Phase 03: Evaluation Report

Course: ITAI 2277
Project Title: *TriagePal*
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Introduction

The TriagePal prototype was designed as an AI-based triage tool to analyze eye images and assist in preliminary detection of conditions such as conjunctivitis. The goal of this assignment was to develop a complete yet manageable image classification pipeline within Google Colab, covering every essential stage—from data acquisition to model evaluation. The project serves as a foundational step toward integrating artificial intelligence into healthcare triage systems.

Methodology

The experiment began with importing the essential Python libraries for data processing and deep learning, including OpenCV, NumPy, Pandas, Matplotlib, and TensorFlow/Keras. A conjunctivitis image dataset was downloaded using KaggleHub, containing both healthy and infected eye samples.

Data preprocessing steps involved resizing all images to 128×128 pixels, normalizing pixel values to the range [0,1], encoding class labels, and splitting the dataset into 80% training and 20% testing subsets. To manage dataset imbalance, class weights were computed to ensure balanced contributions from both classes during training.

The model architecture utilized MobileNetV2 through transfer learning, with additional dense layers to classify images as *Healthy* or *Infected*. Initially, training was limited to 5–10 epochs, which resulted in poor accuracy and misclassifications. To improve performance, training was extended to 30+ epochs, data augmentation was applied, and class weighting was used for better generalization.

Results and Analysis

After extending the training process and incorporating data augmentation, the model began accurately classifying both healthy and infected eye images. Testing on two uploaded samples demonstrated correct predictions for each case, validating the pipeline's capability.

While the dataset size was small, the project successfully established a functional image classification workflow, emphasizing the impact of sufficient training duration, balanced datasets, and consistent preprocessing.

Discussion and Evaluation

This project successfully met its core objective of creating a modest yet functional AI triage prototype. The use of transfer learning significantly reduced development complexity, while preprocessing and augmentation enhanced the model's learning capability.

However, several limitations were noted:

- The small dataset restricted the model's ability to generalize.
- Limited classes (only healthy vs. infected) simplified the task but did not reflect real-world complexity.
- The short training duration initially hindered learning performance.

Despite these limitations, the pipeline serves as a strong foundation for future expansion.

Conclusion

The TriagePal prototype effectively demonstrates the potential of AI in healthcare triage through automated image classification. Future improvements may include increasing

dataset diversity, incorporating additional disease categories, and integrating text-based symptom data to enrich diagnostic insights.

Overall, this assignment provided valuable hands-on experience in building, training, and testing a complete deep learning pipeline using Google Colab, highlighting the real-world potential of AI-driven diagnostic systems.