PNEUMONIA & RESPIRATORY DISEASE SEVERITY SCORING

AGENDA

- What is Pneumonia ?
- Current Challenges in Diagnosis .
- Consequences of Inaccurate Assessment .
- Project Objective .
- Datasets and Data Sources .
- References .

WHAT IS PNEUMONIA ?

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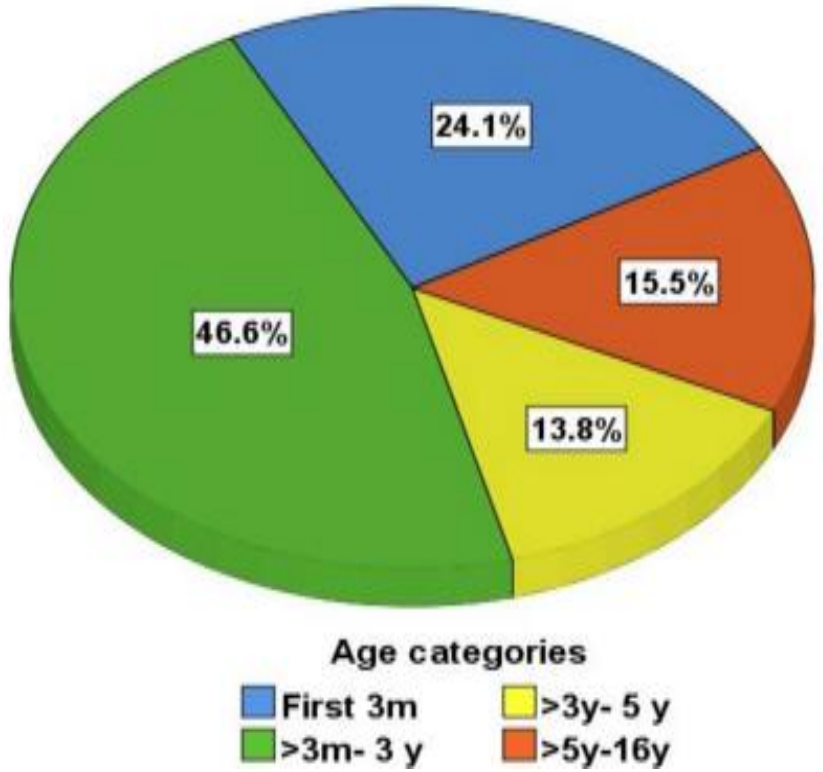
- Every year, pneumonia kills over 2 million people worldwide — including more than 740,000 children under five, making it the single deadliest infectious disease for young children, so what is pneumonia ?

WHAT IS PNEUMONIA ? (CONT..)

- **Definition**: Infection that inflames air sacs in one or both lungs.
- **Causes**: Bacteria, viruses, fungi
- **Symptoms**: Cough, fever, difficulty in breathing
- **Global Impact**: Leading cause of death
- **Local Impact**: High affect in Egypt, especially in vulnerable areas.

WHAT IS PNEUMONIA ?

- Pie chart showing age distribution among the studied group of 39,130 patient



CURRENT CHALLENGES IN DIAGNOSIS

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- **Symptoms Overlap:** Like flu , bronchitis, COVID-19
- **Resource Limitations:** limited access to advanced imaging in some hospitals
- **Time Pressure:** Rapid decisions needed in dire situations
- **Data Fragmentation:** Lab results, imaging, and notes are often scattered
- **Subjectivity in Clinical Judgement** : Clinicians often rely on their experience which can differ between hospitals, doctors, and patient populations

CONSEQUENCES OF INACCURATE ASSESSMENT

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- **Underestimation:**
  - Delayed treatment -> higher mortality
  - Missed ICU(intensive care unit) admission
- **Overestimation**
  - Unnecessary hospital stays -> resource strain
  - Increased healthcare costs

PROJECT OBJECTIVE

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- The objective of this project is to develop an AI-powered computer vision model that can automatically detect pneumonia from chest X-ray images and accurately score disease severity, thereby supporting clinicians in making faster, more reliable, and resource-efficient diagnostic and treatment decisions

DATASETS & DATA SOURCES

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- NIH CLAHE Enhanced Chest X-rays
  - Over 112,000 CLAHE Chest X-ray images from more than 30,000 unique patients
- RSNA Pneumonia Processed Dataset
  - Optimized RSNA Pneumonia Dataset for Faster Training and Easy Integration
- Chest X-Ray (Pneumonia,Covid-19,Tuberculosis)
  - 7135 Images of Pneumonia,Covid-19,Tuberculosis

TOOLS & TECHNOLOGIES

Category	Tools	Purpose
Vision	CNNs (ResNet/DenseNet), OpenCV	Chest X-ray analysis & preprocessing
NLP	ClinicalBERT/BioBERT, spaCy	Extract insights from clinical notes
Data Processing	Pandas, NumPy, scikit-learn	Data wrangling & baseline models
Model Training	PyTorch/TensorFlow	Deep learning development
Deployment	Flask/FastAPI, Docker	API & portability
Version Control	Git/GitHub	Collaboration and tracking

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TEAM MEMBERS :

- Abdellatif Ahmed Abdellatif
- Omar Essam Mohamed Ali
- Ramez Mohamed farouk
- Ibrahim Hany Ibrahim Hanafy
- Amr Mohamed Abdelaziz Ghonim
- Ali Mohamed Elsayed Abdelrahman

THANKS