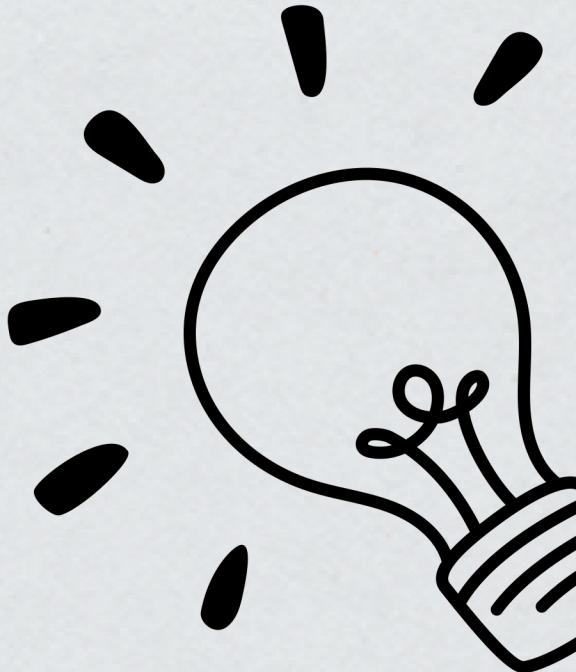


# SKIN DISEASES DETECTION

Using Convolutional Neural Network (CNN)



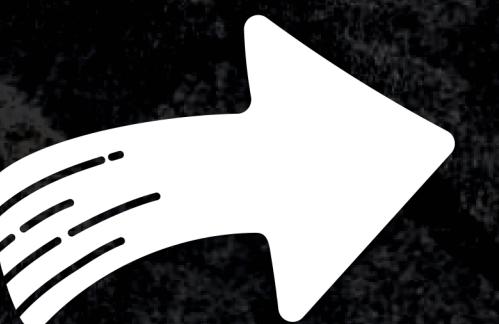
# PROJECT OVERVIEW

- The skin, a vital organ, serves as a protective barrier against various threats. With over **900 million** people globally affected by skin diseases, accurate identification is crucial.
- Skin disorders range from environmental to genetic, requiring precise examination. Deep learning-based **Convolutional Neural Networks** (CNN) have significantly improved skin disease classification.
- This project focuses on diagnosing four prevalent skin diseases: **Eczema, Psoriasis, Herpes, and Melanoma**. Leveraging **CNN**, we aim to enhance early and precise diagnosis, particularly for diseases like Melanoma, a preventable skin cancer.

# WHY TO USE CNN?

- The supply of doctors is limited in developing countries like in India, especially in smaller towns and villages making the provision of healthcare is difficult to a large group of people.
- If the skin disease is not detected in the early stage, it can get worse & and may turn into a serious health condition.
- It is also needed that they are detected at a faster pace, as we have a very large population, using CNN skin diseases can be detected easily and accurately.

# INTRODUCTION



Research indicates that most experienced dermatologists can skin diseases with 81% accuracy while 92% correct diagnosis is achieved using machine learning techniques.

In this project, our task is to detect the most common type of skin diseases at an early stage using CNN.

The skin diseases covered are:-

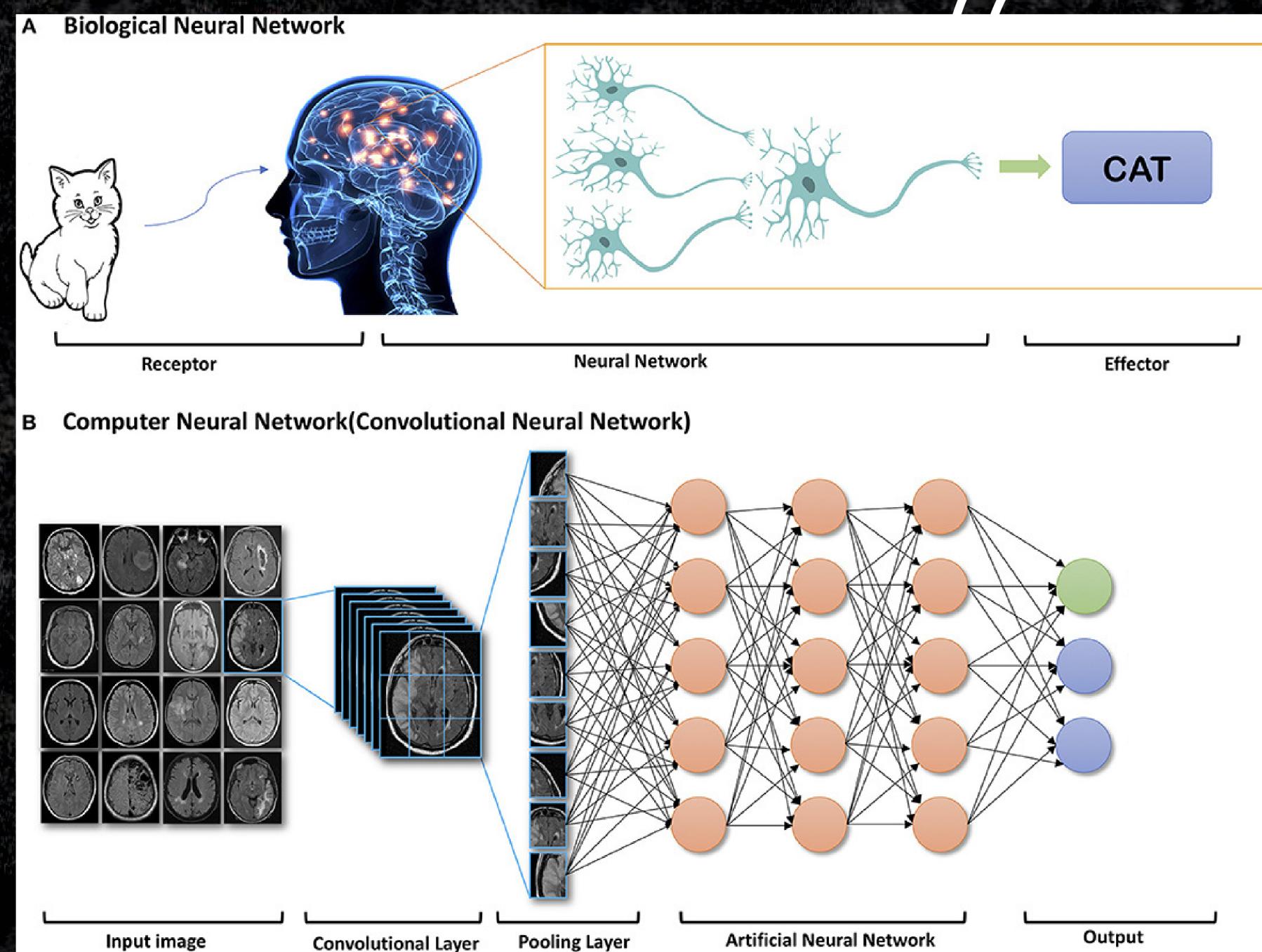
- **Actinic Keratosis** is a precancerous skin condition marked by rough, scaly patches due to sun exposure
- **Atopic Dermatitis** is an inflammatory skin condition causing itchy and inflamed skin
- **Dermatofibroma** a benign skin growth resulting in a firm nodule, typically brownish
- **Melanoma** is a type of skin cancer arising from melanocytes

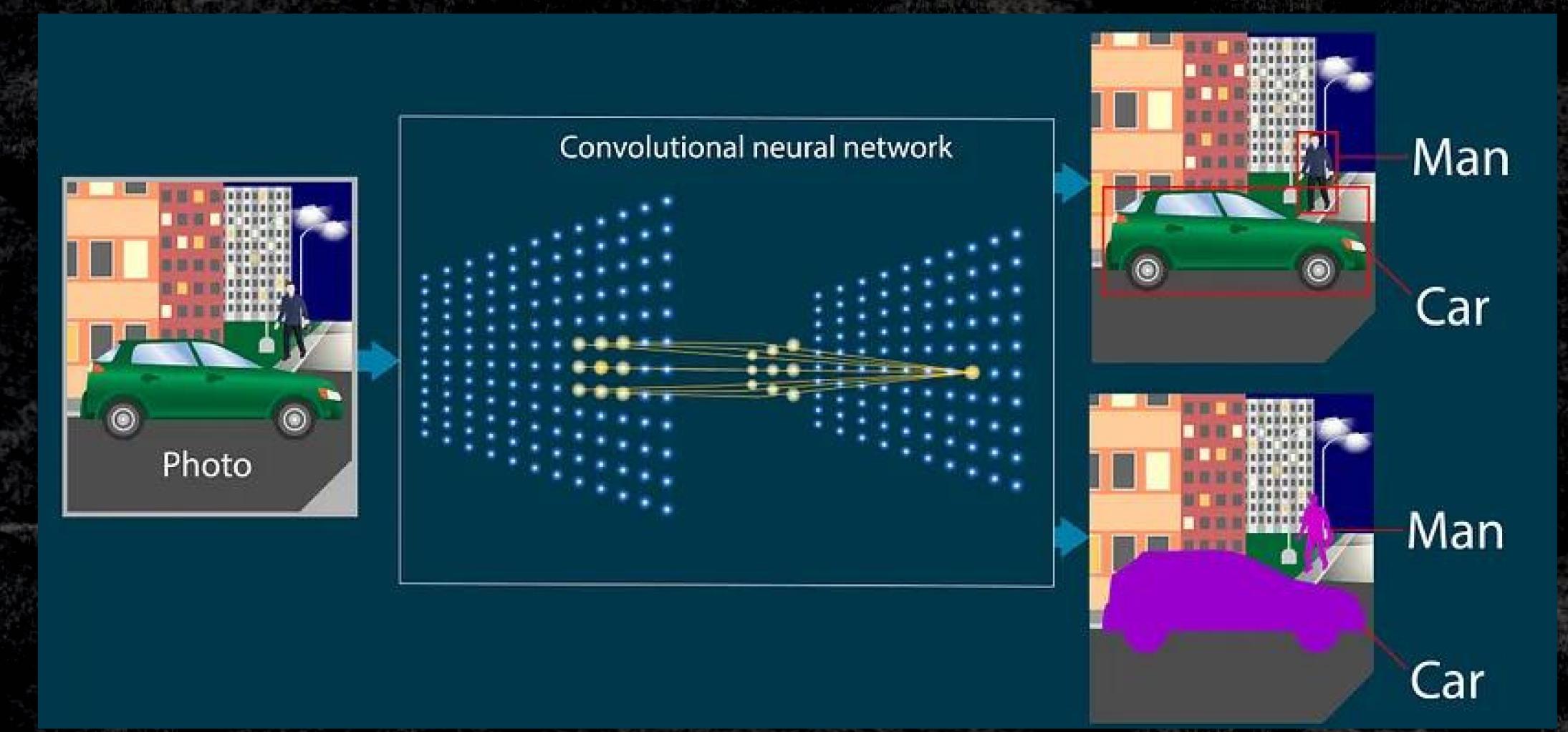
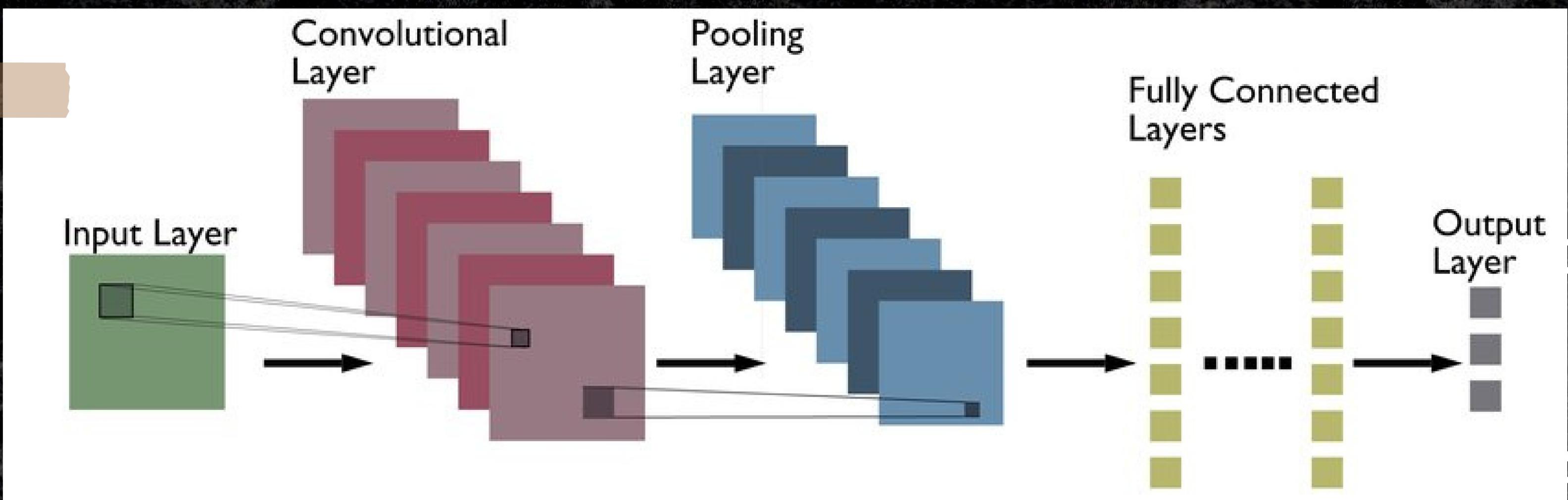


# WHAT IS CNN ???

In Deep Learning, a Convolutional Neural Network (CNN) is inspired by biological processes in which the connectivity pattern between neurons is the organisation of the animal visual cortex (area of the brain that processes visual information).

It is an AI function that mimics the workings of the human brain in processing data for use in detecting objects, recognizing speech, translating languages, and making decisions. **Deep Learning** AI is able to learn without human supervision.





# BAGROUND STUDY

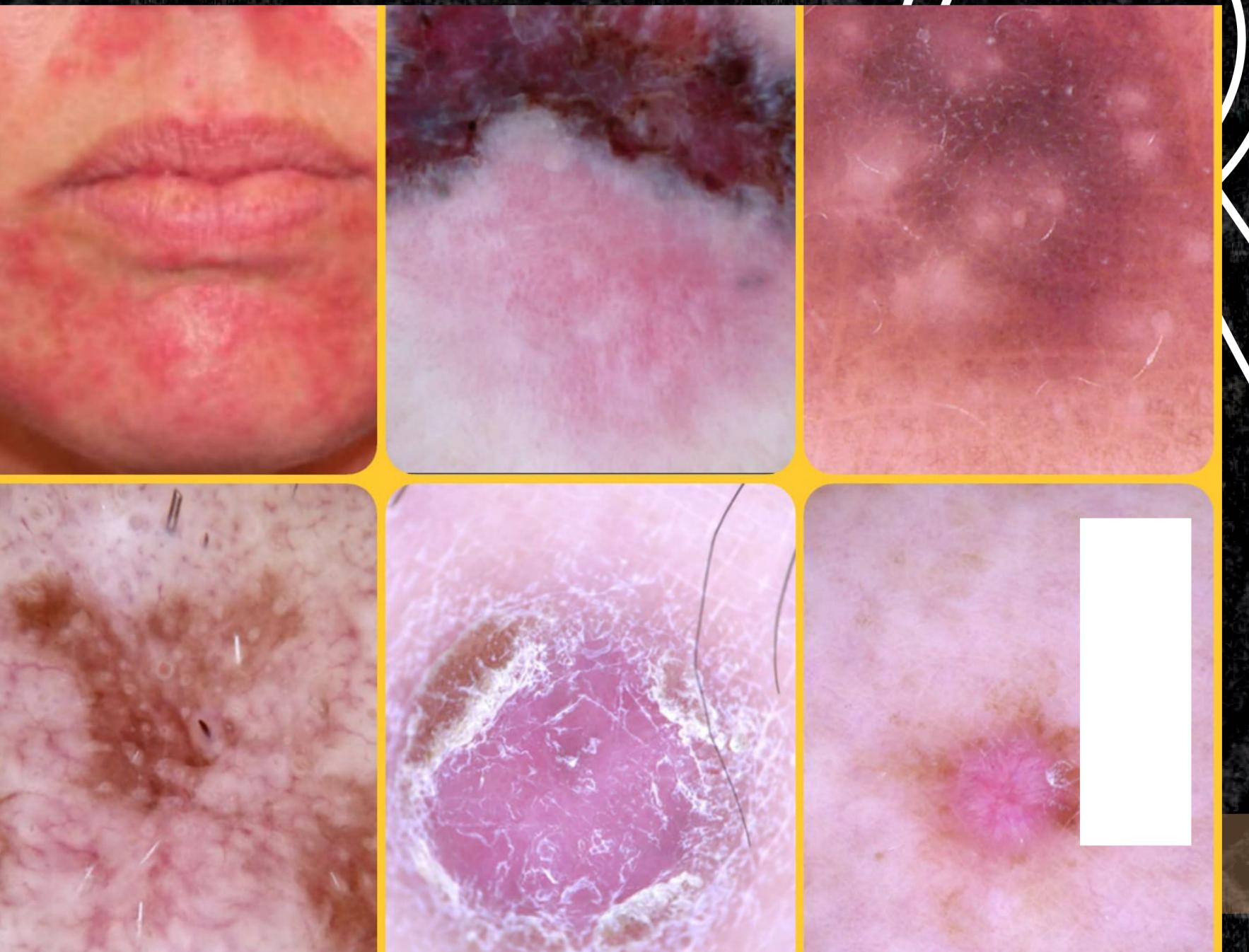
Method Name	Overview of Tech. & Classifier Used	Detection Accuracy	Future Scope
Nasr-Esfahani et al.	Two layered CNN is used for melonma Classification	81%	Deep layered network can be used for increased results
Khryashcheve et al.	CNN U-Net based algorithm is proposed for medical images	Not defined	Despite achiving high level image segmentation, this algorithm is not used; due to high time complexity. So it can be improved.

# BACROUND STUDY

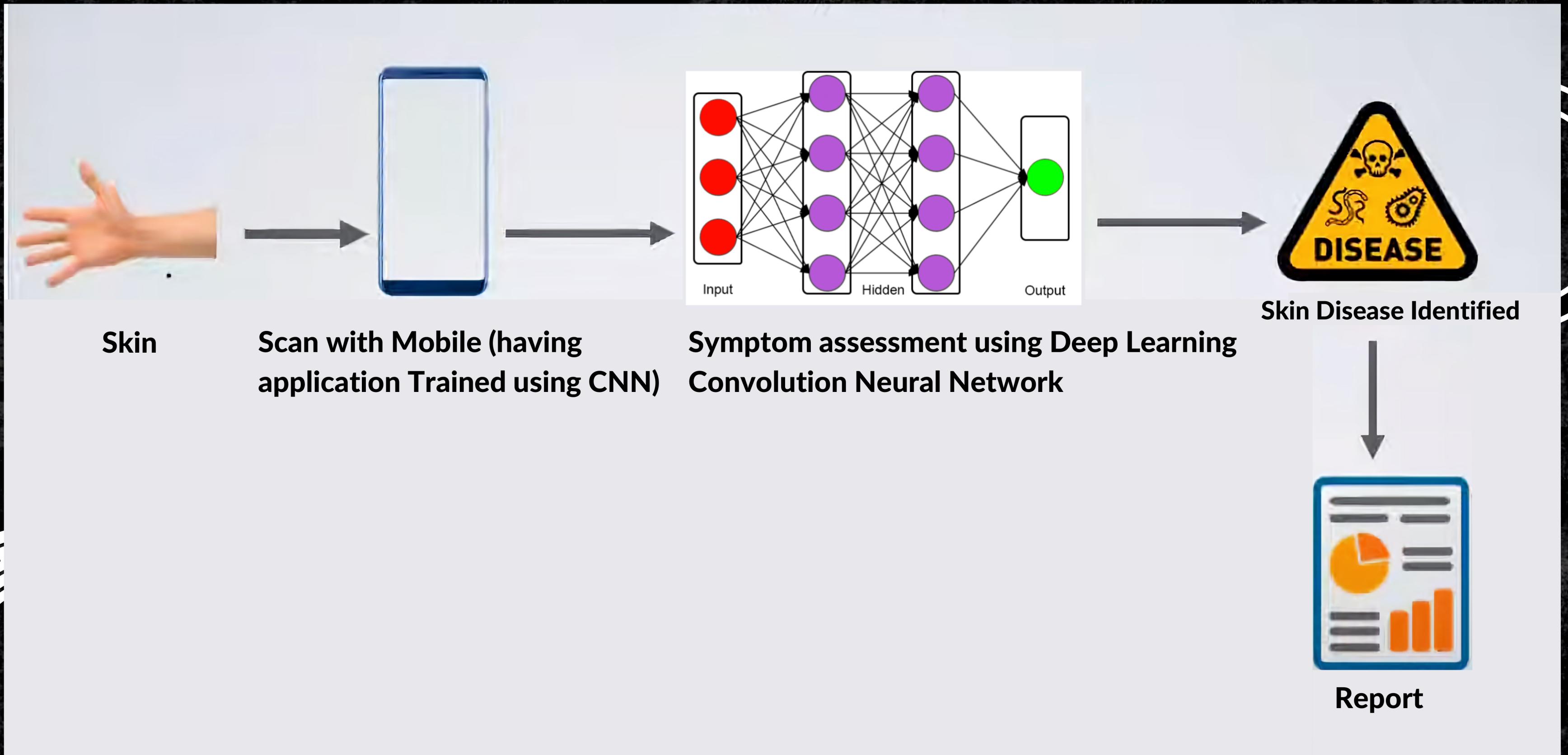
Method Name	Overview of Tech. & Classifier Used	Detection Accuracy	Future Scope
Sahu et al.	Hybrid deep learning MobileNet	70%-75%	Uses raspberry pi, which is not a good option as high computational power is needed
Chadwick et al.	Aim to identify the apps available to detect melanoma; used for testing accuracy of those apps	Not defined	Testing parameters should be revised

# DATASET

- Images are taken from multiple datasets. This dataset is a collection of multi-source dermatoscopic images of common pigmented skin lesions.
- The dataset is split into two parts, 80% for training and 20% for validation.
- **Transfer learning** is applied to models.



# STRATEGY



# NETWORK USED IN THIS PROJECT



```
1 # Initializing the CNN
2
3 model =Sequential()
4
5 model.add(Convolution2D(16, (3, 3),padding='same', activation='relu', input_shape=(224,224, 3)))
6 model.add(MaxPooling2D((2, 2)))
7
8 model.add(Convolution2D(32, (3,3),padding='same', activation='relu'))
9 model.add(MaxPooling2D((2, 2)))
10
11 model.add(Convolution2D(64, (3, 3),padding='same', activation='relu'))
12 model.add(MaxPooling2D((2, 2)))
13
14 model.add(Convolution2D(128, (3, 3), padding='same', activation='relu'))
15 model.add(MaxPooling2D((2, 2)))
16
17 model.add(Convolution2D(256, (3, 3), padding='same', activation='relu'))
18 model.add(MaxPooling2D((2, 2)))
19
20
21 model.add(Flatten())
22 model.add(Dense(1024,activation='relu'))
23
24 model.add(Dropout(0.4))
25
26 # model.add(Dense(512,activation='relu'))
27 # model.add(Dropout(0.2))
28
29 model.add(Dense(4, activation='softmax'))
```



# UNIQUENESS

## USE OF CNN

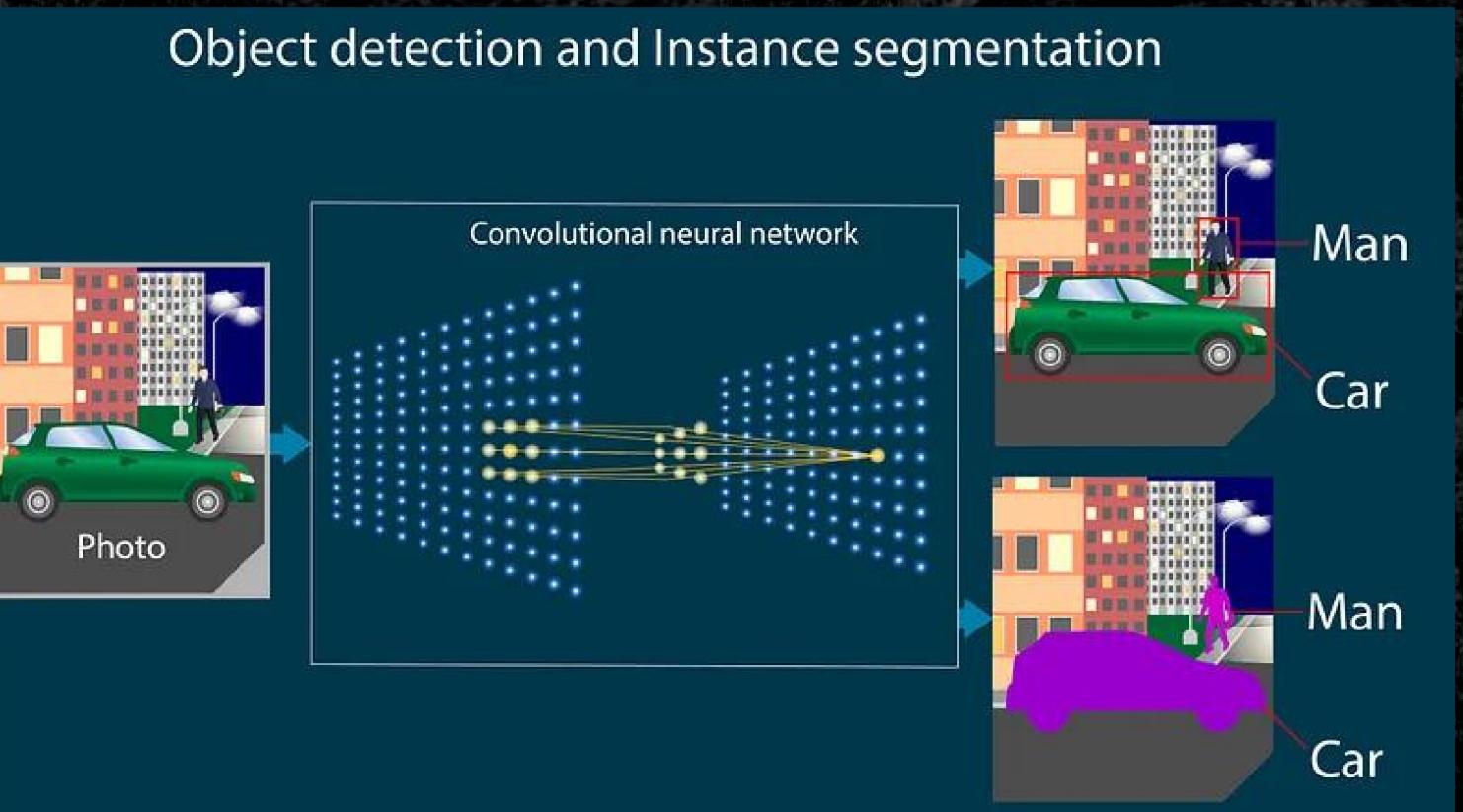
- We will be using a Convolution Neural Network for the detection of skin diseases at an early stage.
- The automatic system will reduce human efforts and costs with improved accuracy.

## CLOUD COMPUTING

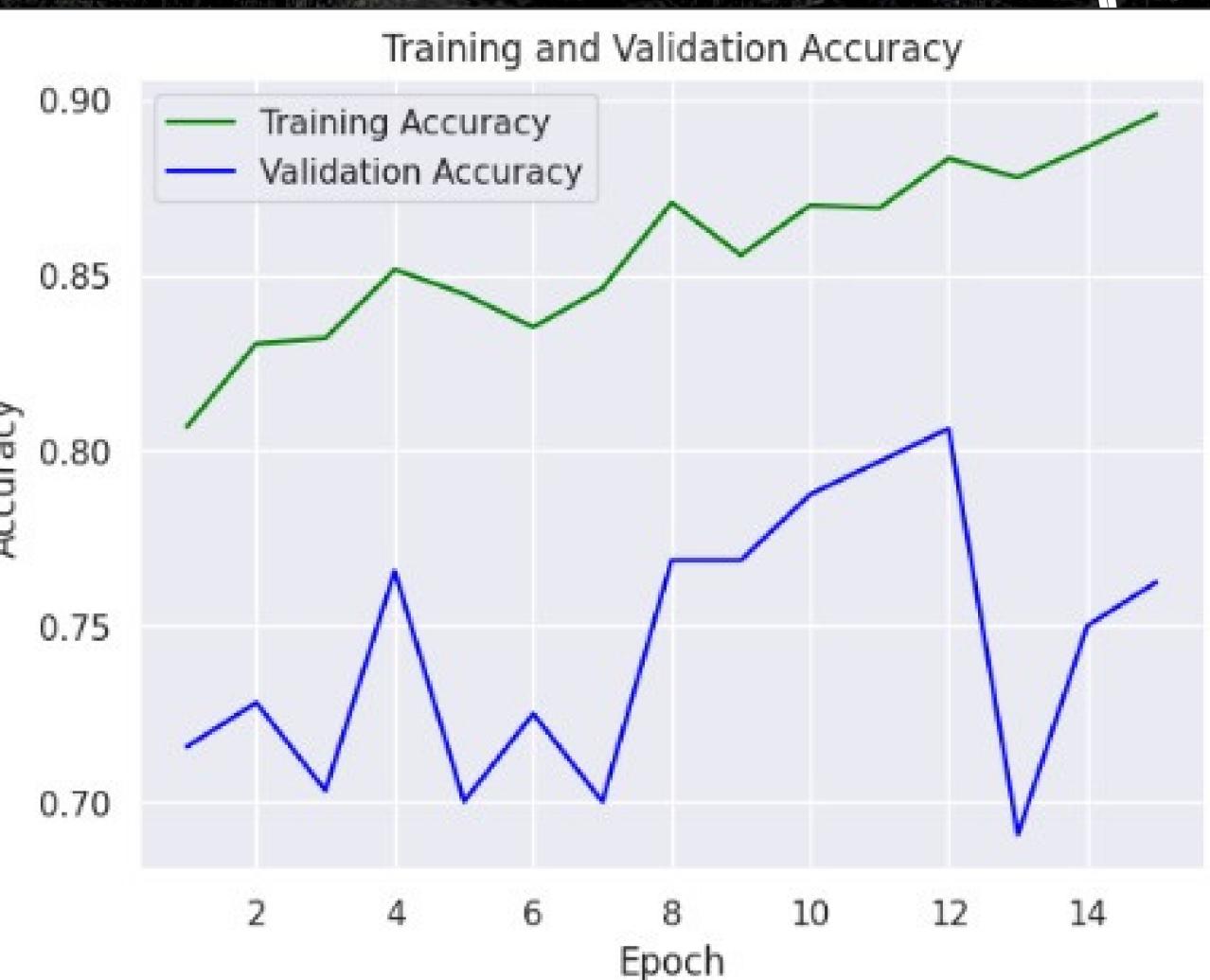
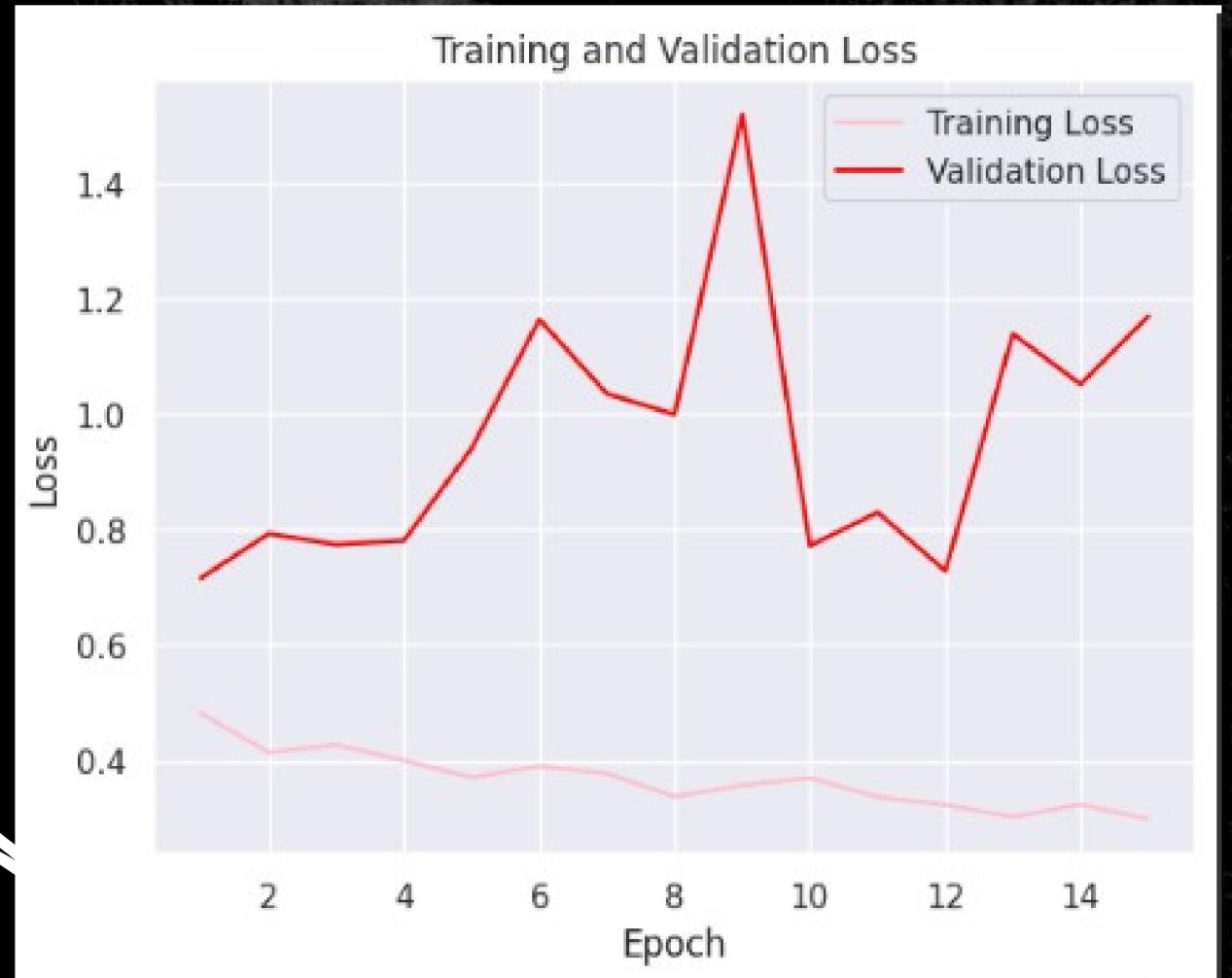
- We will also be using cloud computing for faster processing and reduce system overload.
- Ensuring maximum productivity with reduced wastage of resources

# TECHNOLOGIES USED

- Convolutional Neural Network (CNN)
- Tensorflow
- Deep Learning
- Android Development
- Cloud Computing



# WORKING PROTOTYPE



# CONCLUSION

- Modified SSD mobilnet v1 coco is a better choice for implementing it in mobile application if speed is concerned but very poor if accuracy is to be concerned. The used model follows CNN approach to produce better detection accuracy
- In our case accuracy is the only factor because for skin disease detection, therefore, false positives and false negatives are minimized. In future, it can be implemented as a composite model that will be able to detect all forms of skin diseases.
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**THANK YOU**