

Symbiotic systems

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Why is Generative AI important for R&D

Need: Speed & Productivity

Tool: Automation

Accelerator: Gen AI

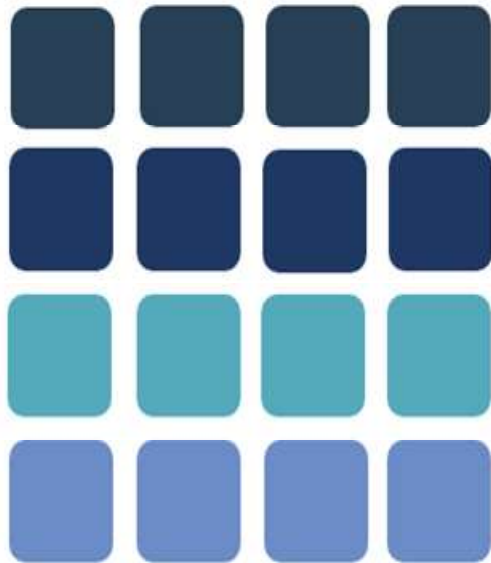
- Knowledge management
- Test automation
- Code refactoring
 - Document generation

And
a Gazillion more
reasons

Why we like Generative AI

Its power to process and interpret vast amounts of **unstructured data**

Structured



- Follows a data model
- Typically maintained in IT systems
- Queryable

Unstructured



- Data is hard to find, hidden
- Vast amount of data to go through
- Relationships are
- Scattered over multiple sources

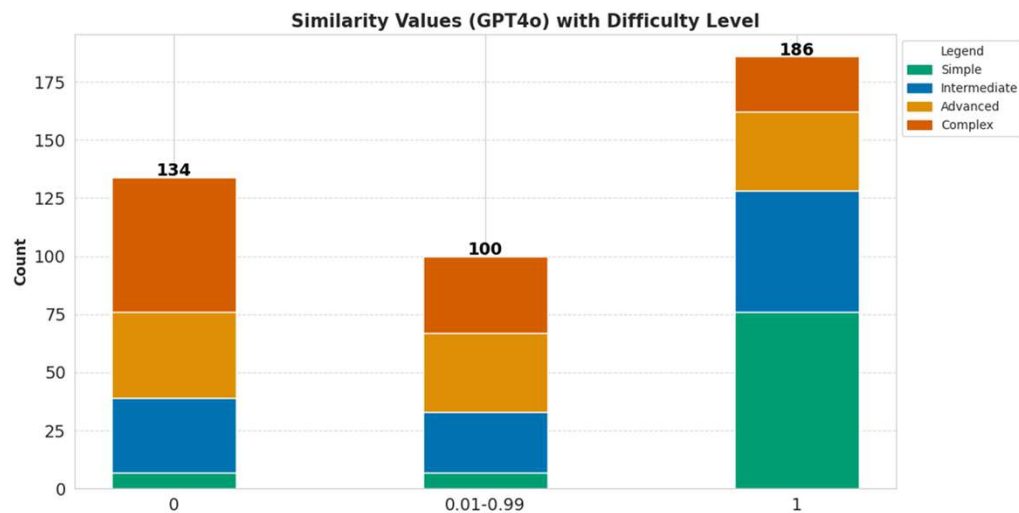
Powerful use of GenAI

- GenAI excels in Interpreting diverse and unstructured data sources
- In R&D we see a lot of unstructured data
 - Complaint record
 - Technical documentation
 - Diagnostics logs
 - Code comments
 - Software Code?
- Scattered data – multiple (IT) systems
- Hard to process / costly
- Oversight over various sources

Interpreting unstructured data is a clear strength of GenAI. Generating data into pre-existing structures is more of a challenge. This is why we see extracting knowledge from code, provided the context is right, to be more successful than generating code

Why do we NOT like Generative AI

We do not trust the answers



Courtesy TNO-ESI, Rosilde Corvino

TNO project on code assistant

- The answers are not always correct
- When difficulty level increases the answers are becoming less accurate
- Traceability / reasoning unclear



The Paradox

We trust a young adult with a drivers license over a self driving car?



AI-generated by GPT-4o

VS



We trust our junior programmer over GenAI coding?



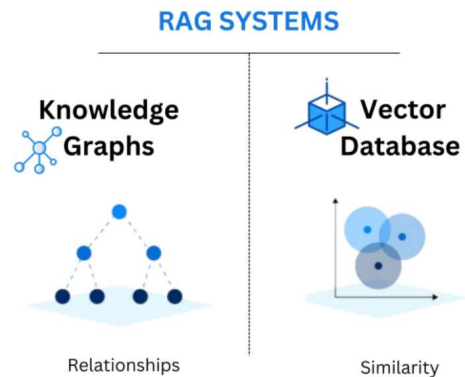
VS



Symbiotic Systems

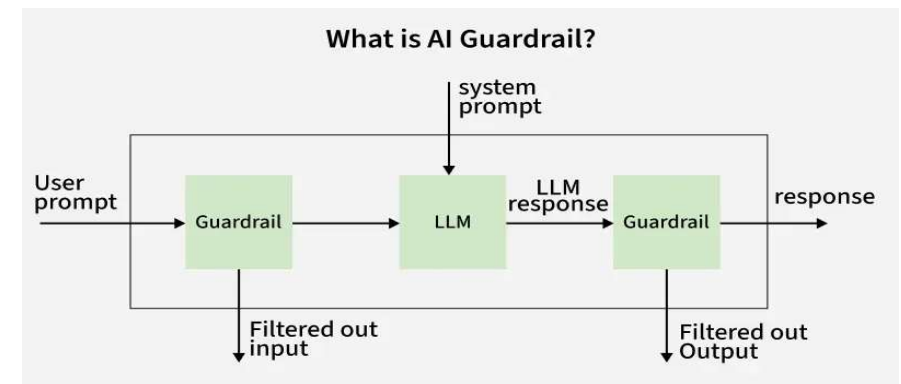
Combining deterministic and non-deterministic tools

Reliability and traceability



- RAG to limit hallucination
- Knowledge graphs combined with vectorization
- Traceability through references from knowledge graph
- E.g. combining renaissance with LLMs

Validating output



- Input and output (widely known from Ethical filtering)
- Qualification / automated tests
- Security checks / coding tools; access control
- Requirements validation/ Design checks
- In Agentic or multi agent systems it can be used to reflect and update the response