Bangladesh University of Business and Technology (BUBT)

Tooth Disease Classification

BUBT

Intake-49 , Section-3 , CSE

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Introduction

Early diagnosis and proper classification of tooth diseases can significantly improve treatment outcomes. This project aims to automate the classification of common tooth diseases using deep learning, reducing human error and saving valuable diagnostic time.

Scope & Objectives

Classify common tooth diseases from raw images.

se and compare CNN and ViT models.

Enable end-to-end automated diagnosis.

Assist dentists with AI-based decision

Features & Modules

- Image upload and preprocessing module.
- Disease prediction using CNN and ViT models.
- Visual result display with labels and confidence.
- Performance metrics and comparison dashboard.

Disease Categories

- **CaS** – Dental Caries
- **CoS** – Calculus (Tartar)
- **Gum** – Gum Diseases
- **MC** – Mouth Ulcer
- **OC** – Oral Cancer
- **OLP** – Oral Lichen Planus
- **OT** – Other Tooth Conditions

- **Special Features: Combines CNN and ViT for enhanced disease detection accuracy & also provides visual explanations using Grad-CAM and attention maps**

Methodology

Data Collection – Gathered labeled dental disease images.

Preprocessing – Resized, normalized, and augmented images

Model Training – Trained CNN and ViT on the dataset.

Evaluation – Compared models using accuracy and F1-score

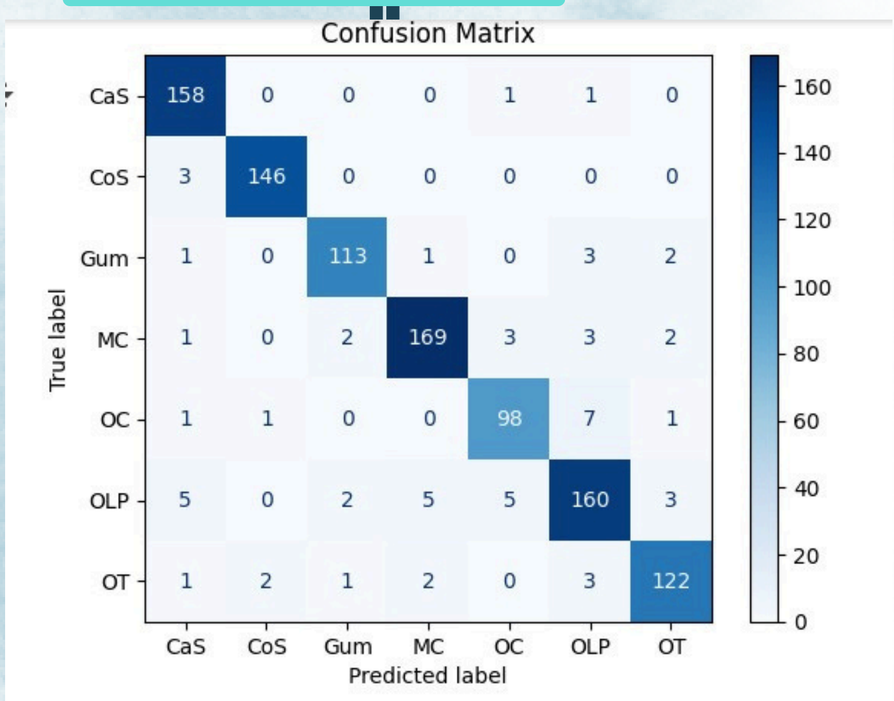
Results / Evaluation

Model	Accuracy	F1-Score
CNN	91.2%	90.6%
Vision Transformer	**96.8%**	**96.2%**

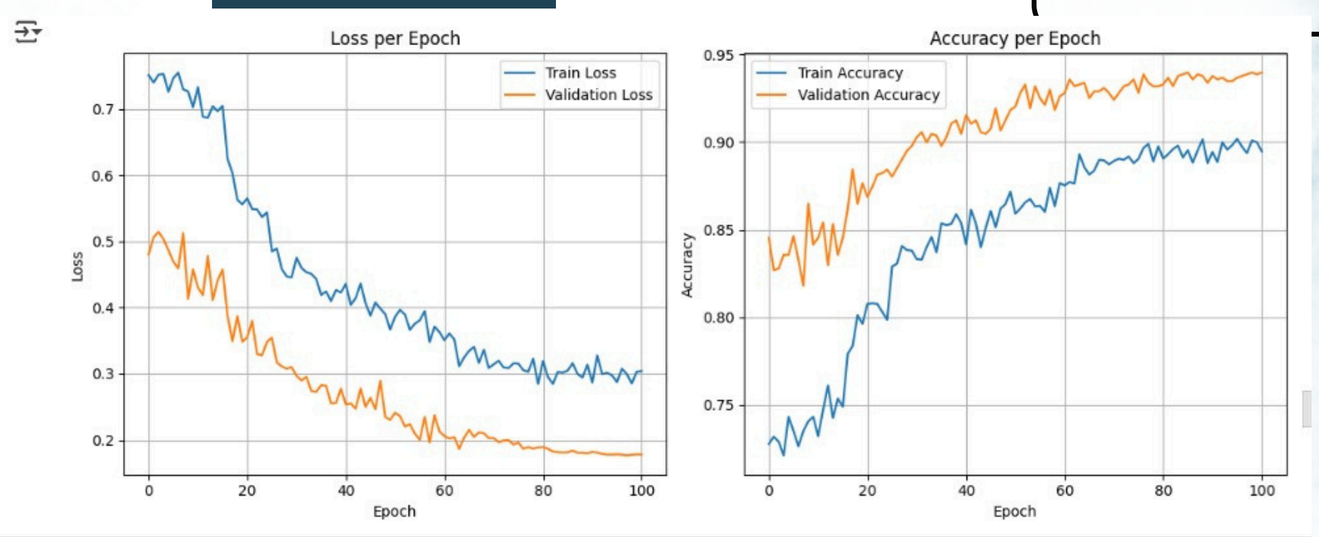
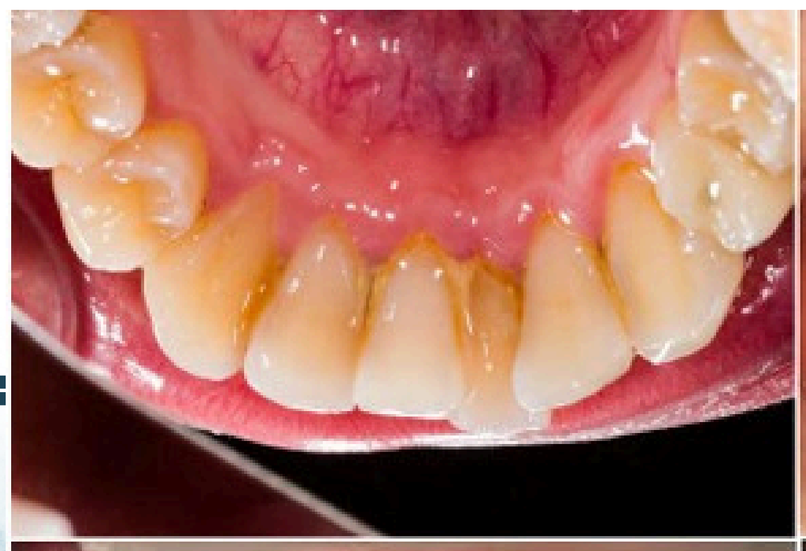
Conclusion

- **Successfully classified tooth diseases using CNN and ViT.**
- **ViT outperformed CNN in accuracy and reliability.**
- **Model supports early, AI-driven dental diagnosis.**
- **Scalable for real-world clinical and mobile use.**

Cosine Matrix



Graphs



Visualization