



# Product Strategy Case Study.

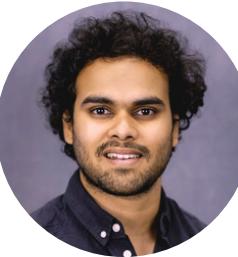
AI-Powered Radiology Transforming  
Patient Care with Bayer & Google

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# About Bayer

Bayer, a life-science company with a rich heritage spanning over **100 years in radiology**, is dedicated to excellence in patient care through innovative products and high-quality services.

The company offers a robust portfolio of contrast media for various imaging modalities like computed tomography (CT), X-ray, and magnetic resonance imaging (MRI), complemented by precise administration devices and AI-enhanced informatics solutions.

In 2023, Bayer's radiology products generated approximately **€2 billion in sales**, highlighting their commitment to ongoing research and development aimed at pioneering advances in medical imaging.



# About Google

Google Cloud sets the standard for modern cloud computing, offering an advanced suite of AI, infrastructure, developer tools, and security solutions designed for the future.

It features a fully integrated and optimized AI stack, built on proprietary, planet-scale infrastructure and custom chips. This platform supports a range of transformative AI-powered applications, helping organizations worldwide innovate and grow.

Trusted by customers in over **200 countries** and recognized for its ***leading security measures***, including solutions from Chronicle and Mandiant, which ensure exemplary data management, quality, and consistency.



# Problem Statement



## Burnout and Overload

Radiologists are overwhelmed by the sheer volume of medical imaging data, leading to fatigue and burnout.



## Data Complexity

Medical imaging data accounts for **90%** of all healthcare data, making it challenging to process and analyze efficiently.



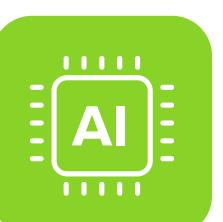
## Analytical Limitations

Current radiological tools must improve their ability to perform advanced predictive analytics, which is essential for delivering personalized patient care.



## Regulatory Hurdles

Developing compliant, scalable AI solutions that integrate with existing healthcare systems is complex and costly.



## AI Integration Challenges

Modern AI tech often struggle to seamlessly integrate with existing healthcare infrastructures, hindering the adoption of new solutions.



## Security Challenges

Life science companies struggle to manage sensitive data at scale while meeting strict security, compliance, and privacy standards.

# Proposed Solutions



## Efficiency & Reduced Workload

AI-powered image processing using **Vertex AI** and Bayer's expertise reduces radiologist burnout, allowing focus on complex tasks.



## Predictive Analytics & Integration

Bayer-Google's **multimodal AI** improves predictive care by analyzing both text and imaging data, ensuring seamless system integration and regulatory compliance.



## Security & Continuous Improvement

Built on Google Cloud, the platform ensures **HIPAA/GDPR** compliance, secure data management, and ongoing bias detection with continuous system improvements.

# Competitors



# Competitive Advantage



## 01

### Extensive Global Radiology and Healthcare Network

Bayer's vast network spans ***Europe, North America, Asia, and Latin America***, providing a significant competitive advantage through collaborations with radiology departments and healthcare institutions across these regions. This global reach facilitates data collection from ***diverse clinical environments***, enabling access to large, ***real-world datasets crucial for training AI models***. By utilizing high-quality data from varied healthcare settings, the Bayer-Google collaboration ensures that its AI solutions are highly accurate and generalizable across different medical systems and populations, giving them a ***distinct competitive edge in building robust, real-world radiology tools***.



# Competitive Advantage



## 02

### Scalable, Cloud-Based Solutions

While many competitors offer specific imaging applications, Google Cloud's scalable infrastructure ensures that the Bayer-Google solutions are adaptable and seamlessly integrated into existing healthcare systems. By leveraging platforms like **Vertex AI** and **BigQuery**, the collaboration provides an edge in handling large datasets, scaling AI solutions across multiple medical institutions, and **cost-effectively** deploying these models in **real-time** clinical environments. This **scalability allows the partnership to reach more healthcare providers globally**, ensuring AI benefits a wider patient base.



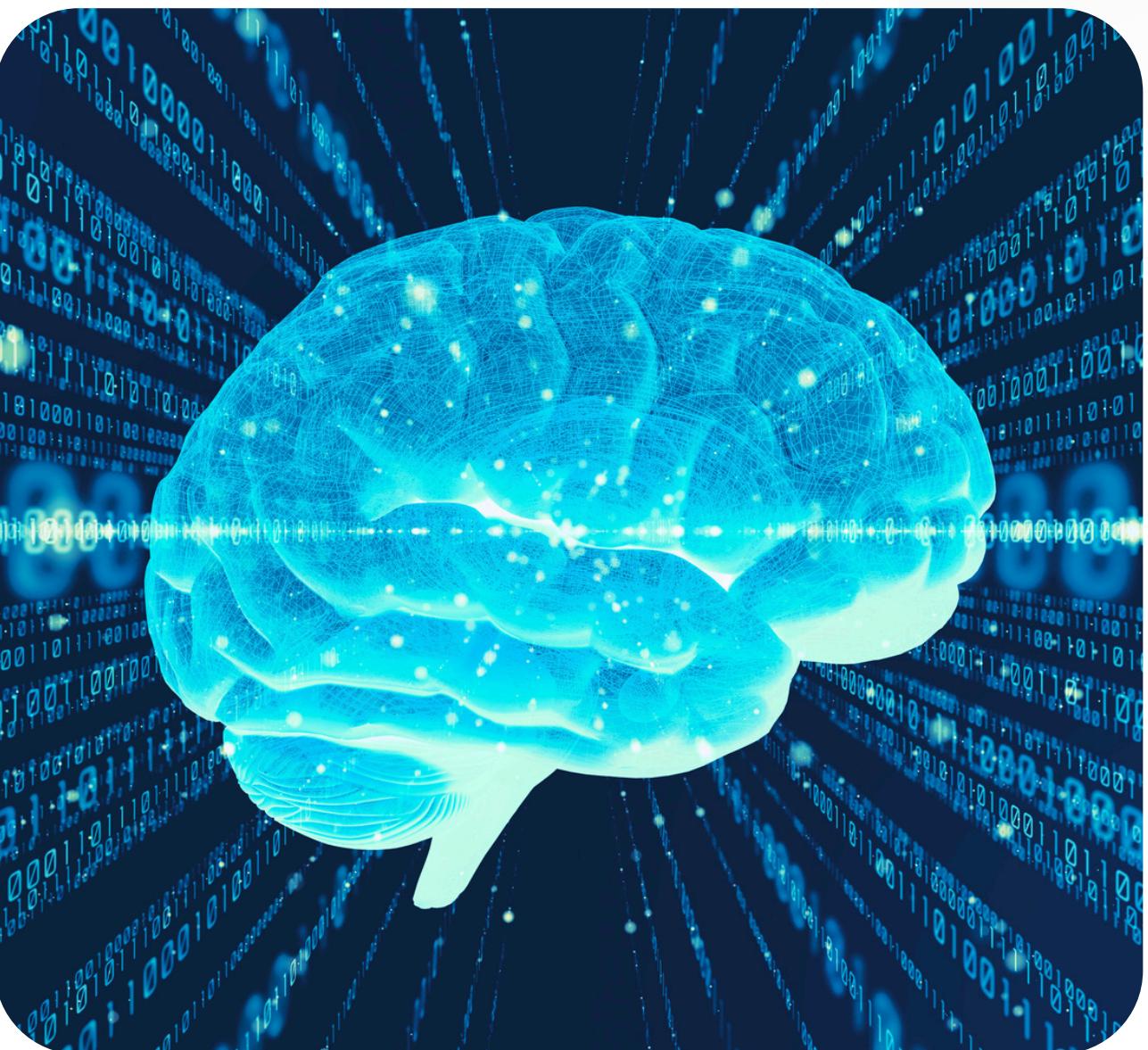
# Competitive Advantage



## 03

### AI-Powered Innovations

With Google's expertise in multimodal AI models like **Med-PaLM**, **Med-PaLM 2**, and **Gemini**, the collaboration introduces advanced AI tools that process both text and image data simultaneously. This capability allows for deeper diagnostic insights by integrating textual clinical information with visual imaging data. Paired with Bayer's radiology expertise, **these tools enable faster, more accurate diagnoses, driving breakthroughs in personalized healthcare solutions**. This combination ensures real-time decision-making, improving outcomes for patients.



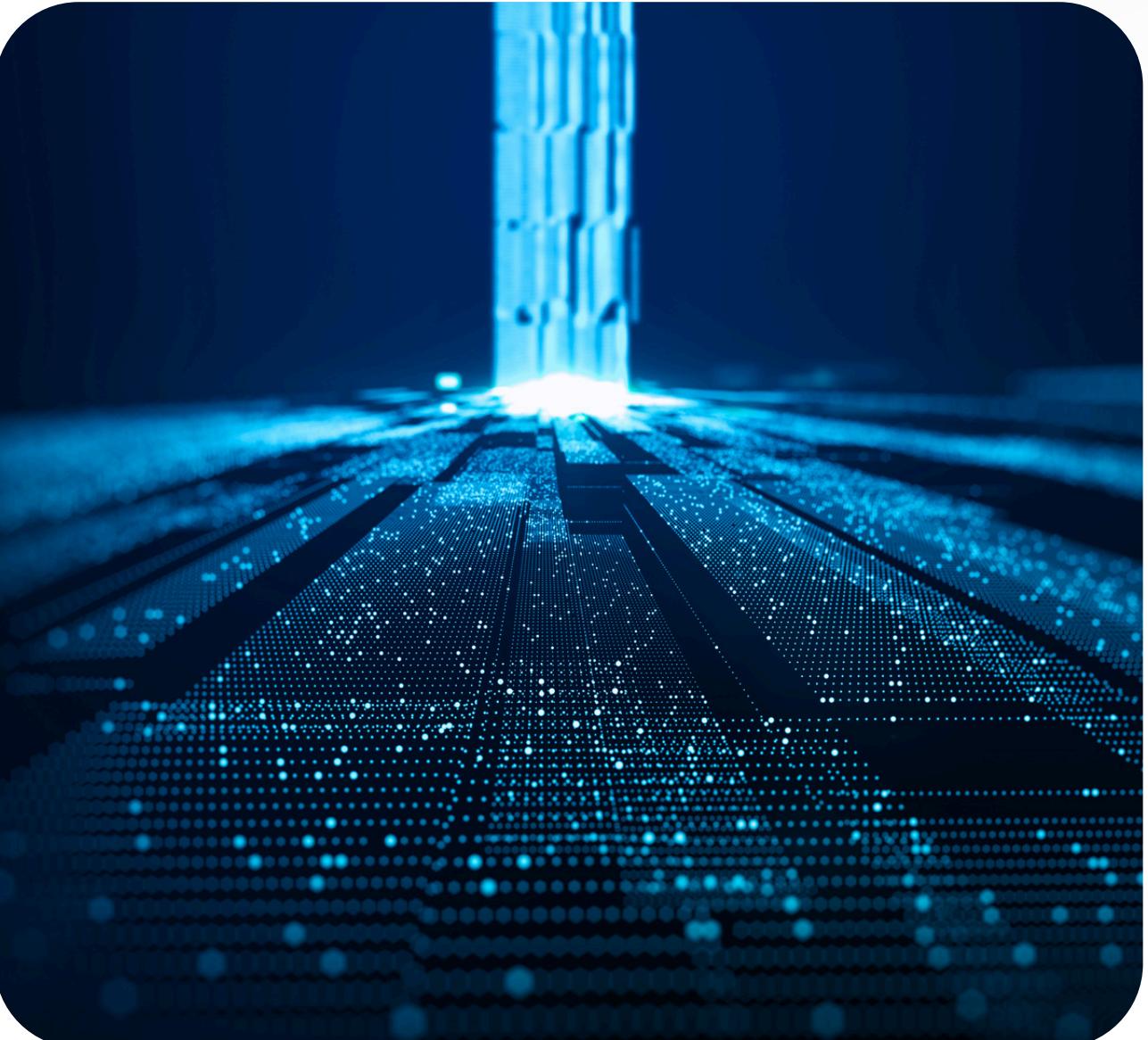
# Competitive Advantage



## 04

### Comprehensive Data Ecosystem

Unlike competitors focused on niche imaging or AI solutions, the Bayer-Google partnership provides an integrated platform that ***combines AI, machine learning, and healthcare data management***. This unified approach accelerates innovation in medical imaging and enhances data-driven healthcare by offering tools that can process vast amounts of imaging data across a wide range of applications. This platform enables radiologists to efficiently manage complex data workflows, thus ***improving both the speed and accuracy of diagnostics***.



# Competitive Advantage



## 05

### Regulatory and Security Expertise

The Bayer-Google Cloud collaboration combines Bayer's extensive experience in radiology and healthcare with Google Cloud's regulatory compliance tools. ***Google Cloud offers key tools like the Healthcare API for secure data exchange (DICOM, FHIR, HL7), BigQuery for compliant data analytics, and Chronicle and Mandiant for data protection.*** Apigee ensures secure API management, and ***Google's compliance certifications (HIPAA, GDPR, ISO) provide robust regulatory support.*** Bayer's vast network and healthcare expertise in gathering clinical data for AI model training further enhance the ability to develop compliant, cutting-edge AI solutions for medical imaging.

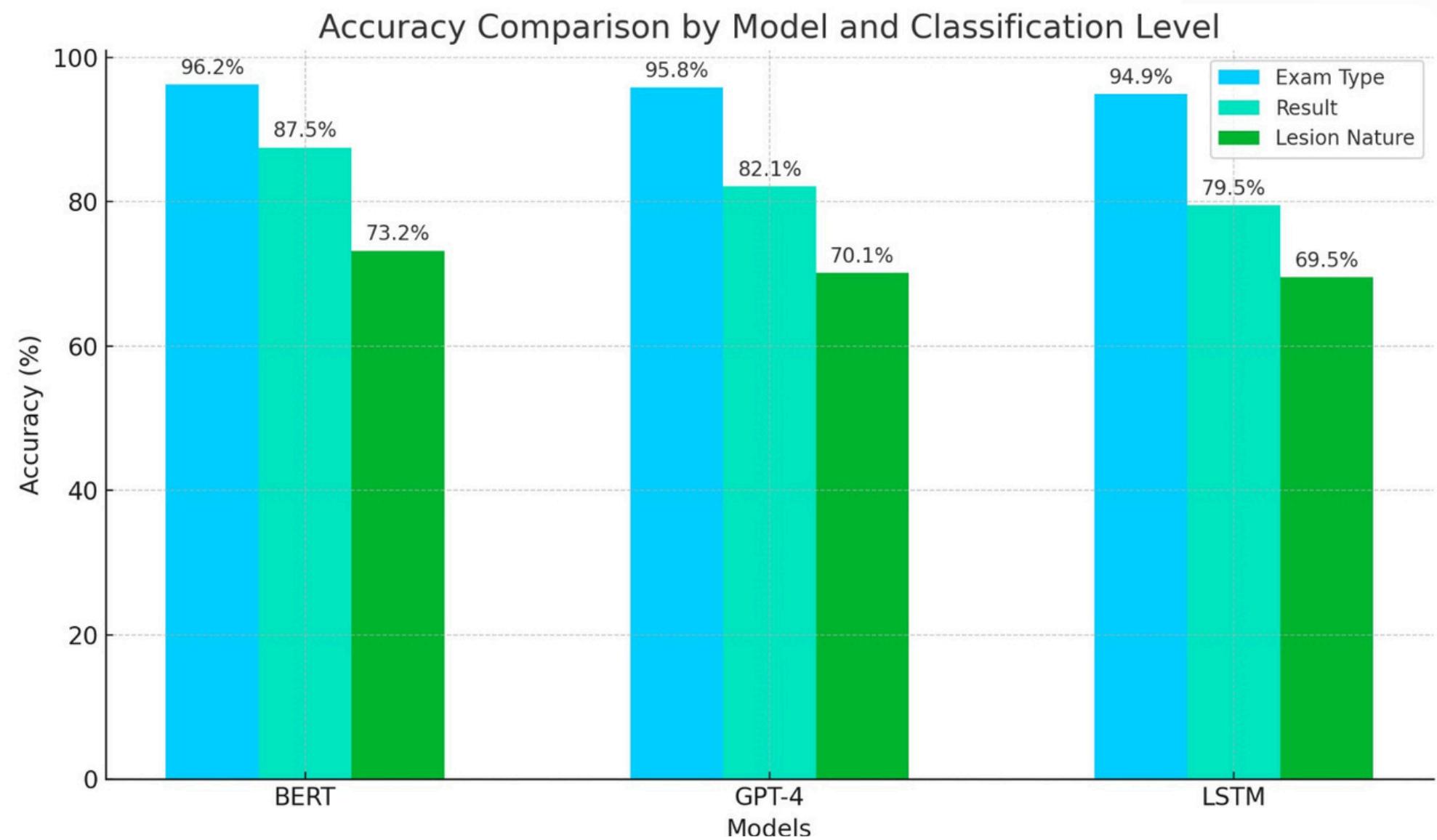


# Models Comparisons



The paper "***Language Models for Hierarchical Classification of Radiology Reports With Attention Mechanisms, BERT, and GPT-4 by Matteo Olivato and colleagues***" compares BERT, GPT-4, and LSTM models for automating radiology report classification.

**BERT** outperformed in most tasks, while GPT-4 showed potential for improvement. The research highlights AI's role in reducing radiologist workload and improving classification accuracy.



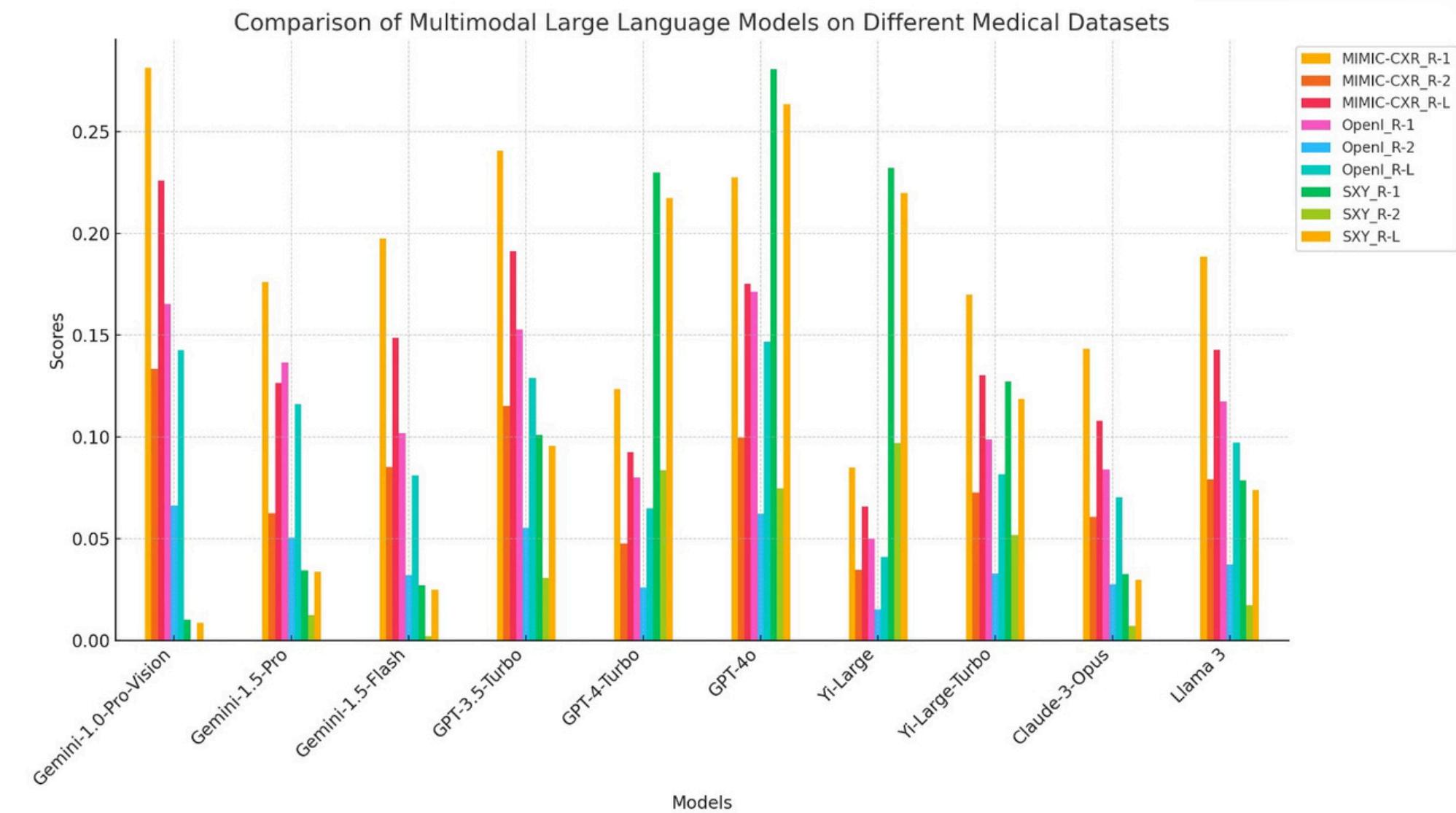
# Models Comparisons



This research, from the paper "**Potential of Multimodal Large Language Models for Data Mining of Medical Images and Free-text Reports**", evaluates several large language models (LLMs) across various medical datasets. The models were compared in their ability to generate accurate medical reports based on image and text data.

Test Results for Compared LLMs. For results within each dataset, each model corresponds to three similarity scores, R-1, R-2, and R-L.

According to the research, **Google's Gemini models** excel in multimodal capabilities, **offering accurate and fast diagnostics**.



# Models Comparisons



## PaLM's Potential in Radiology

Basic models like Google's Gemini 1 series and BERT have already demonstrated remarkable performance in medical tasks. The Gemini-1.0-Pro-Vision model, for instance, excels in medical image analysis, producing accurate diagnostic results across datasets like MIMIC-CXR. BERT, with its natural language processing (NLP) capabilities, has significantly enhanced the accuracy of medical report generation by understanding free-text medical data.

***However, the real breakthrough lies in Google's PaLM models, which offer even more advanced multimodal capabilities.*** PaLM's potential to handle both image and text data at scale positions it as a game-changer for radiology, promising more accurate diagnoses, faster data processing, and enhanced predictive analytics. PaLM models can pave the way for real-time, AI-driven healthcare solutions that further improve patient care, showcasing the incredible potential of Google's AI models in the future of healthcare.

# Med-PaLM 2

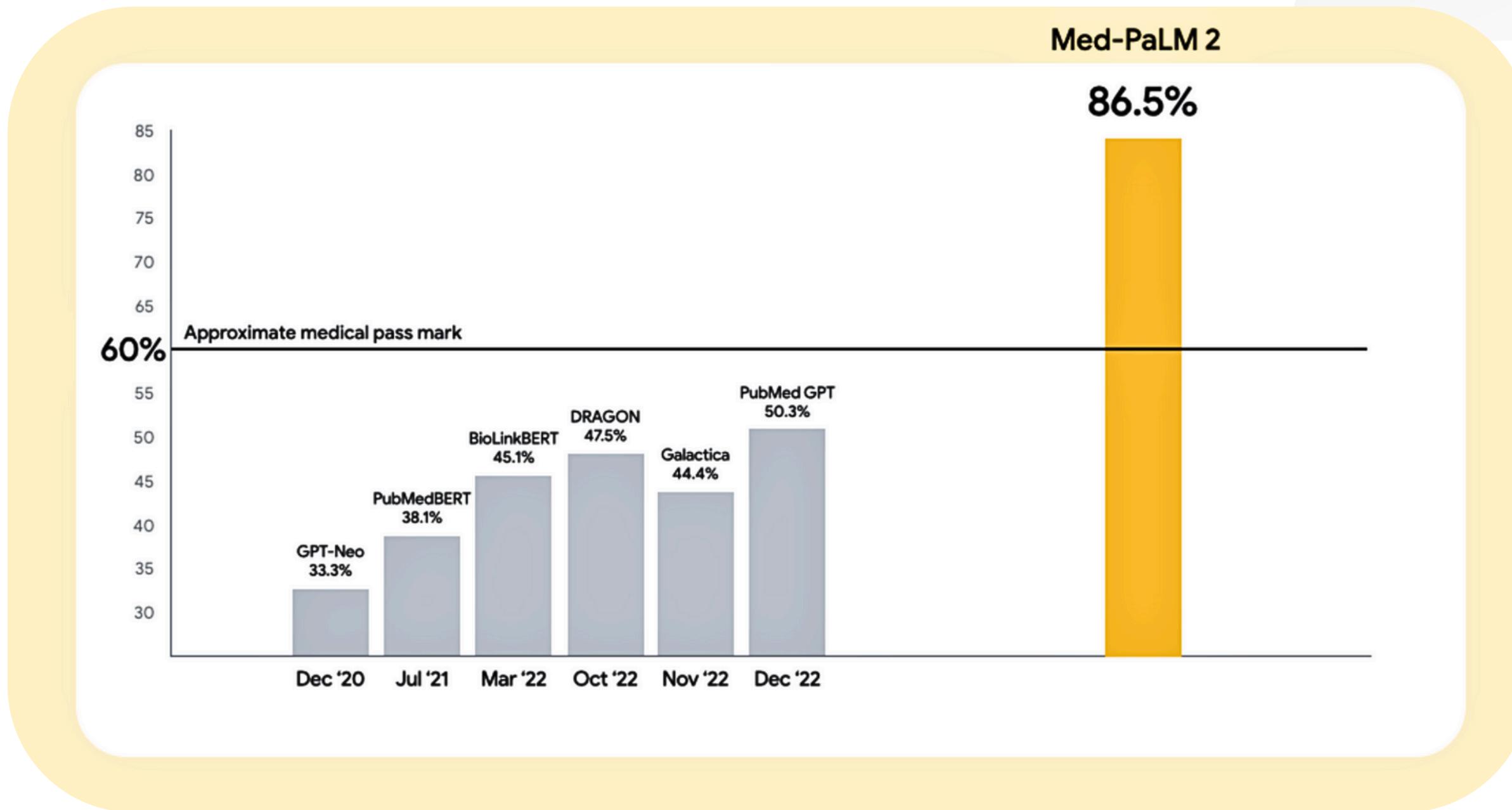


Med-PaLM 2 harnesses the power of Google's LLMs, aligned to the medical domain to more accurately and safely answer medical questions.

As a result, ***Med-PaLM 2 was the first LLM to perform at an “expert” test-taker level performance on the MedQA dataset of US Medical Licensing Examination (USMLE)-style questions, reaching 85%+ accuracy, and it was the first AI system to reach a passing score on the MedMCQA dataset comprising Indian AIIMS and NEET medical examination questions, scoring 72.3%.***



# Med-PaLM 2



Med-PaLM 2 reached 86.5% accuracy on the MedQA medical exam benchmark in research

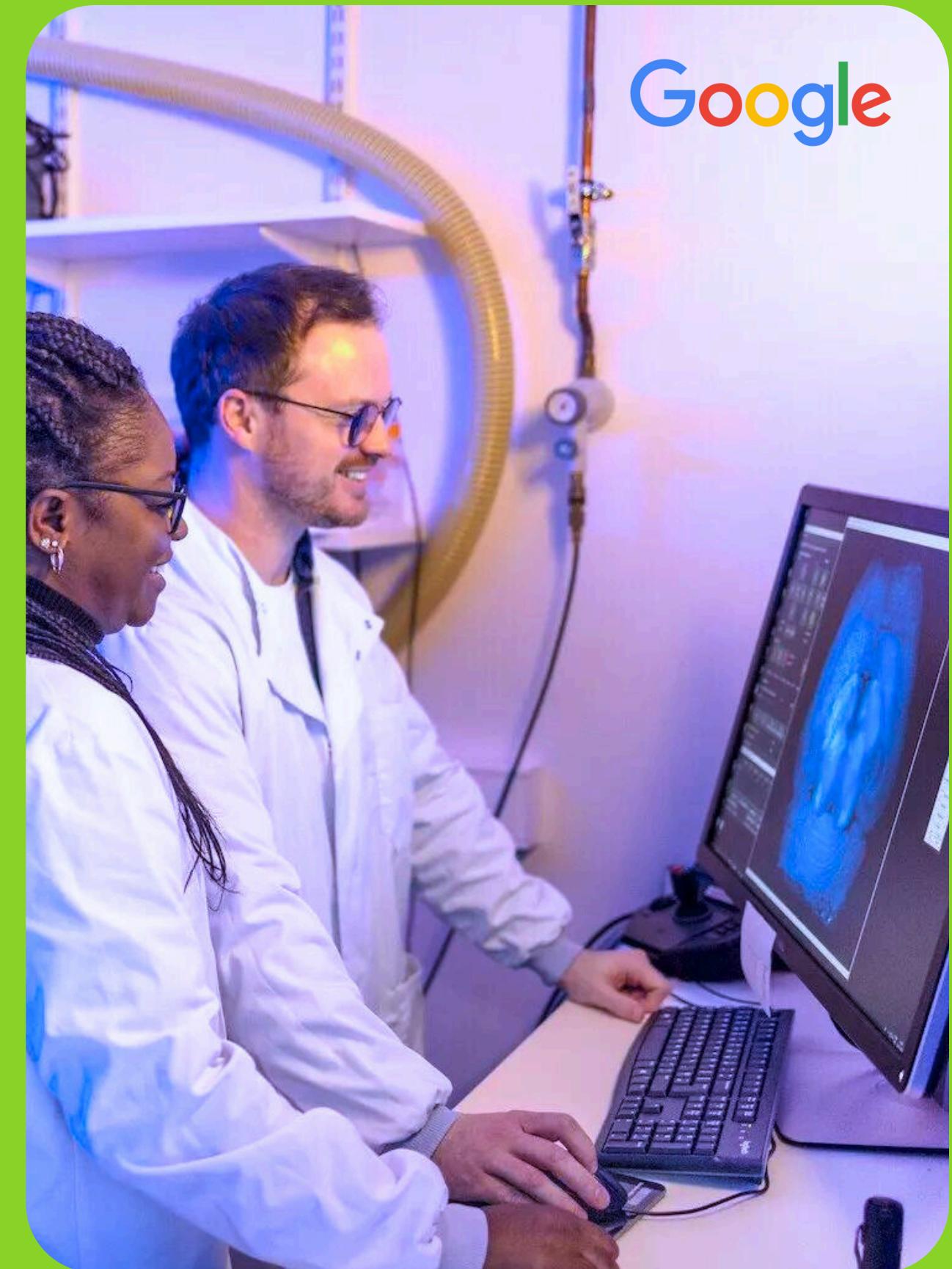
# Med-PaLM 2

## Future of GenAI in HealthCare

MedPaLM 2, with its advanced capabilities in medical diagnostics and patient care, is poised to revolutionize healthcare. ***Its multimodal features allow it to process both medical images and text, enabling accurate and comprehensive analysis.***

The model's extensive medical knowledge and clinical reasoning capabilities make it a powerful tool for supporting healthcare professionals in diagnostics, case evaluations, and treatment plans.

Furthermore, its adherence to medical privacy standards, such as HIPAA, ensures secure data handling in clinical settings. By improving the accuracy of medical Q&A and decision-making processes, ***MedPaLM 2 holds great potential in transforming both diagnostics and clinical practices, leading to enhanced patient outcomes and more efficient healthcare delivery.***



# Mandiant for Bayers



## Enhanced Data Security

Mandiant's advanced threat detection and real-time monitoring will help Bayer secure sensitive patient data and radiological images from cyber threats, ensuring compliance with healthcare regulations like HIPAA and GDPR.



## Proactive Threat Mitigation

Mandiant's intelligence-driven solutions will allow Bayer to proactively identify vulnerabilities and mitigate potential attacks, ensuring uninterrupted service and maintaining the integrity of radiology platforms.



# Chronicle for Bayers



## Comprehensive Data Protection

Chronicle offers Bayer advanced tools to monitor and analyze radiology data, ensuring that any abnormal activity is swiftly detected and addressed, safeguarding patient records and imaging data from breaches.



## Regulatory Compliance Support

With its integration capabilities, Chronicle helps Bayer maintain stringent compliance with healthcare regulations by providing continuous security monitoring and real-time incident reporting for sensitive radiological data.



# Software as a Medical Device



## Transforming Radiology Google and Bayer's (SaMD) Collaboration

Bayer and Google's SaMD (Software as a Medical Device) differentiates itself from other FDA-approved SaMDs primarily through the ***integration of multimodal AI technology and cloud infrastructure***. Unlike traditional SaMDs that may focus on singular data types (like imaging or patient records), this collaboration leverages ***Google's advanced AI models, such as Gemini and PaLM, to process both structured and unstructured data, including images, text, and clinical reports, providing a more comprehensive diagnostic tool***.

Furthermore, ***their use of Google Cloud ensures scalability, real-time analytics, and compliance with international standards like HIPAA and GDPR, while fostering seamless integration across healthcare systems, a key challenge that many other FDA-approved SaMDs face***. This synergy aims to enhance both the speed and accuracy of diagnostic processes, setting new benchmarks in personalized patient care and medical innovation.

# Iconic alliance

## Final Conclusion

Together, this collaboration is truly revolutionary, positioning Bayer and Google at the cutting edge of medical advancements. By merging Bayer's extensive radiology expertise with Google's AI-driven technologies, this partnership significantly enhances radiological diagnostics, allowing for faster, more accurate analysis of medical images. Moreover, the use of multimodal AI models like Gemini and PaLM streamlines complex data processing, offering groundbreaking support in drug discovery.

This powerful integration not only speeds up the identification of potential drug candidates but also improves the personalization of treatment plans, directly benefiting patient care. Ultimately, this collaboration is set to reshape the future of healthcare, accelerating innovation in diagnostics, treatments, and overall healthcare delivery.



# Thank You!

Feel free to reach out for any questions or further discussions.



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