Technology and Medical Ethics

Navigating Ethical Healthcare in an Era of Human and Technological Complexity: Exploring the Impact of Clinical Wellbeing, emerging technologies, and Ethical Leadership on decision-making, patient safety, and Medico-Legal; Accountability

Douglas Reed B Sc (Eng), Pr Eng

Atlantic Advanced Technologies

SAMLA NATIONAL CONFERENCE 2026

8–10 October 2026 · Kopanong Hotel & Conference Centre, Benoni

Physically Moving People ... to Virtually Moving People

SOUTH AFRICAN AIRWAYS

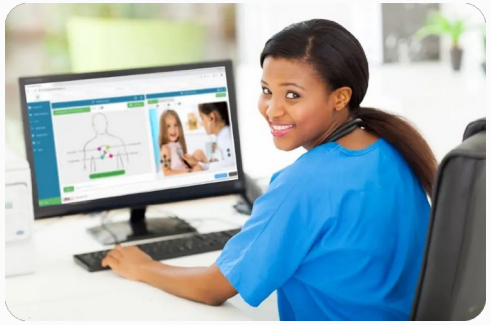
WHERE IT STARTED

Aeronautical Engineer

South African Airways

Moving people physically, efficiently, at scale.

An aircraft is a complicated system with no emotions and feelings



WHERE IT LED TO

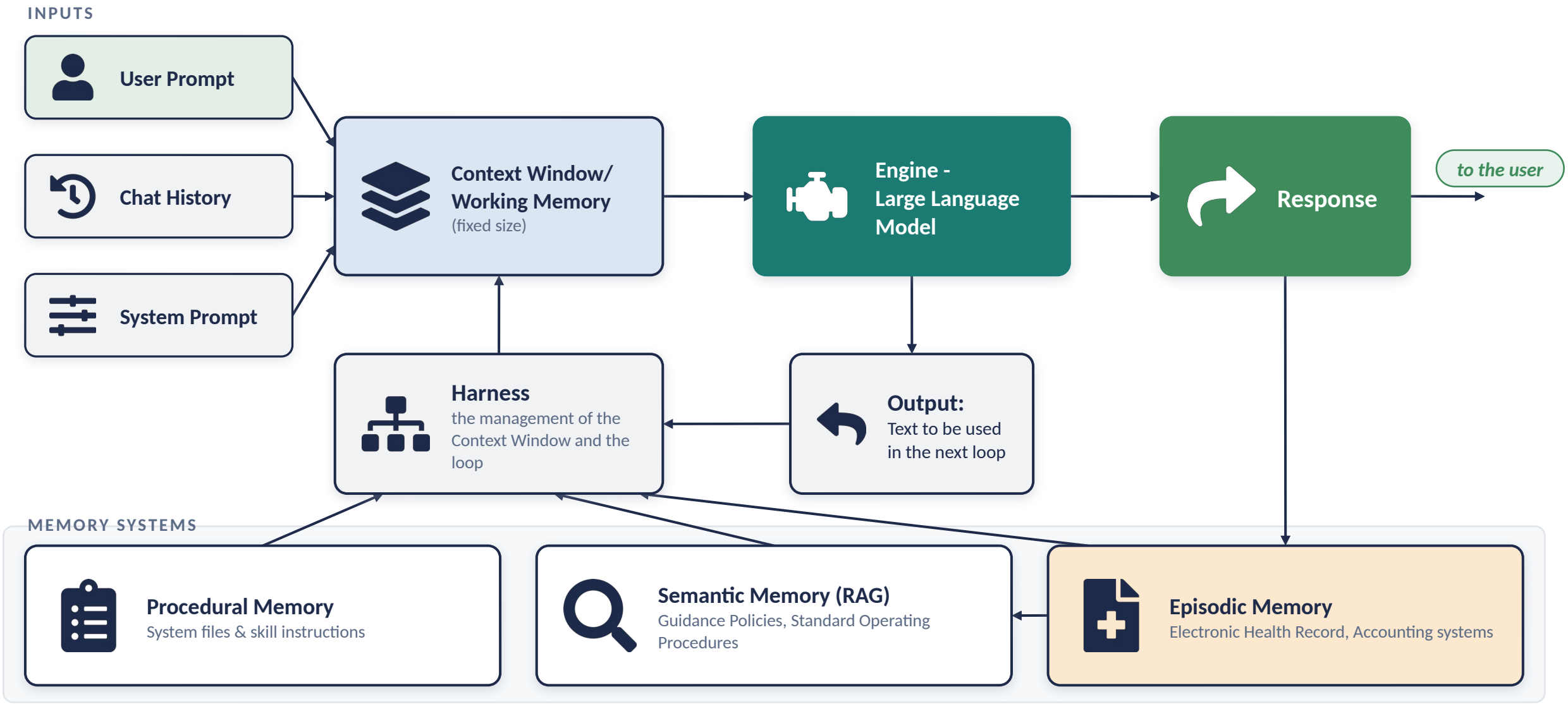
Doc-2U and EasyClinic

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Moving doctors virtually to clinics equipped with integrated medical devices

A human being is a complicated system with emotions and feelings = complex system

Fundamental building blocks of an Agentic AI system



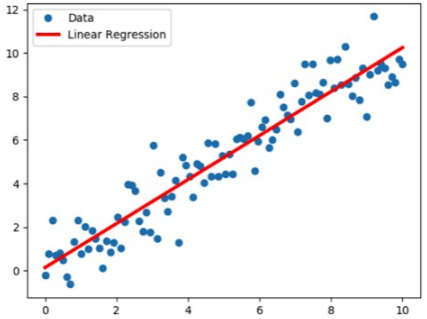
Large Language Model (LLM) considerations



100 tokens ≈ 75 words

Every prompt and reply is priced in tokens not whole words

Text statistical pattern prediction engine



Source: ResearchGate

Model is trained for domain at specific date

1 · Make a Prediction
The model guesses an output from the input

2 · Compared to Known
Measure the gap between the guess and the true answer

3 · Adjust the Model
Nudge its parameters to shrink that gap

4 · Repeat billions of times

Medical LLMs – LLMs do not remember anything from one prompt to the next prompt - dementia!

MedGemma 1.5 4b — built by Google to interpret complex medical text and images · **Free**

61%	65%	69%	90%
CT Classification	MRI Classification	MedQA	EHR Q&A

✓ **Good for summarizing clinical notes** — ⚠ **Not a clinical-decision-support LLM**

MedASR — Google · **Free**

Medical speech-to-text, tuned for clinical dictation and healthcare vocabulary.

≈ 58–82% fewer transcription errors than general-purpose speech-to-text on medical dictation.

Context Window considerations

What Is a Context Window?

Working memory of the Agentic AI platform.

- User prompt
- Contains Chat history
- System Prompts
- RAG Semantic info - Governance database
- RAG episodic info - EMR

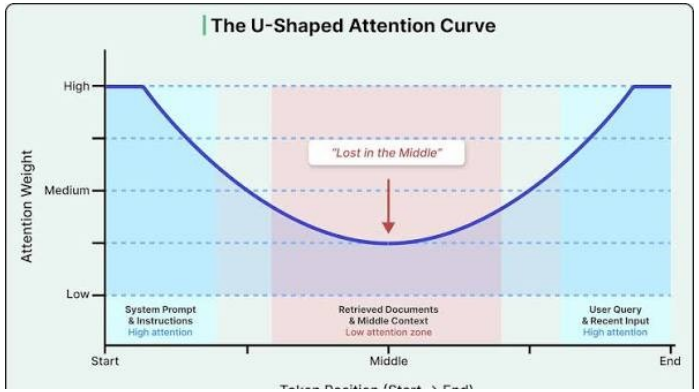
Size of Context Windows

LLMs read and write text in chunks called tokens, not whole words.

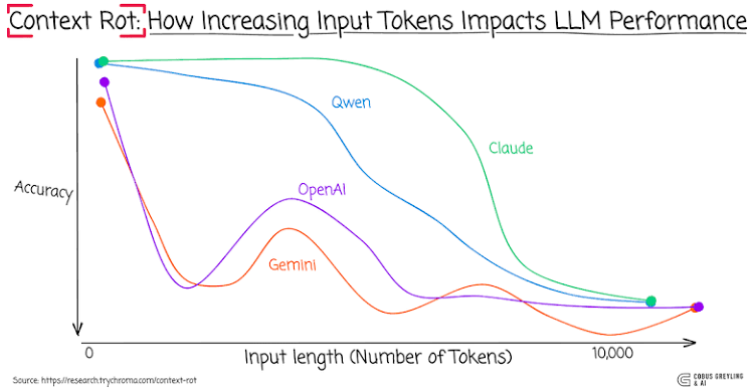
Each LLM has a fixed Context Window size

Impact of accuracy and quality of LLM response – concise prompt (one task at a time) results in better response

Placement curve – "Lost in the middle"

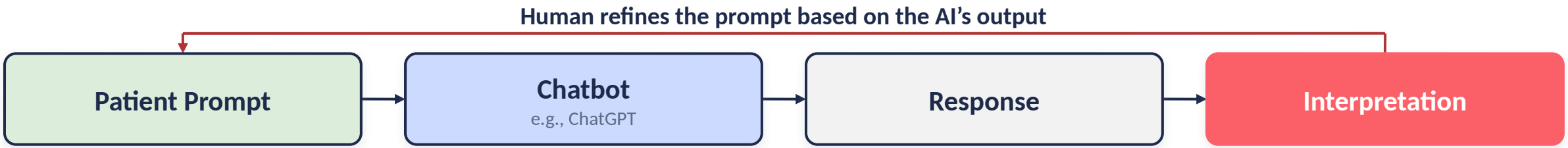


Volume Curve – "Context Rot"



CASE 1

Patients using chatbots to self-diagnose



Prompt Considerations

① How is the prompt framed

② What Constraints are given

③ What context is included

④ Is intent clearly expressed

Response & Interpretation

① Interpretation

Requires critical reasoning — literature, history, philosophy: the humanities.

- **Ethical** judgement
- **Interpretative** judgement
- **Cultural** judgement
- **Communicative** judgement

② Decision & Action

Turning response into a decision — e.g., a care plan, a next step.

⚠ Diagnostic Risk

Accuracy of wearables — the data feeding the prompt may itself be unreliable.

Input limited by context-window size — the Chatbot may not see the full picture.

Interpretation of the output — the patient may misread what the Chatbot is really saying.

CASE 2

Using an AI System for Differential Diagnosis

Gather Clues	Create a List	Physical Exam	Order Tests	Plan
Prompt and Medical Device Inputs	Response from AI system			



- Context window size fixed
- Visual presentation A picture = 1,000 words
- Framing: context, tone, constraints (symptoms)
- Accuracy of wearables
- Health history
- Lifestyle
- Exact signs or pain



- Creates a list of possible conditions — but not comprehensive
- The clinician writes down all the possible illnesses that could match the patient's signs.



- The clinician examines the body to determine what is healthy and what is not.
- Interpretation



- AI assistance reading lab test results
- AI assistance reading images — 2D & 3D scans
- Structured vs. unstructured data

Lab tests and scans

Results are used to eliminate the wrong options until the true cause remains.



- AI-generated summary notes
- Care plans
- Prescriptions (scripts)
- Accountability

The Core Limitation:

AI doesn't tell us which answers **MATTER**, which inputs need to be **PRIORITIZED**, which interpretations are **REASONABLE**, or which consequences are **TOLERABLE**.

What does all this mean for healthcare

Two use cases which show the limitations of AI in healthcare

Use of a Chatbots by patients

- Patient with limited domain skills
- Accuracy of information supplied to the Context Window, wearables, patient prompt - Garbage in Garbage out (GiGo)

Substituting Differential Diagnosis with AI

- Size limit of the Context Window
- Accuracy of information supplied to the Context Window Garbage in Garbage out (GiGo)
- Limited longitudinal health record

People are complex systems

- People emotional and evolve over time, unlike complicated machines like aircraft, power stations
- Physiological
- Psychological

What is clear there needs to be a human to understand/interpret the AI response/output, which is determined by the input/prompt

Treat either in isolation, and you miss where the risk is.

Where the Risk Actually Lives

- The point where a tired clinician meets an unvalidated tool.
- In primary care, the **doctor** is the centre of interpretation.
- Inside a culture that does — or does not — make it safe to speak up.
- In the hospital, the **nurse** is the centre of interpretation.

Where can we use AI for better Healthcare

Summary notes and language translation

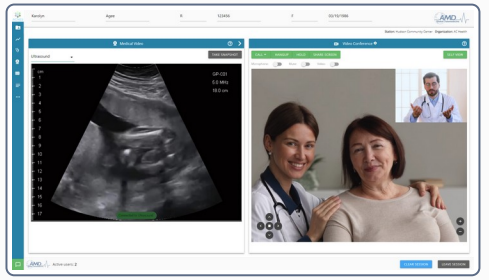


Reducing clinician burnouts which reduces misdiagnosis



Providing healthcare in the patient's mother tongue, better diagnosis

Building software products example creating Doc-2U platform



- Providing expert healthcare to anybody anywhere – closing the equity gap
- No need for both the doctor and patient to travel
- No cost to the doctor/specialist and no need to download software
- Easy to start a medical practice, minimal startup costs
- Clinical-grade medical devices to make a diagnosis, reducing the medico-legal risk

When technology is designed, implemented and used with the four ethical principles (Autonomy, Beneficence, Non-maleficence, and Justice) in mind, it strengthens trust, protects patients, and leads to better, more equitable healthcare for all.

AI in healthcare needs human interpretation

Douglas Reed **email: doug.reed@atlantic.co.za**

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