PROJECT PROPOSAL

PROJECT TITLE:
Pneumonia Detection using CNN

PROJECT AUTHORS:

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OBJECTIVE:
Pneumonia is an infectious and fatal illness that affects millions of individuals, primarily those over the age of 65 and those with chronic illnesses like diabetes or asthma. Chest X-rays are thought to be the most reliable way to locate and assess the size of the infected zone in the lungs during the diagnosis of pneumonia.

The objective of a pneumonia detection project using Convolutional Neural Networks (CNN) is to develop a deep learning model that can accurately classify chest X-ray images as either showing signs of pneumonia or not. This can be used as a tool to assist healthcare professionals in the diagnosis of pneumonia, which is a common and potentially life-threatening respiratory infection.

The CNN model is trained on a large dataset of chest X-ray images with corresponding labels indicating whether pneumonia is present. The model learns to extract relevant features from the images and uses those features to make predictions on new, unseen images.

The overall goal of the project is to develop a reliable and accurate pneumonia detection tool that can assist doctors in making more informed diagnoses and providing appropriate treatment. By accurately identifying cases of pneumonia, the model can potentially help reduce the number of misdiagnoses and unnecessary treatments, as well as improving patient outcomes and potentially saving lives.

CURRENT STATE – OF – ART:
The state of the art in pneumonia detection using CNNs is advanced, with several studies showing high accuracy in detecting pneumonia from chest X-ray images. One of the most well-known models in this area is CheXNet, which achieved radiologist-level performance in pneumonia detection. Other studies have also shown that CNN models such as DenseNet and Inception-v3 can achieve high accuracy in identifying pneumonia. While these models have shown promise, there are still challenges to be addressed, such as the need for larger and more diverse datasets, as well as the need to ensure the generalizability and interpretability of these models. Overall, these studies suggest that CNN models have the potential to assist healthcare professionals in making more accurate diagnoses of pneumonia, which could have significant benefits for patient outcomes.

APPROACH:

1. Preprocess the Data
2. Feature Extraction – Extract features that can be used by the model for classification.
3. Model Building – Model architecture can include convolutional layers for feature extraction, pooling layers for down-sampling, and fully connected layers for classification.
4. Model Training – Hyperparameters such as learning rate, batch size, and number of epochs can be tuned to improve the model performance.
5. Model Evaluation – Model is evaluated on the test set to measure its accuracy and other performance metrics such as precision, recall, and F1-Score.
6. Model Fine-Tuning – If the model performance is not satisfactory, fine-tuning can be done by adjusting the hyperparameters or changing the model architecture.
7. Model Deployment
8. Interpretation of Results – Once the model is trained and evaluated, it can then be used to make predictions on new, unseen chest X-ray images. The predicted labels can be compared to the ground truth labels to assess the model's accuracy.

DATASET TO BE USED:

- **Link:** https://data.mendeley.com/datasets/rscbjbr9sj/2