

Synopsis of **Minor Project**

Dental Image Classification

UNDER GUIDANCE OF

Prof. Amit Prakash Singh

USICT , GGSIPU



University School of Information, Communication and
Technology

Guru Gobind Singh Indraprastha University, Dwarka

SUBMITTED BY :

MANIK GOYAL (01116401521)

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Project Title : Dental Image Classification using InceptionV3

Objective : To develop a multi-class image classification model for dental images using transfer learning with the InceptionV3 architecture, fine-tuned on a custom dental image dataset.

(1) INTRODUCTION

This project is focused on dental image classification using deep learning techniques. It classifies dental images into multiple categories using a pre-trained InceptionV3 model. The system leverages transfer learning to fine-tune the model on a custom dataset of dental images, providing an automated solution for dental diagnostics. The model supports tasks like loading images, preprocessing, training, evaluating accuracy, and making predictions. Additionally, the system provides data augmentation and model performance visualization features.

(2) Description

Product Functions:

- The project performs multi-class classification on dental images, identifying categories based on the images.
- Transfer learning is applied using the pre-trained InceptionV3 model for enhanced accuracy.
- The system preprocesses dental images and resizes them to the required input size.
- Data augmentation techniques are used to enhance the diversity of the training dataset.
- The model's performance is evaluated using accuracy and loss metrics during training and testing phases.
- Users can visualize the model's performance through loss and accuracy plots.
- After training, the model saves its weights for future use and predictions can be made on new unseen data.
- Predictions provide the most likely classification for each dental image.

(3) TECHNOLOGIES USED

For Model Development and Training:

- TensorFlow
- Keras (InceptionV3)
- Python
- NumPy
- Matplotlib
- OpenCV

For Image Augmentation and Data Handling:

- ImageDataGenerator (for real-time data augmentation and batching)
- Pandas (for dataset manipulation)

(4) External Interface Requirements

User Interface: This project provides the following user interfaces:

- Command Line Interface (CLI) for running the model training, evaluation, and prediction tasks.
- Plotting Interface for visualizing training/validation accuracy and loss curves.
- Model Prediction Interface that takes dental images as input and outputs the predicted class.

CODE EDITOR USED:

- Visual Studio Code

Result

Through this program I was able to learn new technologies and implement them to make a project. This minor project gave me ahead start in my journey of learning and working with latest technologies.

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