Synthetic Data Generation:nThe “Clinical Turing Test”

Generative AI in the Hospital: Privacy-Compliant & Realistic?

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The Data Dilemma in Medicine

AI research requires data.

However, patient data is strictly protected (GDPR/ HIPAA).

The Challenges:

- Real clinical documents cannot leave the hospital infrastructure.

Data Access

Barrier: Hospital boundaries and legal constraints.

Need: Realistic text without real patients.

- Anonymization is expensive, error-prone, and often destroys context.
- **Result:** A “chicken-and-egg” problem for medical NLP models.

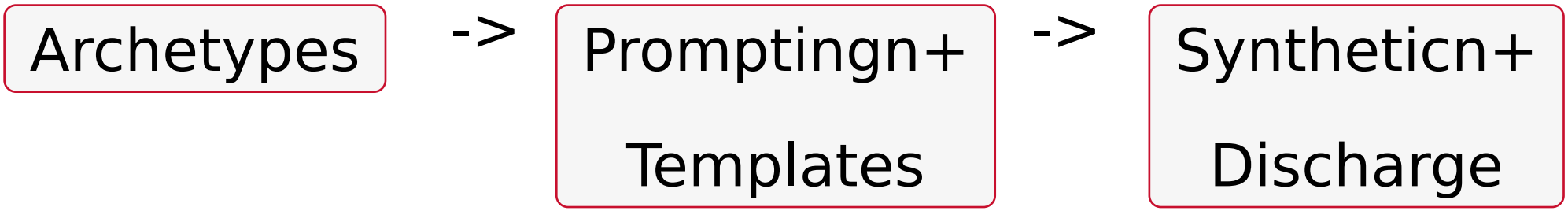
The Solution: We generate **synthetic discharge summaries** that are statistically and medically indistinguishable from real data but do not correspond to actual patients.

Project C: The Pipeline We use local, open-source LLMs (e.g., Llama 3, Mistral) running “on-premise”.

The Workflow:

1. **Input (Medics):** Define structured patient scenarios (“Archetypes”).
    - **Ex:** Female, 82 y/o, hip fracture, history of dementia, anticoagulation.

2. **Generation (CS):** Build a pipeline using **Few-Shot Prompting**.
    - Use real, anonymized letters as “style templates”.
3. **Output:** A fully generated, coherent discharge letter.



Tech Stack: Python, Ollama, LangChain/LiteLLM.

The ‘Clinical Turing Test’

Can AI models write like a senior physician?

The Scientific Question:

Does the model maintain medical logic (internal consistency) or does it

Blind Review

Real + Synthetic are shuffled.

Reviewers score realism and logic.

hallucinate (e.g., prescribing penicillin despite a known allergy)?

The Experiment:

- We mix 20 real (anonymized) and 20 synthetic letters.

- **Blind Review:** Medical students/doctors evaluate the documents.
- **The Goal:** If you cannot tell the difference, the test is passed.

Who We Need & What You Learn We are looking for a mixed team (1-4 students):

Computer Scientists

- **Prompt Engineering:** How to precisely steer LLMs?
- **Constraint Checking:** Validating LLM

Medical Students

- **Scenario Design:** What defines a complex clinical case?
- **Review:** Critically evaluating AI hallucinations.

Ready for the Turing Test?

Feel free to contact us!

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