CitiusTech

Shaping Healthcare Possibilities

Transforming patient care co-ordination for a leading Health System on Google Cloud

The client is a non-profit American academic medical center, and as part of its 2030 Vision, sought to develop digital products to enhance patient care management. CitiusTech, a strategic partner, was tasked with creating a solution that would allow patient-facing teams to identify the optimal care team members for specific clinical scenarios and facilitate curb-side consults. The resulting solution leveraged data-driven frameworks to quantify clinician expertise across 90+ specialties.

CASE STUDY

BUSINESS CHALLENGE

A scalable solution to improve accuracy in identifying the right care team member for each medical scenario

As the client expanded its reach and reputation, maintaining an accurate repository of care team member expertise emerged as a critical challenge. The client was looking to collaborate and define the multi-disciplinary approach to patient care, while eliminating the outdated processes. Physicians, burdened by self-declaration requirements, often hesitated to update their expertise profiles. Consequently, the clinic struggled to identify the right team members for specific clinical scenarios, leading to delays in care delivery.

The existing web-based tools, hindered by outdated data and subjective definitions of clinical expertise, did not offer an optimal solution. The consequences were twofold: first, care team members spent valuable time making multiple calls and engaging with secondary contacts to find relevant care providers; second, an uneven distribution of workload persisted, with some clinicians receiving a disproportionate number of referrals.

In this context, the client needed a transformative solution—one that would objectively quantify clinician expertise, streamline care team identification, and improve patient outcomes. The business imperative was clear: enhance efficiency, reduce delays, and ensure optimal allocation of resources.

THE SOLUTION

Revolutionizing clinical expertise: A cloud-driven framework for informed decision-making

The solution entailed the development of a cloud-based, data-driven framework designed to assess expertise related to clinical conditions and medical procedures. This framework empowered care providers with an objective, scalable approach to quantify their proficiency.

Salient features:

- **Expertise Framework:** Leveraging internal and external data sources (including billing, research publications, and physicians' biographies), the system quantified clinical expertise. This data-driven model enabled accurate assessments for specific conditions or procedures.

- **Natural Language Processing (NLP):** The solution possessed the ability to understand natural language queries, extract relevant medical entities, and convert them into standardized medical codes (such as ICD 10 and CPT).

- **Semantic Search:** By utilizing pre-trained sentence embedding models, the system transformed text into multi-dimensional vectors, facilitating semantic search. This allowed for precise information extraction from care providers' profiles and resumes.

- **ML Modeling:** Internal consults data informed the development of a model that assigned importance to expertise data markers. This mimicked the decision-making process used by clinicians to identify relevant care providers for specific clinical scenarios.

SOLUTION ARCHITECTURE

- **Cloud Services:** The solution was cloud-native, leveraging Google Cloud's robust infrastructure.

- **Database Management:** BigQuery stored, transformed, and retrieved data from diverse sources (including revenue management/billing data, biographies, and PubMed).

- **API Management:**

  a. Google Cloud Run deployed various microservices, including batched jobs for maintenance.

  b. Google Compute Engine hosted and served large language models capable of understanding biomedical natural language.

  c. Google BigQuery ML facilitated efficient machine learning routines on extensive datasets, yielding results comparable to custom training.

This transformative solution addressed the client's need for informed decision-making, streamlined care team identification, and improved patient outcomes.

Unlocking clinical efficiency: Transformative outcomes

Enhanced accuracy and efficiency - Achieved an impressive 85% accuracy in identifying the right care team member across 90 medical specialties. This precision significantly streamlined patient care coordination.

Accelerated development timeline - By constructing 100% reusable subcomponents through microservices, we saved approximately 10 months of development time. This efficiency allowed us to focus on critical enhancements.

Expanded search capabilities - Empowered users to search across a vast network of 5,000+ physicians and 2,000+ advanced care providers—an unprecedented capability that was previously unattainable.

Gained holistic responses and improved user experience - Seamlessly integrated the solution into the customer's enterprise-wide clinical search, resulting in more comprehensive responses to user queries.

Dramatic increase in query response rate - Witnessed an impressive 80-90% surge in query response rates compared to the previous search engine.

Enterprise-wide adoption and workload coordination - Demonstrated consistent growth in adoption across the enterprise:

30% year-on-year increase in weekly searches (from 330 in 2023 to 430 in 2024).

Sustained 3% monthly growth in search volume throughout 2024, in contrast to the 9% decline observed in 2023. This facilitated seamless coordination and workload sharing across medical specialties and care providers.

ABOUT THE CUSTOMER

Founded in 1864, the client is a non-profit American Academic Medical Center and has more than 63K employees and spread across three major campuses in Minnesota, Jacksonville, and Florida.

With a legacy of 159 years, the client is as an Healthcare provider organization generates a revenue of more than $15 billion per year. It was ranked as the topmost hospital for seven consecutive years.

Drawing in patients from around the globe, the client performs near the highest number of transplants in the country, including both solid organ and hematologic transplantation.

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CitiusTech is a global IT services, consulting, and business solutions enterprise 100% focused on the healthcare and life sciences industry. We enable 140+ enterprises to build a human-first ecosystem that is efficient, effective, and equitable with deep domain expertise and next-gen technology.

With over 8,500 healthcare technology professionals worldwide, CitiusTech powers healthcare digital innovation, business transformation and industry-wide convergence through next-generation technologies, solutions, and products.

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