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Face Mask Recognition using deep learning

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INTRODUCTION

- The COVID-19 pandemic has reshaped daily life, making face masks a crucial tool in preventing the spread of the virus.
- With the increasing use of face masks, there arises a need for automated recognition systems to enhance safety and security.
- The project aims to leverage deep learning techniques to develop an accurate and efficient face mask recognition system.

SOFTWARE TOOLS USED

- Pandas
- Keras
- Tensorflow
- Matplotlib
- Numpy
- Spicy
- Pycharm

USAGE OF TOOLS

- Python is an interpreted, object-oriented, high-level programming language with dynamic semantics
- Keras is an API designed for human beings, not machines. Keras follows best practices for reducing cognitive load: it offers consistent & simple APIs.
- TensorFlow is an open source framework developed by Google researchers to run machine learning, deep learning and other statistical and predictive analytics workloads
- Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python

USAGE OF TOOLS

•NumPy (pronounced /ˈnʌmpaɪ/ (NUM-py) or sometimes /ˈnʌmpi/ (NUM-pee)) is a library for the Python programming language.

•SciPy provides algorithms for optimization, integration, interpolation, eigenvalue problems, algebraic equations, differential equations, statistics and many other classes of problems

•: PyCharm is a dedicated Python Integrated Development Environment (IDE) providing a wide range of essential tools for Python developers

REPORTED LITERATURE

- Our project builds upon existing research in face mask recognition, leveraging insights from notable papers such as [cite relevant papers].
- Research findings emphasize the effectiveness of deep learning models in image classification tasks, providing a foundation for our work.

OBJECTIVES

- Develop a real-time face mask recognition system for accurate identification of individuals wearing or not wearing masks.
- Enhance public safety by integrating the system into surveillance and monitoring infrastructure.
- Explore potential applications in healthcare, transportation, and various public spaces.

TIME LINE OF WORK PROPOSAL

- **Phases:**
  - Data Collection(1 WEEK)
  - Data Preprocessing(2-4 WEEK)
  - Model Architecture Design(4-6 WEEK)
  - Model Training and Validation(6-8 WEEK)
  - Testing and Evaluation(8-10 WEEK)
  - Integration and Deployment(10-12 WEEK)

USED ALGORITHMS

- **Convolutional Neural Networks (CNNs):**
  - Chosen for their effectiveness in image classification tasks, especially in the domain of facial recognition.
- **Transfer Learning:**
  - Leveraging pre-trained models such as VGG16 or ResNet to capitalize on existing knowledge and optimize training efficiency.

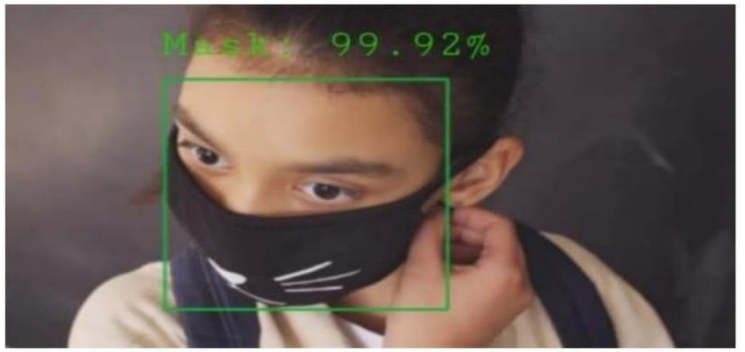
WORK DONE IN STEP BY STEP DESCRIPTION

- **Step 1: Data Collection**
  - Gathered a diverse dataset comprising images of individuals with and without face masks in various settings.
- **Step 2: Data Preprocessing**
  - Resized and standardized images, performed data augmentation to enhance dataset diversity.
- **Step 3: Model Architecture**
  - Designed a custom CNN architecture tailored for face mask recognition, balancing accuracy with computational efficiency.
- **Step 4: Model Training and Validation**
  - Trained the model on the preprocessed dataset, fine-tuned using transfer learning, and validated performance on a separate test set.

RESULTS AND DISCUSSION

- **Results:**
  - Demonstrated high accuracy in detecting the presence or absence of face masks.
- **Confusion Matrices:**
  - Illustrate the model's ability to minimize false positives and negatives.
- **Discussion:**
  - Address challenges encountered during testing and assess the model's performance in real-world scenarios

RESULT



SUMMARY

- Our project has successfully developed a deep learning-based face mask recognition system with promising accuracy rates.
- Challenges faced during the project have provided valuable insights, contributing to ongoing improvements.
- The system's potential applications extend beyond the current pandemic, making significant contributions to public safety and health monitoring.

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4. Cousera

DeepLearning.AI

COURSE CERTIFICATE

Feb 27, 2024

Guna Shekhar Reddy Bhutukuri

has successfully completed

Introduction to Machine Learning in Production

an online non-credit course authorized by DeepLearning.AI and offered through Coursera

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