Shri Ramdeobaba College of Engineering and Management, Nagpur

Department of Computer Science and Engineering

Session 2022-2023 [6th Sem]

Project Synopsis

Project Title :

DIAGNOSIS OF SKIN CANCER USING SKIN LESION IMAGES AND DEEP LEARNING

Problem Definition:

Create a Deep Learning model to detect skin cancer (2 primary types of tumours, malignant and benign) from skin lesion images, using the ISIC2018 dataset.

Project Objectives:

The objective of this project is to develop a framework to analyse and assess the risk of melanoma using dermatological photographs taken with a standard consumer-grade camera. An increasing number of genetic and metabolic anomalies have been determined to lead to cancer, generally fatal. Cancerous cells may spread to any body part, where they can be life-threatening. Skin cancer is one of the most dangerous forms of cancer. It is caused by unrepaired deoxyribonucleic acid (DNA) in skin cells, which generate genetic defects or mutations on the skin. Skin cancer tends to gradually spread over other body parts, so it is more curable in initial stages, which is why it is best detected at early stages. The increasing rate of skin cancer cases, high mortality rate, and expensive medical treatment require that its symptoms be diagnosed early. Considering the seriousness of these issues, researchers have developed various early detection techniques for skin cancer. Lesion parameters such as symmetry, colour, size, shape, etc. are used to detect skin cancer and to distinguish benign skin cancer from melanoma. It is also one of the most common types of cancer, and its frequency is increasing worldwide. The main subtypes of skin cancer are squamous and basal cell carcinomas,and melanoma, which is clinically aggressive and responsible for most deaths. Therefore, skin cancer screening is necessary. One of the best methods to accurately and swiftly identify skin cancer is using deep learning (DL). The ultimate goal of a skin cancer detection project is to provide an accurate and reliable tool for dermatologists and medical professionals to detect and diagnose skin cancer at an early stage, thereby improving patient outcomes and survival rates.

Proposed Plan of work:

- Week 1: Project Research
- Week 2-3: Learning Phase (Machine Learning & Python)
- Week 4-5: Learning Phase (Deep Learning)
- Week 6: Data Acquisition, Image Preprocessing and analysing current model
- Week 7-9: Model Construction and Tuning
- Week 10-11: Model Optimization
- Week 12: (Buffer)

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<tr><td>February</td><td colspan="4">March</td><td colspan="4">April</td><td colspan="3">May</td></tr>
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Methodology:

- **Data collection**: Gathering a large dataset of lesion images from various sources, including medical databases, research papers, and hospitals. The dataset should be diverse, including images of different types of lesions and from different imaging modalities.

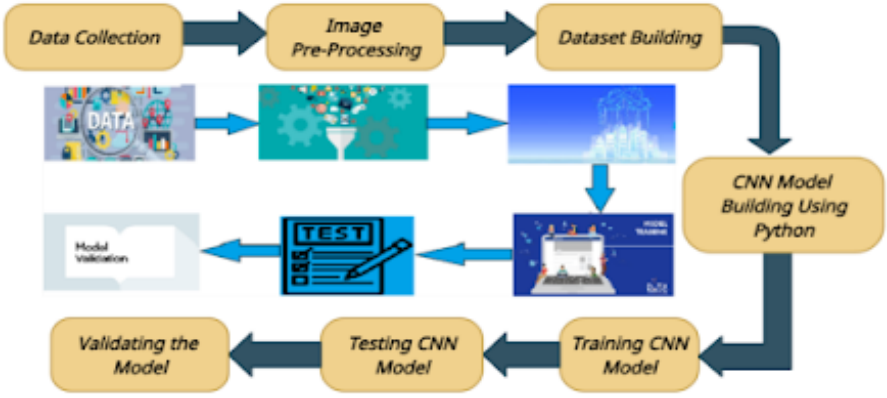
- **Data pre-processing**: Pre-processing the data to ensure that the images are of high quality and are standardised in terms of resolution, colour, and format. This may involve cleaning the data, removing outliers, and applying image enhancement

- **Feature extraction**: Extracting features from the lesion images using machine learning algorithms, such as convolutional neural networks (CNNs) or other deep learning models. These features may include texture, colour, shape, and other characteristics of the lesions.

- **Model development**: Developing a machine learning model that can accurately classify lesion images as either cancerous or non-cancerous. This may involve using different types of models, such as logistic regression, and support vector machine.

- **Model training and validation**: Training the model using the pre-processed data and evaluating its performance using various metrics, such as sensitivity, specificity, and accuracy. The model may need to be fine-tuned and re-trained using different techniques to improve its performance.

- **Evaluation**: Continuously evaluating the model's performance and making improvements as necessary to ensure that it remains accurate and reliable over time. This may involve collecting new data, re-training the model, or modifying its architecture or parameters.



Technology:

- Programming Language: Python
- Libraries: Tensorflow, ScikitLearn
- Workspace: Google Collab, Pycharm
- Dataset: Kaggle ISIC2018

Functional Specifications [Deliverables]:

In the proposed work, the deep learning method convolution neural network(CNN) will be used to detect the two primary types of tumours, malignant and benign, using the ISIC2018 dataset

Project Scope:

The scope of a skin cancer detection project involves developing a system that can accurately identify and classify different types of skin lesions and moles as either benign or malignant. The project may involve the use of computer vision techniques, machine learning algorithms, and deep learning models to analyse images of skin lesions and moles.

Submitted by:

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