# Pill Identification Model Using Deep Learning Techniques

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***Abstract—*** **Since accurate drug identification immediately affects patient care and avoids serious repercussions, it is essential to prevent medical errors. Patients run a significant risk of injury and consequences when they misuse medications. Healthcare workers are burdened by this problem because, in situations where patients are unable to supply their prescription information, they must manually search through pill databases to identify drugs. The development of computerized medication systems that use information technology to precisely identify medications and identify possible interactions between them is urgently needed to address these issues. The MobileNet architecture serves as the foundational paradigm for the system, which is created in Python. The principal aim of this project is to identify medications intelligently and recognize pills accurately from photos. In order to achieve this, 1,268 samples from the dataset are used to train and test the system. The system achieves excellent performance metrics through its training process, which makes use of the MobileNet architecture. Both the validation accuracy and the training accuracy that were attained are reported as 98.00%. The system's capacity to precisely identify medicinal medications and detect pills is validated by the excellent accuracy rates. This pill identification system reduces human error and saves healthcare worker's important time by automating the pill identification procedure. The technology also helps patients, as it allows them to confirm that they are taking their prescribed medications and obtain detailed pharmacological information.**

***Index Terms*—Pills, MobileNet architecture, identify medications, healthcare**

## I. INTRODUCTION

By applying the back propagation algorithm to suggest changes to a machine's internal parameters that are used to compute the representation in each layer based on the representation in the previous layer, deep learning uncovers complex structure inside massive data sets. While recurrent nets have shed light on sequential data, such as text and voice, deep convolutional nets have made significant advances in the processing of pictures, video, speech, and audio.

Deep learning techniques are representation-learning techniques that incorporate many layers of representation. They achieve this by building straightforward but non-linear modules, each of which converts the raw input's representation at one level into a higher, marginally more abstract representation. Learning of very complicated functions is possible if enough of these transformations are coupled. Higher layers of representation emphasize characteristics of the input that are crucial for discriminating and suppress variations that are unimportant for classification tasks.

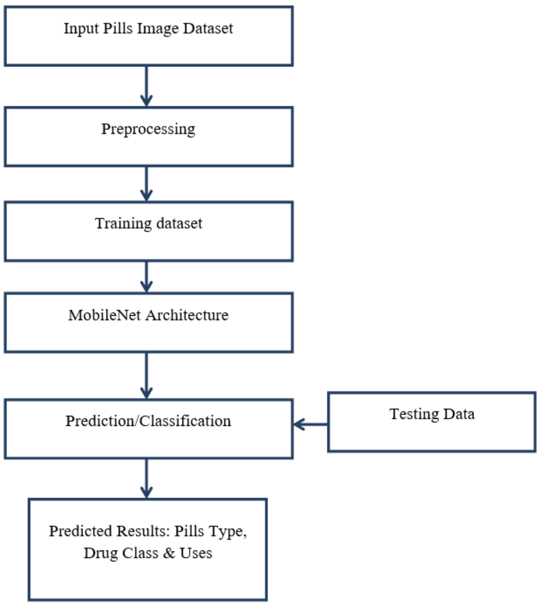
Deep learning is making significant strides in solving problems that have long escaped the best efforts of the artificial intelligence field. It has shown to be quite successful at locating intricate structures in high-dimensional data, which makes it valuable in a variety of commercial, governmental, and scientific settings. Along with smashing image and speech records, it has outperformed other machine-learning techniques in reconstructing brain circuits, predicting the activity of putative drug molecules, analysing particle accelerator data, and predicting the effects of mutations in non-coding DNA on gene expression and disease.

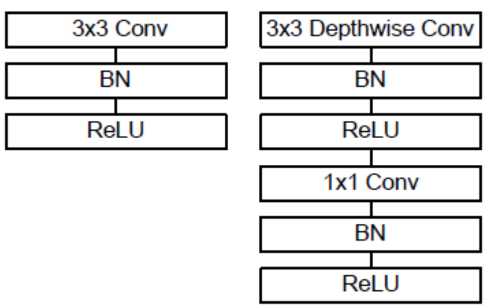
Hundreds of millions of these movable weights and hundreds of millions of labelled samples to train the machine are possible in a typical deep-learning system.

Next, the gradient vector's adjustment is made to the weight vector in the opposite direction. The goal function can be viewed as a type of hilly terrain in the high-dimensional space of weight values, averaged over all training samples.

## II. METHODOLOGY

### *A. Flowchart*




## III. RESULTS AND DISCUSSIONS

In real-world scenarios involving pill detection, the model demonstrated resilience to changes in lighting, backdrops, and orientations. The model showed generalisation to previously encountered medicines, despite having been trained on a particular dataset, suggesting its potential for practical use.

## IV. CONCLUSION

Through the study, the efficacy and promise of using deep learning techniques like the MobileNet architecture to improve medicine recognition efficiency and accuracy have been shown. High pill recognition and identification accuracy rates have been attained by the created system after rigorous training on a variety of pill image datasets. Healthcare workers save a great deal of time and money with this method, which also lowers the possibility of human error by automating the process and decreasing the need for manual searches.

## V. ACKNOWLEDGEMENT

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