

Clouds Modeling and Forecasting

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Introduction

This project introduces a novel method for precise cloud image segmentation and forecasting of cloud movement, aiming to improve irradiance predictions. By leveraging a dataset of 6 million fisheye camera images, Convolutional Neural Network (CNN) models are utilized for cloud image segmentation. Additionally, an RNN-LSTM model is incorporated for time series analysis to forecast cloud movement. The project emphasizes the importance of accurate cloud segmentation and forecasting in various domains such as renewable energy generation, climate modeling, and weather forecasting.



Experimentation and Evaluation

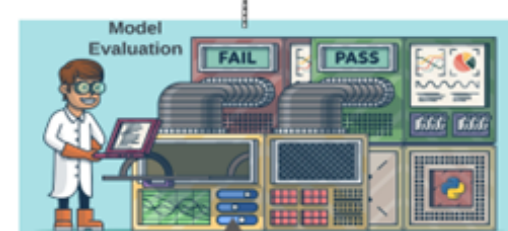
- Prepare a diverse dataset with cloud images and segmentation masks.
- Implement new CNN architecture or improve existing CNN.
- Evaluate models using metrics like precision, recall, F1 score, and pixel accuracy.
- Perform visual inspections and compare cloud movement predictions with actual observations.
- Analyze results, compare models, and iterate if necessary for improved performance



Methodology

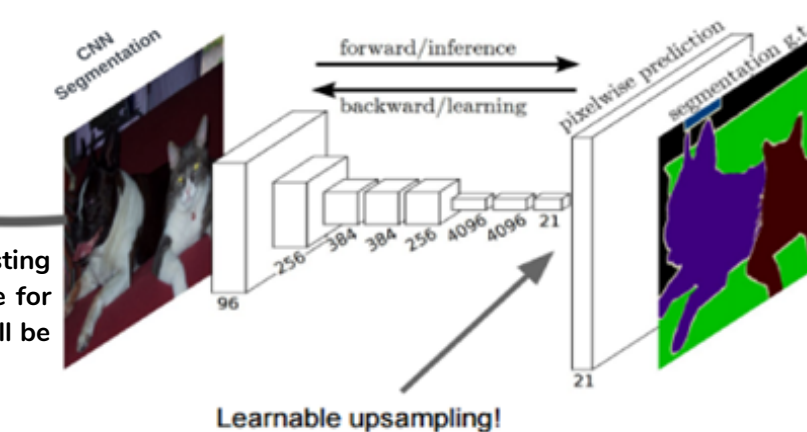


we will design and develop an RNN-LSTM model architecture for cloud movement forecasting. The model will be trained using the prepared dataset.



we will evaluate the trained CNN model on diverse test images, and analyze the results for further improvement.

CNN Segmentation: we will study the existing CNN model, improve or develop a new one for accurate cloud segmentation. The model will be trained using labeled images.



The dataset of 6M images will be collected and organized by capturing images using a fisheye camera.



The software environment will be set up, and any errors in the provided code will be debugged.



we will mark the images to identify cloud presence and types using dash application which was created specially.



Results and Expectations

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- Better segmentation tool with optimized result.
- CNN model accurately separates clouds from the background.
- RNN-LSTM model successfully predicts cloud movement.
- Improved model accuracy using evaluation measures (e.g., F1 score, MSE).

Contact for More details

