limitations to specific problems



Define the objective

- Image recognition
- Text summarising
- Playing games

Collect LOTS of data

- Typically, weeks/months of work
- DL models perform better with more training data
- Data also needs to be classified depending on the objective

Train the model on the data

- Very expensive process
- Typically requires access to multiple GPUs
- Only really available to very large companies

Test on unseen samples

- Test whether the model is doing what it's supposed to
- Iterate or abandon

Deploy (if it works!)

- Deploy if model is working
- Handwriting recognition for post is a good example of a successful training/deployment
- You can only deploy in a setting related to what the model has been trained in

LLMs are pre-trained and can greatly speed up data aggregation, synthesis, and analysis on a large scale



Define the objective

- Summarising clinical trial reports
- Extracting key information from patient records
- Writing code for analytics

Create prompts

- Instead of collecting and training we only need to create prompts
- Prompts are “instructions” to the large language model
- You give the model input and ask for output
- “Summarise this clinical trial publication extracting the following key details...”

Hit the API

- Much cheaper than training
- One simple line of code to hit the API
- No knowledge of AI required!

Test on unseen samples

- Test whether the model is doing what it's supposed to
- Iterate or abandon

Deploy (if it works!)

- Deploy if model is working
- Models are deployed in a similar way
- You can fine tune models for your own purpose

Advancements in AI, particularly in Generative AI, may speed up value development and assessment



Faster execution,
shortening the time to
bring new treatments and
devices to patients



More consistent results,
due to automation



Reduced cost of
generating outcome
materials and evidence



AI will greatly decrease product R&D time, including software engineering, evidence development, and commercialisation

Total impact across pharmaceutical and medical products industry¹

\$60-\$110 billion
(3-5% of industry revenue)

Primary divisions impacted are



Product R&D

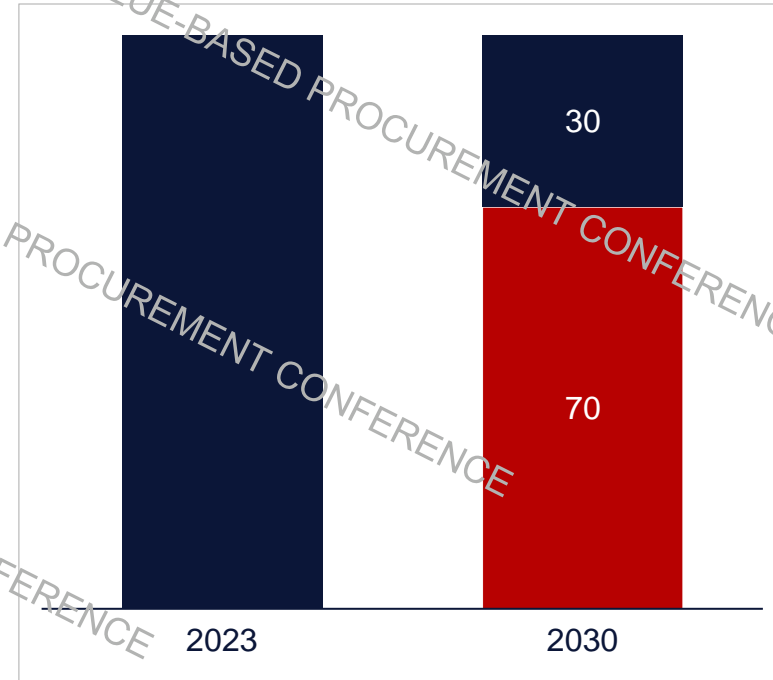


Commercialisation



Software engineering

Across all industries, 30% of hours worked could be automated by 2030²



1) McKinsey & Company (June 2023). The economic potential of generative AI – The next productivity frontier

2) McKinsey Center for Government (July 2023). Generative AI and the future of work

AI needs further evolution to become fully accessible for enterprises and organisations



**“The AI hallucinates,
so we can’t trust it”**



**“This is not fully
ready for enterprises”**



**“It’s a
black box”**



**“Generative AI is biased
due to its training set”**



Use Cases

Evidence to Value

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Data modeling, insight development, and multivariate simulations are crucial for speeding up value analysis



Flexible models that can capture high-dimensional data and complex interdependencies

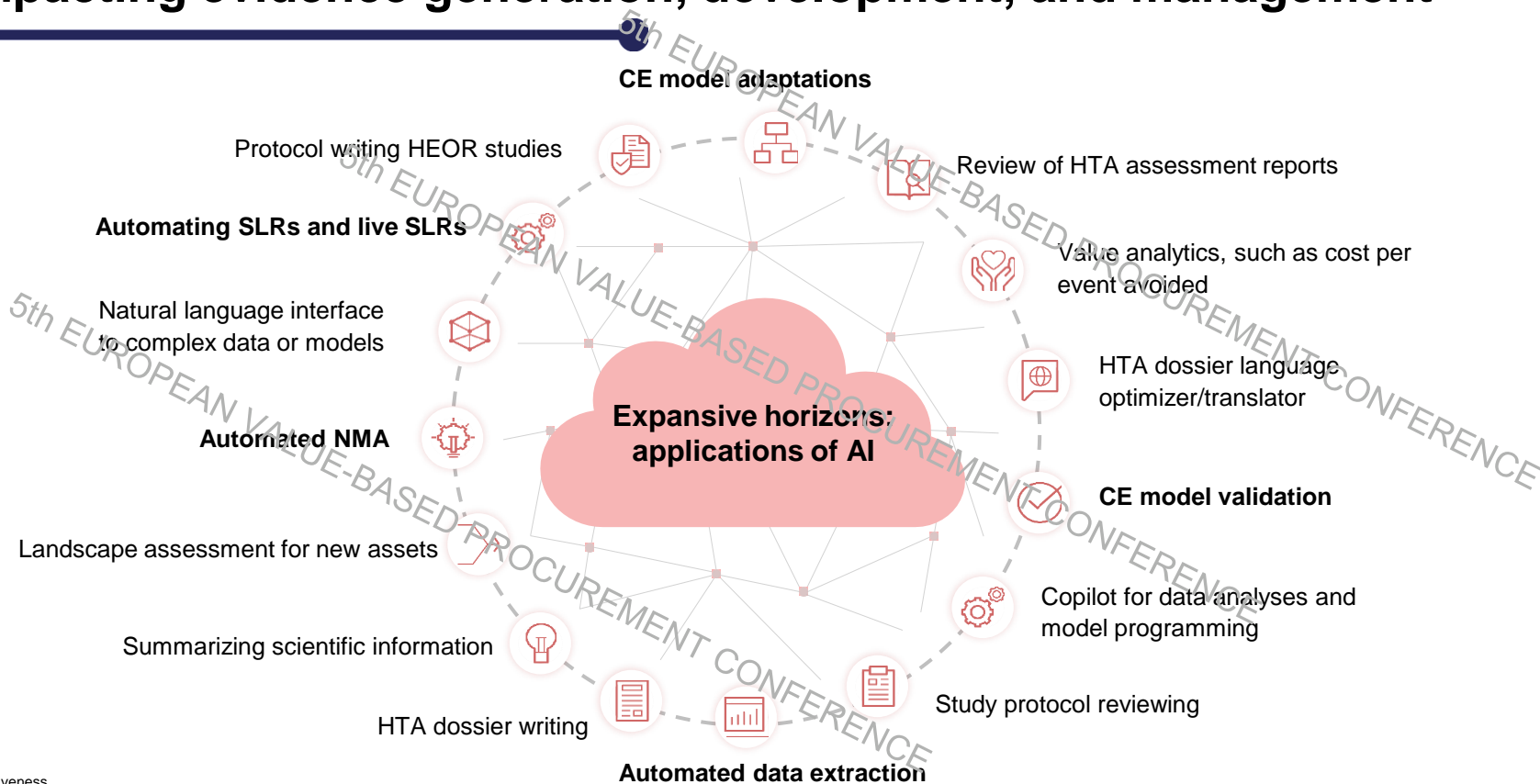


Extracting insights from unstructured data like electronic health records



Stakeholder interaction simulations

AI is improving how we track and manage outcomes data by impacting evidence generation, development, and management



Advancing AI enhances systematic literature reviews, improving care quality and healthcare system efficiency

End to end Systematic Literature Review (SLR)

01

▶ Generate search strings

02

▶ Screen titles and abstracts, and full text

03

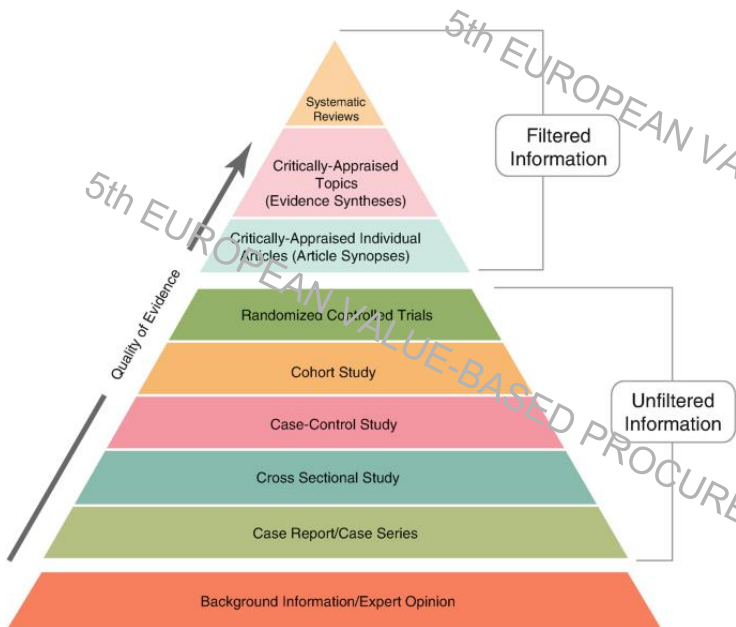
▶ Apply QA checklists (such as Cochrane RoB)

04

▶ Extract data

05

▶ Reporting

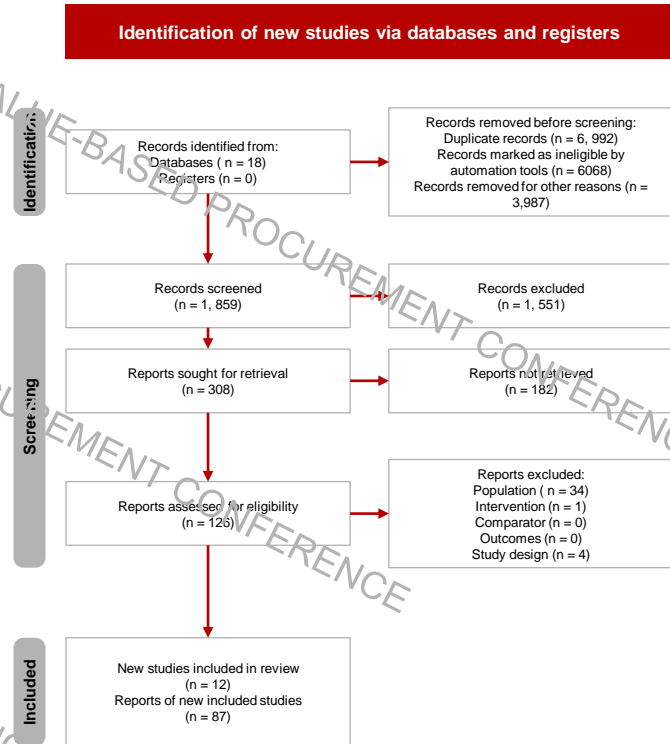


Hierarchy of Evidence

Data from various sources can be extracted, analysed, and visualised for comprehensive evidence evaluation

- Tested on multiple examples including diseases, conditions, and product names
- Accuracy 85-90%; Sensitivity 95%-97%; Specificity 70%-90%
- The process can be incredibly fast – 10,000 abstracts in 10 minutes
- Very detailed data extraction sheets for quality assessment
- PRISMA flow diagram completion

Accurately identify eligible RCTs effortlessly
Highly adaptable to different reviews and easy to use



By integrating a custom NLP network graph with GPT, medical technologies can be analysed more comprehensively

Vamstar's proprietary model can compare all medical technologies across multiple dimensions of evidence

Study Score

Study specific and based on the study type, size, duration, and other parameters

Market Score

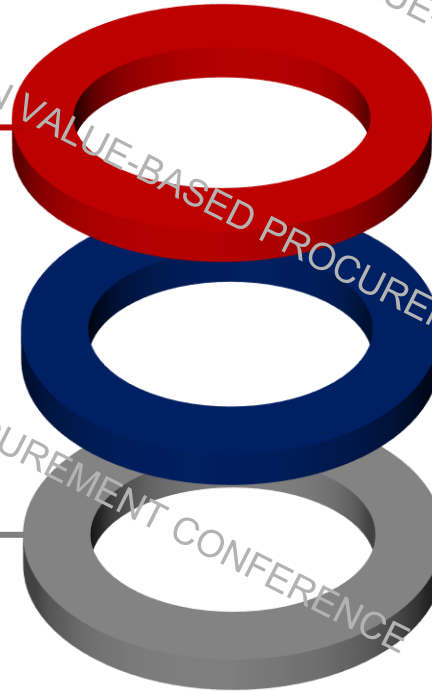
Device specific and based on availability, brochure, complications, and other parameters

Publication Score

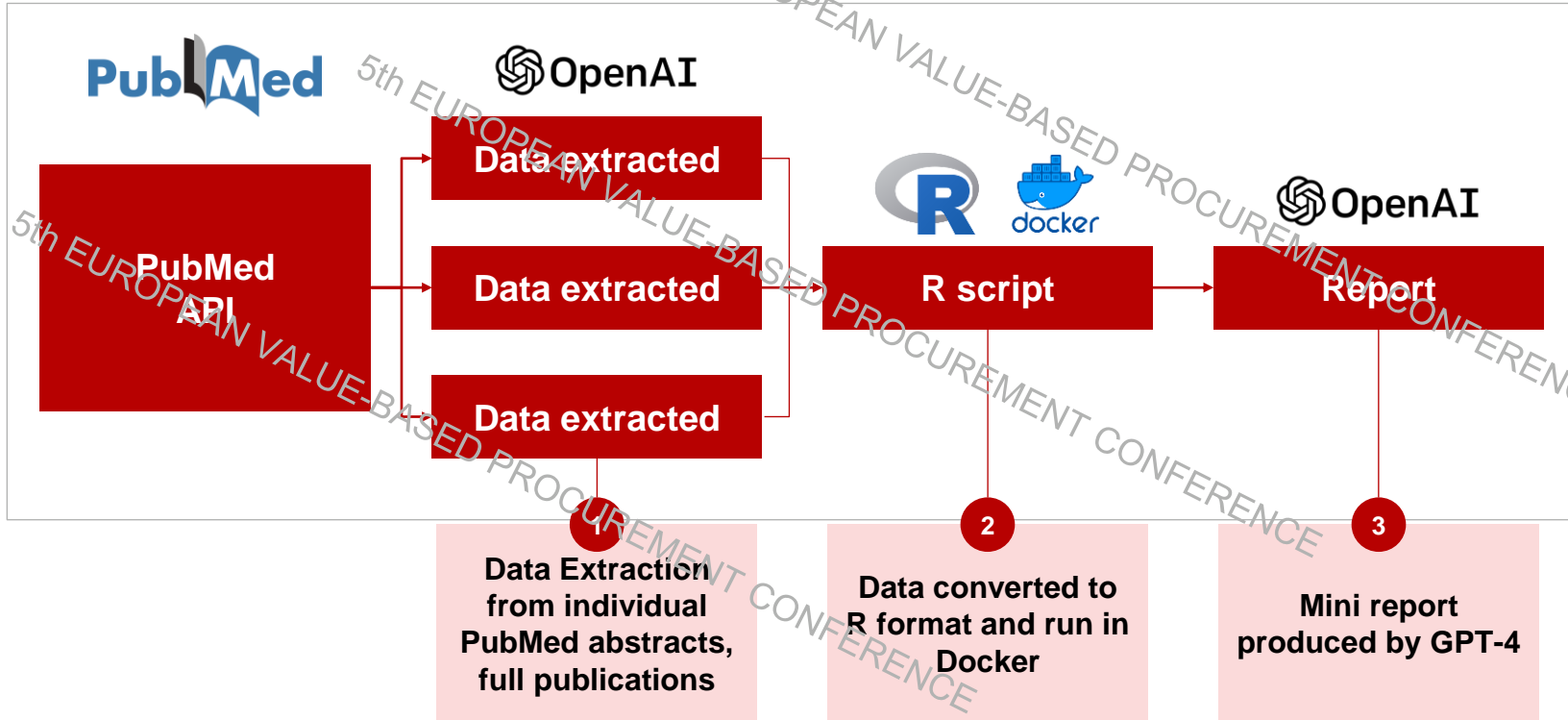
Study specific and based on the journal, availability, funding, and conflict of interest

The information from all studies that are available on a certain device are combined and weighted to reach a conclusion regarding the clinical evidence for the device

Devices with no clinical evidence will surface in search results but are flagged as sitting outside of the scoring methodology



GPT can assist in Network Meta Analysis (NMA), essential for complex medical conditions with multiple treatment options



Summary and Key Challenges

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AI can greatly impact value-based approaches, as shown by numerous industry examples



Earlier attempts to use AI for outcome development and measurement were limited by their narrow focus, data demands, and overall effectiveness



OpenAI has released a series of powerful AI models, but concerns about data privacy persist. Masking proprietary data can help to advance the technology.



Large language models (LLMs) are more versatile than traditional AI models because they are trained on massive amounts of data and can generate new data instances.



Versatile and easily implementable AI is now available, with applications in evidence generation and analysis already in use and more on the horizon



With the right software and processes, we are moving towards a future where outcome-based projects can be completed through natural language commands



With new more powerful models and with things like “fine tuning” this will all get even better quickly!

Path Ahead?

Should we accelerate the adoption of AI in all areas, particularly for evidence generation, development, and analysis, throughout our industry?

About Vamstar

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About Vamstar

- Vamstar is the **MedTech and Pharmaceutical** data and marketplace platform that uses AI to (1) gather and manage **tender and non-tender** data from over **100 countries**, (2) analyse **\$780 billion** of recurring spending to provide insights, (3) automate **commercial** and **procurement** processes, and (4) enhance **supply chain resilience** through network integration
- We collaborate with **public and private buy-and-supply side organisations** worldwide, including hospitals, GPOs, and global MedTech/Pharmaceutical companies
- Our **cloud-based** platform delivers data, analysis, insights, and tools for commercial and procurement teams. The outcome is an interconnected buyer-and-supplier ecosystem
- **Vamstar** was founded by experienced professionals from various industry sectors, including commercial, sales, strategy, technology, tendering, finance, sourcing, and procurement. Our headquarters is in London, United Kingdom, and we have offices in Germany, India, Netherlands, United Arab Emirates, and the United States

86k
BUYERS

40Mn
LOTS

\$780Bn
VALUE



VAMSTAR

Q&A

Vamstar: Data, Insights, and Tools in One AI Platform

Contact us: pratul@vamstar.io

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