

# Survey towards Drug Pill Recognition for visually Impaired Person

<sup>1</sup>Sayali Gaikwad,<sup>2</sup> Ashwini Bade, <sup>3</sup>Shubham Dhire, <sup>4</sup>Ranjeetkumar Sharma, <sup>5</sup>Prof.Twinkal Shukla

<sup>1,2,3,4</sup>Student,<sup>5</sup>Faculty, Information Technology, Moze College, Wagholi, India

<sup>1</sup>[22sayaligaikwad@gmail.com](mailto:22sayaligaikwad@gmail.com), <sup>2</sup>[ashwinibade800@gmail.com](mailto:ashwinibade800@gmail.com), <sup>3</sup>[dhireshubham9921@gmail.com](mailto:dhireshubham9921@gmail.com),

<sup>4</sup>[Sharmaranjit600@gmail.com](mailto:Sharmaranjit600@gmail.com), <sup>5</sup>[twinklshukla44@gmail.com](mailto:twinklshukla44@gmail.com)

**Abstract** - Aging is a natural process typically characterized by loss of capabilities such as vision or memory. These transformations interfere with quotidian tasks performance sometimes leading to dangerous situations for senior adults. One of the most relevant is related with the wrong ingestion of medication or even forgetfulness. This kind of mistakes represents a real threat to elder's health and life. Furthermore, the existing technological solutions concerned with this problematic, are designed for professionals or general public disregarding elderly needs in particular. Thus, in order to overcome this lack of support, it will be presented an image processing tool, which represents the first steps for a larger toolset adapted for elderly persons, under construction. The procedures followed by this proposal include image acquisition and pill characterization based on its shape, dimensions and colours. The system uses these features in the learning step to describe and store pills information on local database. Later, in the recognition step, the same features are determined and compared against database in order to provide the user with relevant information's related with the pill under recognition.

**Keywords**— health care, visually impaired, drug pill recognition, image processing, CNN.

## I. INTRODUCTION

The advancing of age also brings loss of capabilities such as vision and memory, which exposes elderly persons to dangerous situations. A common one is related with medication. Elderly persons tend to forget or fail the correct ingestion of medication which can lead to serious health

damages. On the other hand, when they realize this situation, their self-confidence gets weakened creating the need of a support to change this scenario. Given the situation of Europe - that will continue increasing the imbalance between taxpayers and beneficiaries every year. It is highly unavailable that this support arises from health care system. Thus, in this system, it is proposed an alternative solution based on technological trends, namely mobile devices. This solution is a subset belonging to wider tool support for elderly, under development. It applies computer vision techniques to aid elderly persons on pill identification task, aiming a reinforcement of confidence and autonomy.

In general, visually impaired elderly people will be more likely to take the wrong medicines or forget to take their medication. The study also reported that the subject. Accordingly, errors in drug use affecting visually impaired patients are expected to cause high medical losses, and such patients may not have access to sufficient support in this regard. To overcome this problem, we consider the need for a means of drug pill recognition for visually impaired chronic patients. The proposed system can support the medication-use safety of visually impaired chronic patients.

The paper states the review for drug pill recognition for visually impaired person. The section I is introduction of subject and gives overview. The section II considers literature survey done over few papers and datasets formed for recognition while section III gives proposed system for the system.

## II. LITERATURE REVIEW

There are different approaches that have been presented by different researchers. Some of the methods have been presented in this section. To provide related functionalities (such as drug pill recognition and medication reminders) to facilitate safe medication use, many related tools have been developed and assessed.

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

Correctly identifying pills has become a critical task in patient care and safety. Using the recently released National Library of Medicine (NLM) pill image database, this paper investigates descriptors for pill detection and characterization. Authors describe efforts in investigating algorithms to segment NLM pill images automatically, and extract several features to assemble pill groups with priors based on FDA recommendations for pill physical attributes. Our contributions toward pill recognition automation are three-fold: we evaluate the 1,000 most common medications in the United States, provide masks and feature matrices for the NLM reference pill images to guarantee reproducibility of results, and discuss strategies to organize data for efficient content-based image retrieval.

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 "

In January 2016 the U.S. National Library of Medicine announced a challenge competition calling for the development and discovery of high-quality algorithms and software that rank how well consumer images of prescription pills match reference images of pills in its authoritative RxIMAGE collection. This challenge was motivated by the need to easily identify unknown prescription pills both by healthcare personnel and the general public. Potential benefits of this capability include confirmation of the pill in settings where the documentation and medication have been separated, such as in a disaster or emergency; and confirmation of a pill when the

prescribed medication changes from brand to generic, or for any other reason the shape and color of the pill change. This is an initial promising step towards development of an NLM software system and application-programming interface facilitating pill identification.

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

Health surveillance is an important task to track the happenings related to human health, and one of its areas is pharmacovigilance. Pharmacovigilance tracks and monitors safe use of pharmaceutical products. Twitter data can be used for this task given that users post their personal health related experiences on-line. One problem with Twitter data, however, is that it contains a lot of noise. Therefore, an approach is needed to remove the noise. In this paper, several machine learning algorithms including deep neural nets are used to build classifiers that can help to detect these Personal Experience Tweets (PETs). Finally, we propose a method called the Deep Gramulator that improves results. Results of the analysis are presented 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 "

This paper proposes an intelligent medicine recognition system based on deep learning techniques, named ST-Med-Box. The proposed

system can assist chronic patients in taking multiple medications correctly and avoiding in taking the wrong medications, which may cause drug interactions, and can provide other medication related functionalities such as reminders to take medications on time, medication information, and chronic patient information management. The proposed system consists of an intelligent medicine recognition device, an app running on an Android

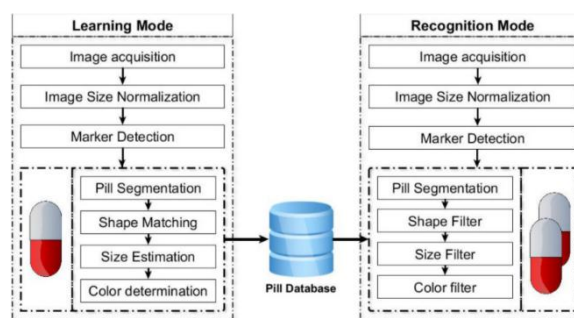
based mobile device, a deep learning training server, and a cloud-based management platform. Currently, 80 different medicines can be recognized by the proposed system.

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

The service concept allows older users with vision impairments to manage their daily medications autonomously by providing them means to identify medicines and retrieve personal medication information. In order to demonstrate the feasibility of the concept, an early prototype called Blind NFC was implemented. It is a NFC enabled PDA with a basic functionality of reading the medicine name and dosage information aloud by touching the medicine package. Findings revealed that older users learned and used the basic functionality of touch- and audio-based system quite easily. They found potential value in the technology also in tagging and identifying other everyday physical objects than medicine packages and using their own self recorded audio messages for marking objects.

### III. SYSTEM ARCHITECTURE

The procedures followed by this proposal include image acquisition and pill characterization based on its shape, dimensions and colours. The system uses these features in the learning step to describe and store pills information on local database. Later, in the recognition step, the same features are determined and compared against database in order to provide the user with relevant information related with the pill under recognition.



### IV. CONCLUSIONS

We have proposed drug pill recognition system using deep learning, for visually impaired chronic patients. The proposed system consists of a pair of wearable smart glasses, an artificial intelligence (AI)-based intelligent drug pill recognition box, a mobile device app, and a cloud-based information management platform and is designed to support safe medication use. The proposed system uploads medication information to the cloud-based management platform to build medication-use records, allowing family members or caregivers to monitor the medication status of visually impaired chronic patients by using the mobile device app. Hence, the proposed system can effectively mitigate the problem of drug interactions caused by taking incorrect medications, thereby reducing the cost of medical treatment and providing visually impaired chronic patients with a safe medication environment.

### REFERENCES

- [1] Ushizima, Daniela, Allan Carneiro, Marcelo Souza, and Fatima Medeiros. "Investigating pill recognition methods for a new national library of medicine image dataset." In International Symposium on Visual Computing, pp. 410-419. Springer, Cham, 2015.
- [2] Yaniv, Ziv, Jessica Faruque, Sally Howe, Kathel Dunn, David Sharlip, Andrew Bond, Pablo Perillan, Olivier Bodenreider, Michael J. Ackerman, and Terry S. Yoo. "The national library of medicine pill image recognition challenge: An initial report." In 2016 IEEE Applied Imagery Pattern Recognition Workshop (AIPR), pp. 1-9. IEEE, 2016.

- [3] Calix, Ricardo A., Ravish Gupta, Matrika Gupta, and Keyuan Jiang. "Deep gramulator: Improving precision in the classification of personal health-experience tweets with deep learning." In 2017 IEEE International Conference on Bioinformatics and Biomedicine (BIBM), pp. 1154-1159. IEEE, 2017.
- [4] Chang, Wan-Jung, Liang-Bi Chen, Chia-Hao Hsu, Cheng-Pei Lin, and Tzu-Chin Yang. "A deep learning-based intelligent medicine recognition system for chronic patients." *IEEE Access* 7 (2019): 44441-44458.
- [5] Ervasti, Mari, Minna Isomursu, and Igone Idigoras Leibar. "Touch-and audio-based medication management service concept for vision impaired older people." In 2011 IEEE International Conference on RFID-Technologies and Applications, pp. 244-251. IEEE, 2019.
- [6] Ou, Y.-Y., Tsai, A.-C., Zhou, X.-P. and Wang, J.-F. (2020), Automatic drug pills detection based on enhanced feature pyramid network and convolution neural networks. *IET Comput. Vis.*, 14: 9-17. [https:// doi.org/ 10.1049/iet-cvi.2019.0171](https://doi.org/10.1049/iet-cvi.2019.0171)
- [7] L. S. Cordeiro, J. S. Lima, A. I. Rocha Ribeiro, F. N. Bezerra, P. P. Rebouças Filho and A. R. Rocha Neto, "Pill Image Classification using Machine Learning," 2019 8th Brazilian Conference on Intelligent Systems (BRACIS), 2019, pp. 556-561, doi: 10.1109/BRACIS.2019.00103.
- [8] W. Chang, L. Chen, C. Hsu, J. Chen, T. Yang and C. Lin, "MedGlasses: A Wearable Smart-Glasses-Based Drug Pill Recognition System Using Deep Learning for Visually Impaired Chronic Patients," in *IEEE Access*, vol. 8, pp. 17013-17024, 2020, doi: 10.1109/ACCESS.2020.2967400.
- [9] Urja Patel, "Machine Learning-based Pharmaceutical Tablet Inspection and Recognition Techniques – A Review", 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), pp.220-222, 2021.
- [10] S. Bashyal, R. K. Subba, S. Adhikari and L. Wagle, "Medication utilization problem among blind population in Nepal", *Int. J. Pharmaceutical Sci. Res.*, vol. 10, pp. 1959-1965, Apr. 2019.

Copyright protected @ ENGPAPER.COM and  
AUTHORS

[Engpaper Journal](#)



<https://www.engpaper.com>