

Oral Disease Classification Task Description

Objective

Develop a classification model that can classify oral diseases present in a single image. This task focuses on image preprocessing and machine learning (ML) techniques, particularly deep learning models like Convolutional Neural Networks (CNNs). The model should predict a single disease class (e.g., healthy, dental caries, gingivitis, etc.) for each image. It must handle variations in image quality, lighting, and orientations to ensure high classification accuracy.

Tech Stack: Python, OpenCV, TensorFlow/Keras, PyTorch, or any other framework of your preference.

Key Requirements

1. **Multiclass Classification:**
 - Each image can belong to only one disease class.
 - The model must assign probabilities for each class (e.g., caries, gingivitis, etc.).
 2. **Handling Variations:**
 - Variations in lighting, angles, or quality of images should not affect performance.
 - The model should generalize across different age groups, genders, and demographics.
 3. **Dataset:**
 - Use the provided dataset: [Dataset Link](https://drive.google.com/file/d/1ptnehBD0JCSCcw0fFzWi9WKAvgV3oBkT/view?usp=drive_link).
https://drive.google.com/file/d/1ptnehBD0JCSCcw0fFzWi9WKAvgV3oBkT/view?usp=drive_link
 - **Important:** This dataset contains medically sensitive information and is shared strictly for academic purposes related to this assessment. You are not required to share it with anyone or use it outside the scope of this assignment.
 - You are allowed to use additional datasets from the internet or open-source repositories. If you choose to do so, clearly document the source of any external data and include it in your final report.
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Deliverables (Add all to an uncompressed file in google drive and share link in submission)

1. **Python Scripts:**
 - Provide scripts for preprocessing, training, and testing the model.
2. **Model Deployment Video (Mandatory):**
 - Include a screen recording showing your deployed model in action. The video should demonstrate the model making predictions on test images.

3. **Documentation:**

- Submit a well-documented PDF report or an image summary including:
 - Final achievement scores with the test dataset (e.g., accuracy, precision, recall, F1-Score).
 - A Confusion Matrix and analysis of misclassifications.
 - Any additional insights, such as model limitations or ideas for improvement.

4. **Trained Model:**

- Submit the trained model file.
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Evaluation

The primary evaluation criterion is **accuracy and performance** on the test data. Proper documentation, creative approaches, and the ability to handle dataset variations will be highly valued.

Additional Notes

- The dataset is divided into training and test sets. Use the test set only for final evaluation to ensure consistent assessment.
 - If external data is used, ensure you share the source and explain how it was utilized in the solution.
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We appreciate your participation and look forward to your submissions! Please reach out if you have any questions or need clarifications.

Good luck!