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FUTURO E UMANIZZAZIONE DELLE CURE NELLA MEDICINA ORALE. L'INTELLIGENZA ARTIFICIALE AL SERVIZIO DELLA PERSONA ASSISTITA

AI-POWERED TELEDENTISTRY: A NOVEL APPROACH TO ORAL MEDICINE DIAGNOSIS

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INTRODUCTION

The widespread use of smartphones has transformed telemedicine (TM), allowing for the easy sharing of clinical images and information, which is particularly beneficial for patients in rural or geographically remote areas. While previous studies have shown the utility of smartphone applications like WhatsApp in teledentistry, these methods are still exclusively based on a clinician's opinion. This poster proposes a novel, hypothetical **AI-driven teledentistry model** that utilizes conversational AI, creating a "Chat-GPT-like" bot. The purpose is to explore how such a system could provide provisional diagnoses and direct patients to the appropriate specialist, thereby removing geographic barriers and facilitating early detection.

METHODS

The proposed system would function as an AI-powered conversational platform integrated into a mobile application.
Our system's core relies on a Convolutional Neural Network (CNN), an AI model that will be trained on a robust, clinically validated dataset. We will meticulously compile this dataset through a multi-center collaboration, inviting various dental professionals and specialists to submit clinical images of oral lesions. Crucially, each image will be paired with its definitive clinical diagnosis to ensure the AI learns from accurate, real-world data.
The automated patient workflow begins when a patient interacts with the AI bot via a mobile application. They'll provide a brief medical history and upload a photograph of their lesion. The AI will then perform an initial analysis, formulate a provisional diagnostic impression, and based on its classification, automatically generate a referral to the appropriate specialists.
This process ensures patients receive an immediate, preliminary assessment and are directed toward necessary face-to-face care, effectively eliminating diagnostic delays and geographical barriers.

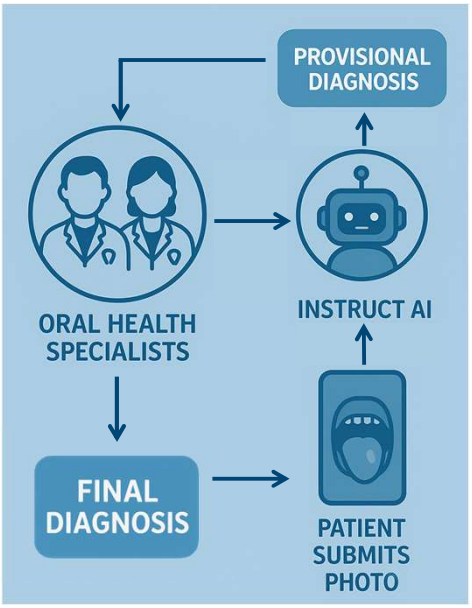

Fig3: Rather than replacing clinicians, AI serves as a supportive tool, enhances collaboration, improving efficiency and accuracy while keeping the clinician at the center of the decision-making process.

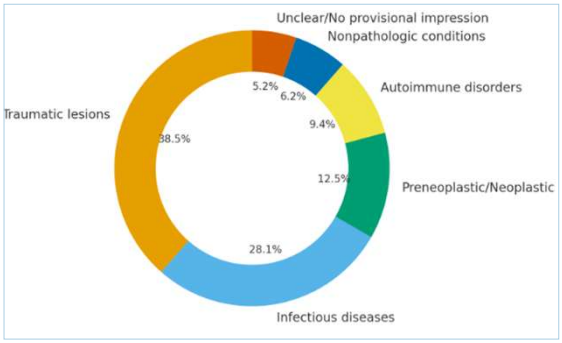

Fig1: The donut chart shows the distribution of provisional diagnostic impressions based on images submitted via WhatsApp in a 2016 study conducted by the University of Bari, with most cases involving traumatic or infectious lesions and smaller proportions of preneoplastic/neoplastic, autoimmune, nonpathologic, and unclear conditions.

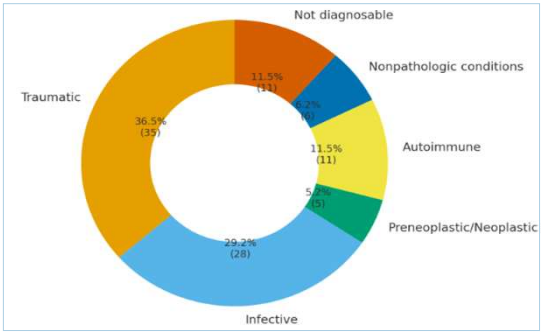

Fig2: This chart illustrates the percentages of definitive diagnoses across the same categories described above. It highlights the strong level of concordance between the provisional diagnoses made via WhatsApp and the final clinical diagnoses.

RESULTS

Based on performance data from existing teledentistry studies, the proposed AI model is projected to yield highly promising results. The adoption of an AI-powered conversational interface is expected to ensure **high patient engagement**, reduce non-attendance rates and the diagnostic delays. The system would also effectively expand its reach to **remote geographical areas**. Furthermore, the model is expected to achieve a **high diagnostic accuracy**.

CONCLUSION

The development of an AI-powered teledentistry platform represents the next logical step in the evolution of oral healthcare. AI could be a valuable tool for overcoming persistent barriers to specialized care, particularly for patients in rural and underserved areas. While face-to-face clinical examination remains the gold standard, this innovative approach has the potential to drastically reduce diagnostic delays and improve early detection rates. Future work must address key limitations, including the standardization of image quality and the establishment of clear medico-legal frameworks to ensure the safe and effective clinical application of this technology.

REFERENCES

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