

## **CS3 Case Study Rubric – Chest X-Ray Classification**

### **Purpose**

This case study puts you in the role of a data scientist building a diagnostic tool to assist in identifying pneumonia from chest X-rays. You'll engage with deep learning tools, evaluate classification performance, and consider model interpretability in a healthcare context. The aim is to replicate and understand the decisions made in the original project while contributing new insights or visualizations.

### **What You'll Do**

You will:

- Review the original project and code using the provided GitHub repository.
- Analyze the model's architecture (EfficientNetV2S) and its training pipeline.
- Evaluate model performance using confusion matrices, accuracy, and loss graphs.
- Write a short reflection (~1 page) that summarizes the project and adds your own analysis, suggestions, or critiques.
- Submit all work in the form of a Jupyter/Colab notebook and a short written case study.

### **Deliverables**

#### **1. Colab Notebook**

- Includes: model summary, visualizations (e.g., loss curves, confusion matrix), and comments explaining your findings.
- Optional: experiment with modifications (e.g., try transfer learning or change loss function).

#### **2. Mini Case Study Write-up (PDF)**

- Executive summary of the project
- Your critique (what worked well, what could be improved)
- Reflections on model performance and applicability to healthcare

### 3. Submission

- Add your notebook and PDF to the GitHub repo
- Ensure the repo README is updated to include your name and section
- Submit the GitHub link via Canvas

### Assessment Criteria

| Criterion                             | Excellent<br>(90–100%)   | Good<br>(80–89%)   | Satisfactory<br>(70–79%)  | Needs<br>Improvement<br>(<70%)                               |
|---------------------------------------|--|--|---|--|
| <b>Data Preparation</b>               | Data thoroughly preprocessed; steps clearly documented and reproducible.   | Data preprocessed adequately; most steps documented.               | Basic preprocessing with minimal documentation.                   | Preprocessing incomplete or poorly documented.               |
| <b>Model Implementation</b>           | Model implemented clearly and correctly; code is well-commented and easy to follow.                                | Model implemented with minor errors or incomplete comments.        | Model implemented but unclear or with significant gaps.           | Model contains major errors or is poorly constructed.        |
| <b>Evaluation &amp; Visualization</b> | Thorough evaluation using multiple metrics (accuracy, loss, confusion matrix); insightful visualizations included. | Evaluation includes key metrics and visuals with minor gaps.       | Basic evaluation; visuals present but could be clearer or deeper. | Evaluation is missing, unclear, or lacks meaningful visuals. |
| <b>Final Report</b>                   | Concise, well-structured, and insightful; clearly explains results and implications.                               | Clear and informative report with some issues in clarity or depth. | Covers main points but lacks strong analysis or reflection.       | Report is incomplete, vague, or lacks key insights.          |

