Survey Paper on ML And AI-Based Drug Pill Recognition System

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Abstract- *Loss of eyesight and memory are two common characteristics of ageing, which is a normal process. The elderly are affected by these malformations, which might occasionally put them in risk while doing their regular tasks. The improper use of medications is one of the most dangerous issues. Such mistakes pose a very significant risk to the wellbeing and lives of elderly people. Furthermore, the technical solutions that are now available for this issue are made for experts or the general public without taking the requirements of the elderly into consideration. An image processing tool, the initial part of a broader collection of tools being developed specifically for senior people, has been presented to help address this lack of assistance.The idea adheres to steps like picture capture and pill categorization using its form, size, and colours. The local database's pill data is utilised in the learning process to characterise and store the system. The same traits are then calculated and checked against a database in the recognition process to give the user pertinent details about the pill under recognition.*

Keywords- Healthcare, Blind, Pill Recognition, Image Processing, CNN

I. INTRODUCTION

Human faculties like eyesight and memory are lost as we age, and we become more vulnerable to harm. Typically, taking drugs is involved. Older adults frequently fail to take their prescriptions, which can seriously harm their health. Knowing this position diminishes your self-confidence, and changing it will require help. The situation in Europe is becoming worse every year, with a growing disparity between taxpayers and recipients. The fact that this help comes from the healthcare system is extremely unavailability. As a result, a different approach based on current technology developments, mainly mobile devices, is suggested for this system.The formulation of the solution is a subset of larger computer vision techniques for aged, the elderly. Computer vision techniques were used in the development of the solution to help the elderly identify their medicine. A subset of the pill identification problem, the development of this solution aims to boost autonomy and self-assurance [9].

Elderly persons who are blind or visually impaired tend to take the wrong medications or forget to take them. The research also mentioned the topic. Patients who are visually challenged who make such medication mistakes are likely to suffer significant medical losses, and they may not have access to adequate help in this area. Eliminating the requirement for a mechanism to determine the prescription of tablets for individuals with persistent blindness solves this issue. Drug safety may be ensured in chronic patients with visual impairment using the suggested approach [7].

This article offers a summary of the methods used by blind individuals to identify medications on tablets. The topic is introduced and an outline is given in Section I. Section III offers a recommended structure for the system after Section II evaluates the literature review on the various papers and data sets produced for certification.

II. LITERATURE REVIEW

Diverse strategies have been put forth by various researchers. The approaches are introduced in this section. In order to offer relevant features (such as pill detection and drug notification) and encourage safe drug use, a variety of related tools have been created and reviewed.

D. Ushizima, A. Carneiro, M. Souza, and F. Medeiros. "Investigating pill recognition methods for a new national library ofmedicine image dataset"

The proper identification of tablets has grown to be a critical concern for patient care and security. Using the recently available National Library of Medicine (NLM) tablet image database for detection and characterisation, this research investigates descriptors for tablets. The authors outline an investigation into an automated NLM pill image segmentation method and the many features they extracted in order to compile a collection of dictionaries and pills based on FDA standards for the physical characteristics of tablets. The evaluation of the 1,000 most popular drugs in the US, the provision of masks and functional matrices to the NLM tablet reference images to ensure reproducible results, and discussion of three data organisation techniques for

compelling content are all part of our contribution to tablet recognition automation. It is constructed in pieces. using a search for images.

B. Z. Yaniv, J. Faruque, S. Howe, K. Dunn, D. Sharlip, A. Bond, P.Perillan. "The national library of medicine pill image recognition challenge: an initial report"

The U.S. National Library of Medicine published a difficult challenge in January 2016 that called for the creation and discovery of high-quality algorithms and software to assess how well consumer prescription medicine photos match reference pill images from the esteemed RxIMAGE collection. The necessity for healthcare professionals and the general public to quickly identify unidentified prescription medications served as the impetus for this challenge. When the prescription medication changes from a brand to a generic or for any other reason the form and colour of the pill changes, this functionality may be useful for verifying the pill in situations when the drug and paperwork have been separated, such as during a catastrophe or emergency.This is a first, encouraging step toward the creation of an NLM software system and an API that facilitates pill identification.

C. R. A. Calix, R. Gupta, M. Gupta, and K. Jiang. "Deep gramulator: Improving precision in the classification of personalhealthexperience tweets with deep learning"

Pharmacovigilance is one of the tasks that make up the crucial human health surveillance system. The safe use of medications is monitored and controlled through pharmacovigilance. When people share information about their own health-related experiences online, we could leverage Twitter data to this aim. The noisy nature of Twitter data is one issue, though. Consequently, a noise reduction strategy is required. In this research, we develop classifiers that can assist in identifying these personal experience (PET) tweets using a variety of machine learning approaches, including deep neural networks. Finally, we provide a Deep Gramulator technique to enhance the outcomes. Results of the analysis are shown and discussed.

D. W.J. Chang, L.-B. Chen, C.-H. Hsu, C.-P. Lin, and T.-C. Yang. "A deep learning-based intelligent medicine recognition system for chronic patients"

In this post, we suggest ST-Med-Box, a smart medicine detection system based on deep learning. The suggested approach could make it easier for chronic patients to correctly take and steer clear of several drugs. Drugs that are ineffective but may interact with other medications and perform other drug-related tasks include managing chronic patient information and providing timely medication reminders and information. The suggested system consists of a deep learning training server, a mobile app running on an Android platform, an intelligent medication identification device, and a cloud-based administration platform. Eighty distinct medicines can be recognised by the system as it is now.

E.M. Ervasti, M. Isomursu, and I. I. Leibar. "Touch- and audio-based medication management service concept for vision impaired older people "

An initial prototype named Blind NFC was used to show that the idea could be implemented. It is an NFC-enabled PDA with the fundamental ability to read the name and dose of a medication by touching the medication container. Results showed that older users picked up and utilised the essential features of touch- and audio-based systems rather quickly. In addition to utilising their own self-recorded audio messages for labelling things, they discovered potential utility in the technique for tagging and recognising other common physical objects besides pharmaceutical packages.

III. SYSTEM ARCHITECHTURE

The system's fundamental architecture is shown in the image below [9]. The system will have two main modules.

Learning Mode and Recognition Mode.
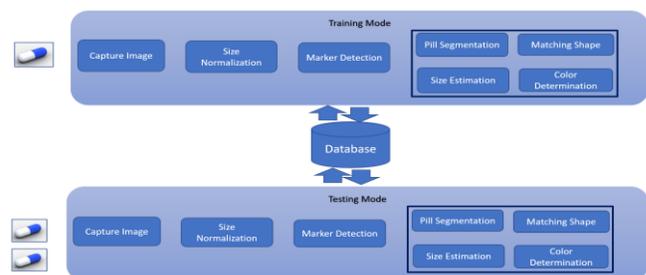
Learning Mode:

This mode is specifically designed to be handled by the caregiver, who will be required to take a picture of the medication the patients with visual impairments have on their prescription, enter the necessary information about the medication in the pill database, and select the appropriate text-to-speech output that the user can hear. Before registering the pill to the database, this learning process will involve a number of processes, including picture capture, size

normalisation, pill segmentation, and size-shape-colour determination.

Recognition Mode:

Users of this mode, such as those who are blind or visually challenged, must first take a picture of the medication they wish to identify in order to utilise it. In order to properly identify the pill, this recognition process will follow the same stages as the learning mode, such as determining the pill's form, size, and colour. As a result, this mode will also provide text and voice output of the information about the pills registered by the specific caregiver and found in the pill database

IV. CONCLUSION

We may thus draw the conclusion that this initiative will benefit many future visually impaired individuals who might require assistance with the administration of their medications. The suggested architecture and algorithm for identifying drug tablets are described in this review. The suggested method creates drug usage records by uploading drug information to a cloud-based drug management platform. This enables family members or caregivers to monitor the medication status of patients who are chronically blind using mobile device applications.

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