Leveraging Large Language Models for Automated Generation of Clinical Examination Reports

National Taiwan University Hospital Information Technology Office

一、 Our Team and Vision

At the NTUH IT Department, patients are at the heart of everything we do. We strive to weave the latest technological advancements into the fabric of clinical care. As AI enters a new era, we are leveraging LLMs and Generative AI to redefine healthcare—transforming technology from a silent assistant into an active partner in medicine. We don't just provide technical support; we empower doctors and patients to connect more effectively. By combining innovation with human compassion, we aim to protect the well-being of our community through the power of smart technology.

二、 Core Features: AI-Driven Healthcare Innovation

Our technical team is a synergistic blend of professional IT engineers and senior clinicians, ensuring that every AI application precisely aligns with clinical demands.

1. Automated Diagnostic Reporting for Faster Clinical Decision-Making

   Efficiency and Precision: We have developed LLM systems capable of automatically analyzing imaging and test data—such as **Bone Mineral Density (BMD)**, **pulmonary function**, and **Auditory Brainstem Response (ABR)**—to assist in generating draft reports. This not only reduces report turnaround time for physicians but also allows patients to receive preliminary results sooner.

   Multimodal Processing: Beyond text, the system can interpret data points and line graphs from **salivary gland scintigraphy** reports, converting complex visual data into standardized medical report content.

2. In-depth Medical Record Exploration for Enhanced Care Quality

   Spatiotemporal Data Integration: Through our **"Deep EMR Augmented Retrieval System,"** AI can swiftly outline a patient’s medical history from vast volumes of outpatient and inpatient records, helping physicians grasp key clinical insights during consultations.

Cancer Staging and Risk Assessment: The AI assists in extracting information from imaging reports to automatically determine **TNM cancer staging**. It also calculates risk scores for **heart failure** or **stroke**, providing evidence-based diagnostic recommendations.

3. Rigorous Privacy Protection and Cybersecurity

De-identification Technology: Before any AI processing occurs, all Patient Identifiable Information (PII) undergoes **privacy masking**. This ensures that personal data remains strictly protected throughout the analytical workflow.

三、 Target Audiences and Tangible Benefits

Our team's services span across all hospital departments, benefiting a wide range of individuals including outpatient, inpatient, emergency, and health screening patients.

- Outpatient Care：

Medical Record Summarization: AI empowers physicians to quickly review your past medical history, ensuring that consultations are more focused and personalized.

Automated Referral Coordination: Our system ensures that medical information remains accurate and swift during the referral process, providing a seamless continuum of care.

- Inpatient and Surgical Patients：

Admission & Progress Note Generation: AI assists in synthesizing treatment milestones and medication dosage adjustments during hospitalization, ensuring the medical team stays updated on every critical change in the patient's condition.

- Specialized Patient Groups：

Targeted Care & Risk Monitoring: For specific groups—including those in **Head and Neck Oncology**, **Cardiovascular Diseases**, **Rehabilitation**, and **Geriatrics**—AI provides tailored medical record organization and continuous risk monitoring services.

四、 Summary

Our vision is to seamlessly blend clinical expertise with AI intelligence. By combining the diagnostic wisdom of our physicians with the data-processing strengths of LLMs, we have created a collaborative ecosystem where both complement each other. While AI handles data extraction and draft reporting to eliminate administrative fatigue, our doctors focus on high-value decision-making and patient care. This "Human-in-the-loop" approach guarantees medical excellence while maximizing efficiency. Ultimately, we leverage the power of technology to deliver faster, more accurate, and more empathetic healthcare to every patient.