Care Connect: Using LLMs to Improve Patient Care & Hospital Efficiency

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Project Overview

Introducing ´Care Connect`, an interactive assistant platform that can save time and energy, with the ultimate goal to improve patient care. The introduction of automation has potential to increase efficiency in the workplace, a significant factor in hospitals with many countries facing an ageing population, increasing the need for healthcare workers.

Problem Statement

Time is paramount in a healthcare environment and can sometimes be a matter between life and death. Often, clinical staff lack specific knowledge and are unable to access necessary data for effective monitoring of a patient's surroundings.

There are several types of data that can impact a patient's satisfaction.

- Temperature
- Humidity
- Air Quality

These challenges lead to a higher workload, and ultimately, compromises the quality of care that hospitals aim to provide.
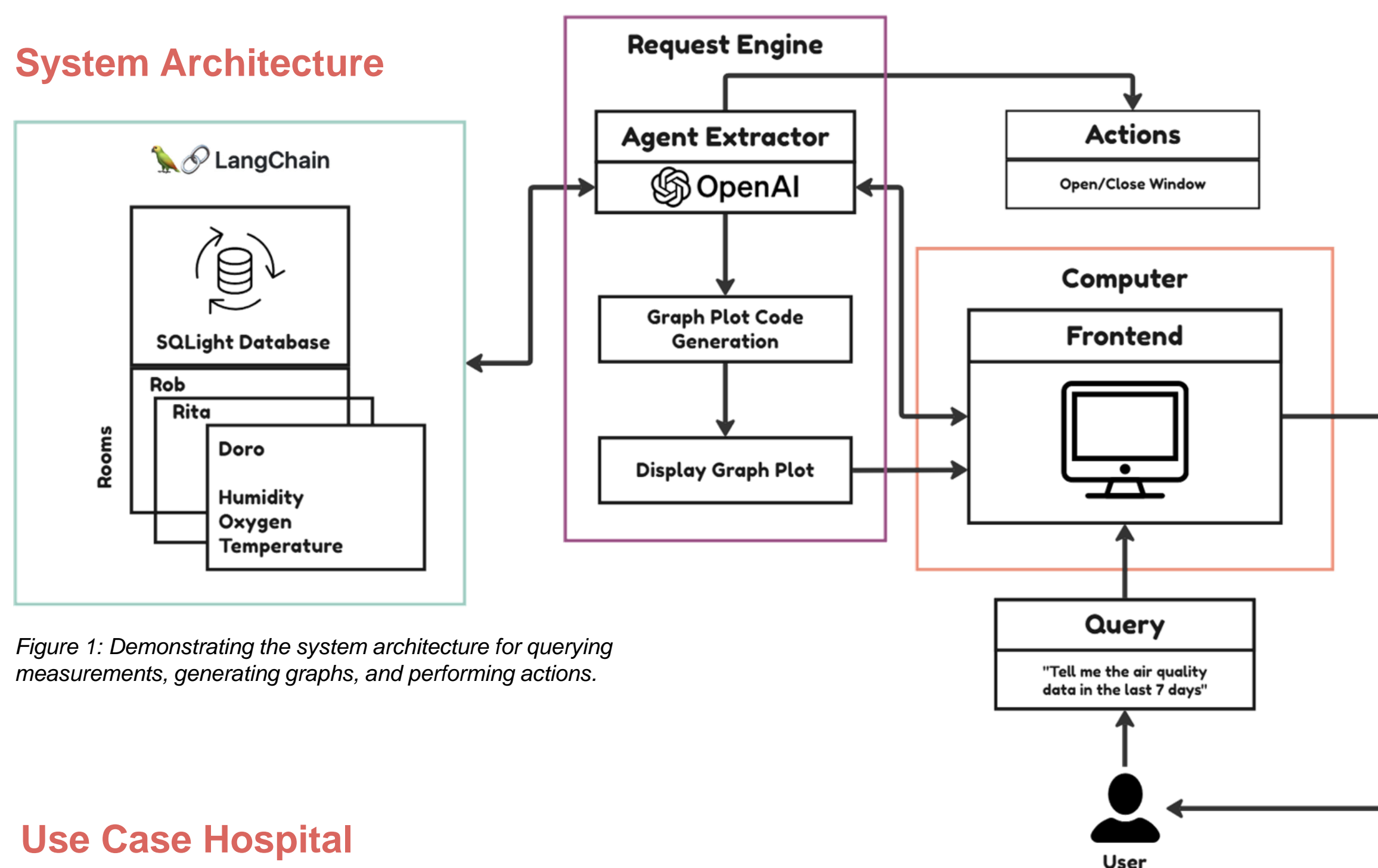
System Architecture

Figure 1: Demonstrating the system architecture for querying measurements, generating graphs, and performing actions.
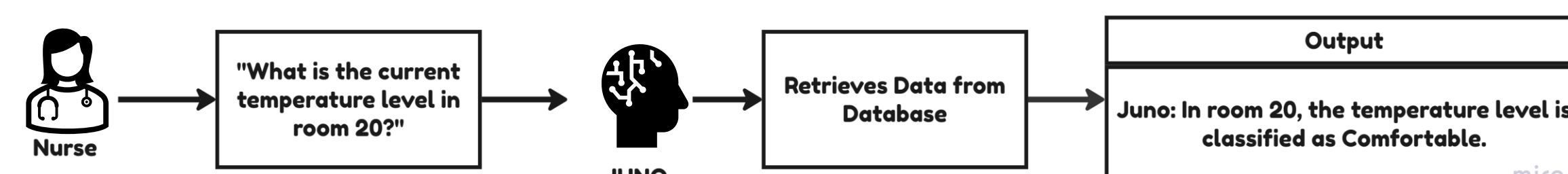
Use Case Hospital

Figure 2: An example of a use case. A nurse requests the current temperature of a room.

Solution
Care Connect

Need for Monitoring Environment for Patient Health and Safety

Time constraints as staff is working at full capacity

Background

- Poor air quality increases the duration of hospitalization by 3 to 5 days on average.
- High concentration of air pollutants is associated with a 36% higher likelihood to be hospitalized in an ICU.
- Suboptimal air temperature can increase recovery time, wound healing and the time spent in hospital significantly.

Aims

- Explore the possibilities for LLMs in public spaces.
- Demonstrate the use case for healthcare workers and hospital staff.
- Investigate automation practices for increasing efficiency in public spaces.

Objectives

- Utilise a database to retrieve and interpret data for healthcare-focused LLM prompts.
- Employ the use of Python to create an user-friendly interface to demo the interaction between AI assistant and users.
- Exhibit an automation feature using a robotic arm.

Process and Interdisciplinarity

We followed the Design Thinking Process including a user-centered approach. All group members participated in the empathizing, defining and ideation phase, which enabled us to clearly define problems and solution. We successfully communicated and collaborated in all stages of the project. We discussed the issues we faced along the way including every team member's opinion in order to get the maximum amount of work with the minimum amount of obstacles.

Use Cases

Commercial, Public and Industrial Buildings

Offices Buildings
- Company facilities
- Governmental buildings (e.g. townhall)

Educational Institutes
- Universities
- Schools
- Kindergarden

Commercial Buildings
- Malls
- Hotels
- Convention centers

Healthcare Facilities
- Hospitals
- Carehomes

Public Venues
- Airports
- Museums
- Botanical gardens

Future Plans & Potentials

- Develop automation with LLMs to improve efficiency (Robot dog/assistant)
- Text to Speech & Speech Recognition
- Setup System (e.g. User Accounts)
- Connecting with staff and patient data
- Define on-boarding of hospital employees

Market, Trends and Environment

Building Automation Market:
2023 global market approx. USD 88.4 billion
Projected CAGR of approx. 12 % by 2028

PESTEL-Analysis

Political E S T E L

Healthcare Policies and Regulations: government investments in healthcare infrastructure and digitalization drives improvements in hospital efficiency, patient care and safety (e.g. Austria's Health Reform)

User Personas

Andrea Müller
Nurse on Oncology Ward

I have limited time for each patient due to staff shortages and bureaucratic tasks take time away from patient care.

Competitor Analysis

LLM Integration

CareConnect ✓
airly ✗
thinxtra ✗

Business Model

Business Model Canvas CareConnect

Key Partners | Key Activities | Value Proposition | Customer Relationship | Customer Segments
Key Resources | | | Channels |
Cost Structure | | Revenue Streams |