Dental Mate

Introduction

Dental diseases such as cavities, gum disease, and oral cancers can have serious health implications if not detected early. Our project leverages Artificial Intelligence (AI) and Machine Learning (ML) technologies to assist General Practitioners (GPs) in identifying these diseases at an early stage. By doing so, we aim to improve patient outcomes and overall oral health.

Objective

The main objective of our project is to develop a system that can analyze dental images and patient data to detect signs of dental diseases accurately and efficiently. This system will support GPs in making informed decisions and providing timely interventions for their patients.

How It Works

1. Data Collection

We gather a large dataset of dental images, including:

- X-rays
- Intraoral photographs
- Bitewing
- 3D scans
- OPG (2D Panoramic)
- CBCT (3D Panoramic)

2. Data Preprocessing

The collected data is preprocessed to ensure uniformity and remove any noise or inconsistencies. This step is crucial for optimizing the performance of our AI models.

3. Model Training

Using advanced ML algorithms, we train our AI models to recognize patterns and features indicative of various dental diseases. The models learn from the labeled data and iteratively improve their accuracy over time.

4. Testing and Validation

We rigorously test and validate the trained models using separate datasets to ensure their reliability and generalization to new cases.

5. Deployment

Once validated, the AI models are deployed into a user-friendly system accessible to GPs. This system integrates seamlessly into existing clinical workflows, allowing GPs to upload patient data and receive

diagnostic insights.

Benefits

For General Practitioners

- **Early Detection:** Helps in identifying dental diseases at their early stages.
- **Informed Decisions:** Provides additional information to support clinical decisions.
- **Efficiency:** Reduces the time needed for manual analysis of dental images.
- **Tracking and Monitoring:** Uses the Oral Health Index to track and monitor patients' oral health over time.

For Patients

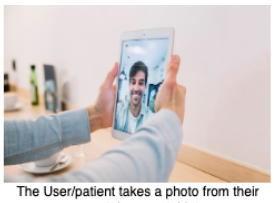
- **Better Outcomes:** Early detection can lead to more effective treatments.
- **Improved Health:** Helps in maintaining better oral health.
- **Peace of Mind:** Provides reassurance through advanced diagnostic support.
- **Personalized Care:** Continuous monitoring enables personalized treatment plans.

Tracking and Monitoring Using the Oral Health Index

Our system includes a robust feature for tracking and monitoring patients' oral health using the Oral Health Index. This index provides a comprehensive overview of a patient’s oral health status, allowing for:

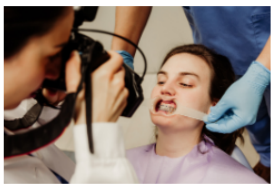
- **Regular Monitoring:** Continuous assessment of oral health to detect changes early.
- **Progress Tracking:** Monitor the effectiveness of treatments over time.
- **Preventive Care:** Identify trends that might indicate potential issues before they become serious problems.
- **Patient Engagement:** Educate and engage patients by showing them their oral health progress.

Temporary How to Use



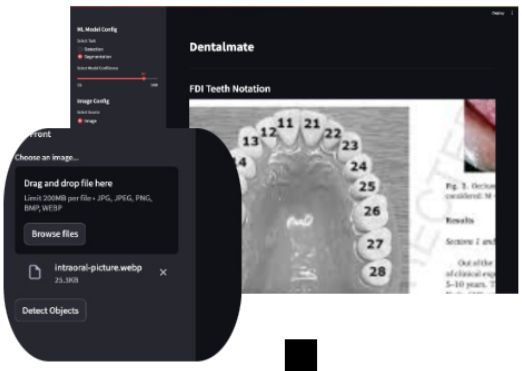
The User/patient takes a photo from their smartphone or tablet

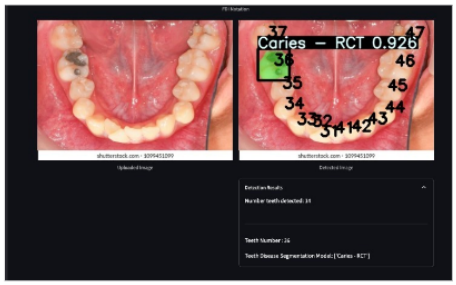
Or



The user/patient took a photo from dentist

The patient or general practitioner inputs the image into the Dental Mate system





The system shows, in what number of teeth has a disease? what is the possible treatment?

Based on the information from the system, general practitioners pass the information to the dentist, and the dentist analyzes the information and makes a decision on what treatment will be performed.

Patients receive treatment based on the diagnosis made by the dentist.

1. User/patient take a photo from their smartphone or tablet
2. Or User/patient took a photo from dentist
3. The patient or general practitioner inputs the image into the Dental Mate system
4. The system shows, in what number of teeth has a disease? what is the possible treatment?
5. Based on the information from the system, general practitioners pass the information to the dentist, and the dentist analyzes the information and makes a decision on what treatment will be performed.
6. Patients receive treatment based on the diagnosis made by the dentist.
7. User/patient can take a subscribtion plan
8. User/patient can track their teeth health based on the OHI
9. User/patient can get treatment plan based on the subscription plan

Conclusion

Our AI and ML-based system for early detection of dental diseases aims to revolutionize dental care by assisting GPs in diagnosing conditions early and accurately. This project not only enhances the capabilities of GPs but also improves patient outcomes and overall oral health.