

Project Proposal

Project Title

Face Mask Detection Using Deep Learning

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١. Project Overview

This project focuses on developing a deep learning-based model to automatically detect whether individuals in images are wearing face masks or not. With the rise of global health concerns and pandemics, enforcing mask compliance is essential in public areas to prevent the spread of infectious diseases. Manual monitoring of large crowds is time-consuming and prone to human error. This project will contribute by providing an automated, accurate, and efficient computer vision solution that assists in real-time mask detection and supports public safety measures.

٢. Project Goal

The goal of this project is to build a deep learning model using Convolutional Neural Networks (CNN) capable of accurately detecting face masks in real-time images or video streams. The system aims to achieve a detection accuracy of over 90% and provide a foundation for intelligent surveillance applications in healthcare and public safety environments.

٣. Approach

The project will follow the following main steps:

- **Data Collection:** The project will use the Face Mask Detection Dataset from Kaggle, which includes thousands of labeled images of people with and without masks.
- **Data Processing:** Images will be resized and normalized to prepare for model training.
- **Model/Method Selection:** A Convolutional Neural Network (CNN) will be developed using TensorFlow and Keras. Transfer learning techniques (e.g., MobileNetV2) may also be explored to enhance accuracy.
- **Testing and Evaluation:** Model performance will be evaluated using metrics

such as accuracy, precision, recall, and F₁-score. Confusion matrices will be generated to assess classification quality.

4. Project Steps and Timeline

- Week 1–2: Data collection, exploration, and preprocessing
- Week 3–4: CNN model design and training
- Week 5: Model evaluation and parameter tuning
- Week 6: Final adjustments, report preparation, and documentation

5. Expected Results

The expected outcome is a fully functional deep learning model that can detect whether a person is wearing a mask with high accuracy. The system will demonstrate the potential of AI in supporting public health initiatives and could be integrated into real-time monitoring systems in hospitals, offices, and public spaces.

6. Resources Needed

- Software: Python, TensorFlow, Keras, OpenCV
- Hardware: GPU-enabled computing environment for model training
- Dataset: Face Mask Detection Dataset from Kaggle
- Additional Resources: Research articles on deep learning and image classification

7. References

1. Andrew Mvd (2021). Face Mask Detection Dataset, Kaggle.
<https://www.kaggle.com/datasets/andrewmvd/face-mask-detection>
2. Chollet, F. (2018). Deep Learning with Python. Manning Publications.
3. Raj, S., & Saini, M. (2020). Face Mask Detection using CNN. International Journal of Computer Applications.