

# Secured IoT Based Assistance System and Application for Alzheimer's disease

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**ABSTRACT:** In many nations, the rising prevalence of Alzheimer's disease is a serious worry. New approaches are thus needed for preventing, identifying, and helping those who have Alzheimer's disease. The aim of this project is to develop a prototype that provides support services. Our prototype enables tracking the location of person with Alzheimer's disease. It supports them for remembering persons familiar to them. An emergency alert will be sent to the caretaker when required, communication via voice message between caretaker and patient. Camera module in the home environment detects anomalies.

**KEYWORDS:** Alzheimer's Disease, Face recognition, IoT, Object detection.

## I. INTRODUCTION

The fact that Alzheimer's disease affects so many individuals make it one of the main issues affecting public health highly alarming. Alzheimer's disease is a degenerative condition that gradually erodes mental capacity and memory. The brain regions that are responsible for cognition, memory, and language are affected by Alzheimer's disease. It may significantly impair a person's capacity to carry out everyday tasks. Almost 10 million new instances of dementia are diagnosed each year, and there are already over 55 million individuals living with the disease globally. Alzheimer's disease presently has no known treatment. The objective of this project is to develop a prototype that delivers help services for Alzheimer's patient. Our programme functions as a smart assistant that helps Alzheimer's sufferers identify their loved ones. Some patients leave their home and end themselves lost because they can't recall how to get there. As a result, the patient's relatives and friends could have to spend a lot of time looking for them without knowing where they are. The system helps patients with Alzheimer's feel more confident, which improves their ability to go on engaging in social activities.

## II. RELATED WORK

The creation of a wearable tracking gadget will help family members and carers overcome the difficulties they have while keeping track of people with this condition. A wearable transmitter on the gadget sends the patient's location [1]. People who are in the early phases of dementia may also get therapeutic help and direction during the hours of darkness, such as lighting direction and verbal directions. [2]. For attendance systems based on video in real time processing, face

recognition technology—which is separated into the concepts of face detection and recognition—is employed [3]. A user-centred development method for a tracking system with GPS to be applied in dementia care to assist care for people with wandering behaviour is provided by the authors in [4]. A motion-based object identification algorithm is put forward in [5]. Target detection using motion detection is suggested. Consequently, it suggests a technique for object detection.

### III. METHODOLOGY

The following figure, Fig. 1 shows the system architecture:

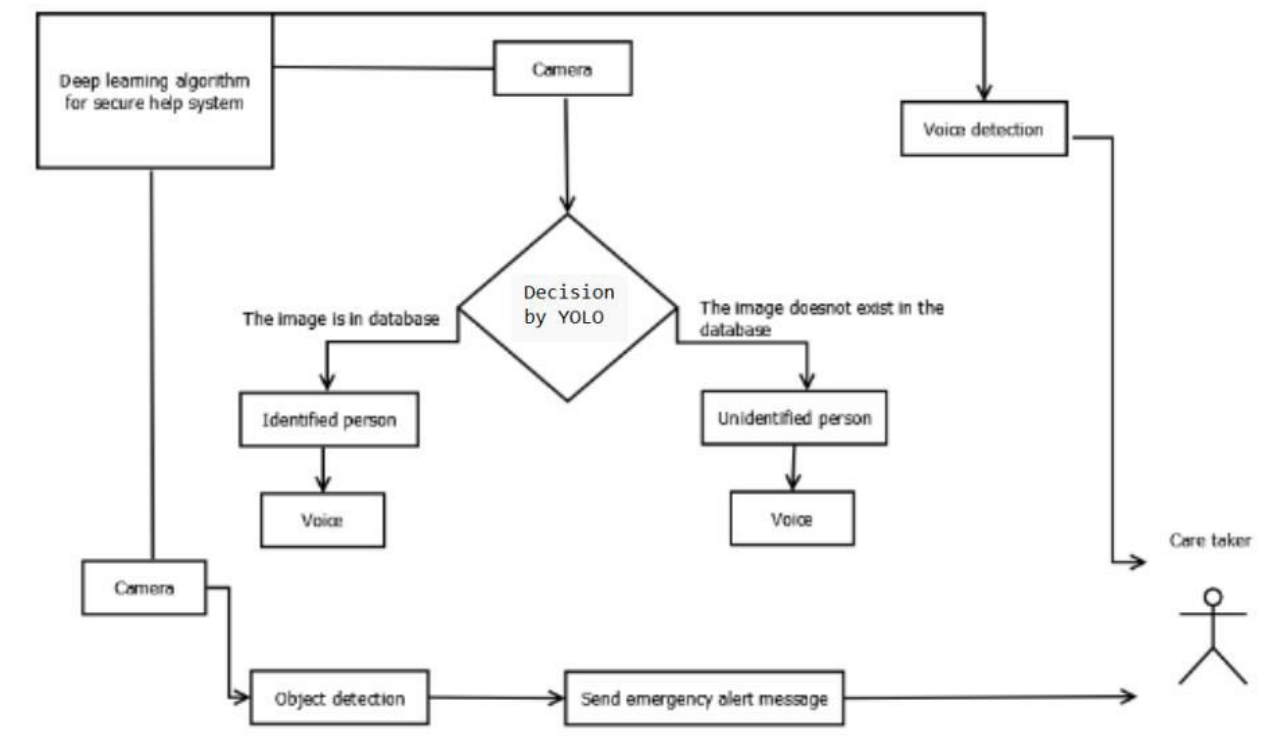


Fig. 1 Block Diagram of proposed system

The proposed system is a deep learning-based health assistance system. It has two camera sections: the inbuilt camera in mobile phone and the CCTV. The camera in mobile phone is used for decision making by using face recognition. Here identified or unidentified person information are voiced out. Another function of this component is giving out emergency alert to the caretaker when required. CCTV camera uses object detection to detect anomalies and send an emergency alert to caretaker if required.

The algorithm used here for face recognition is YOLO. The system has 4 modules: admin, caretaker, patient, a camera module.

Admin: The Admin module perform functionalities such as login, registration, registration of volunteers, request to view volunteer and patient accounts, view complaint and sent reply.

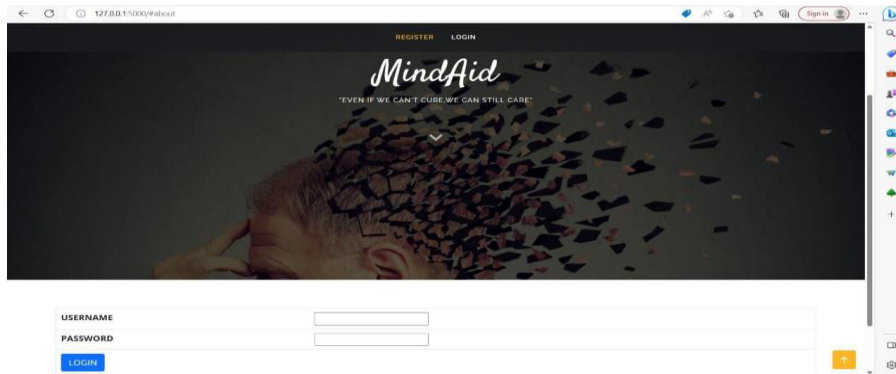
Caretaker: The caretaker module performs functionalities such as signup, login, view profile, edit and change password. It also allows patient management and familiar person management. It can be used to send messages to patient and send complaints and view reply.

Patient: The patient module has the functionalities of Authentication check using IMEI number, object detection and voice out, familiar person detection, emergency command invocation using voice (SMS, web), location updation using GPS.

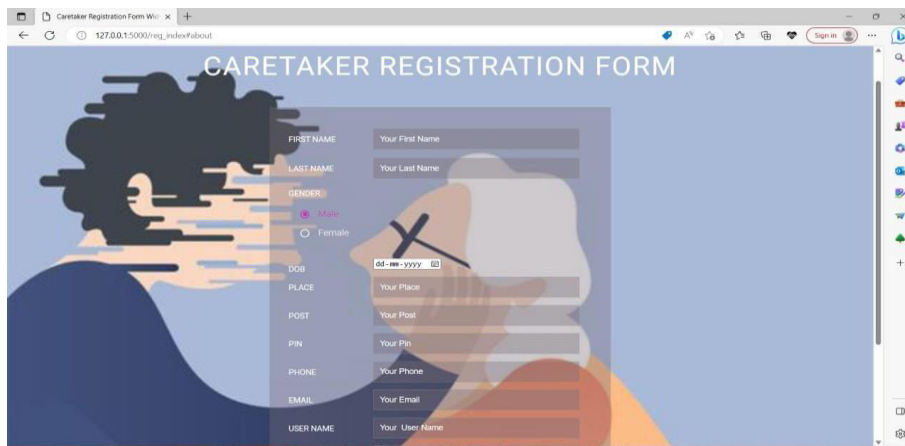


IV. EXPERIMENTAL RESULTS

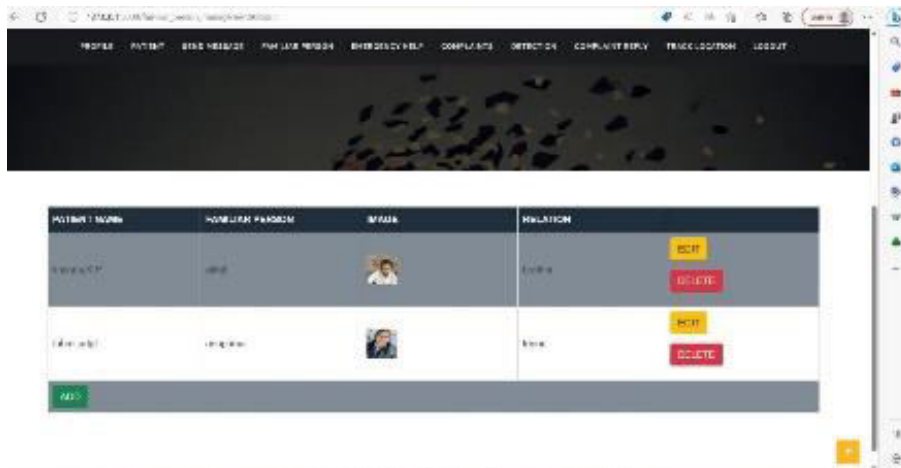
Figures shows the results. Figs. 2 (a) shows the image of homepage of website. (b) shows the image of caretaker registration page. (c) shows the familiar person management page. (d) shows image of anomalies detected by the camera module in the home environment. (e) shows the page where location of the patient is tracked. Fig. 3 shows application with location update.



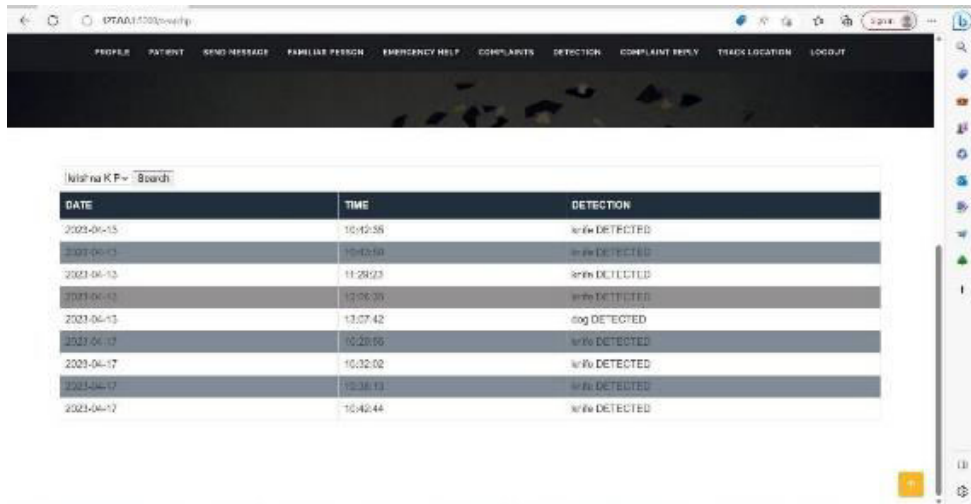
(a)



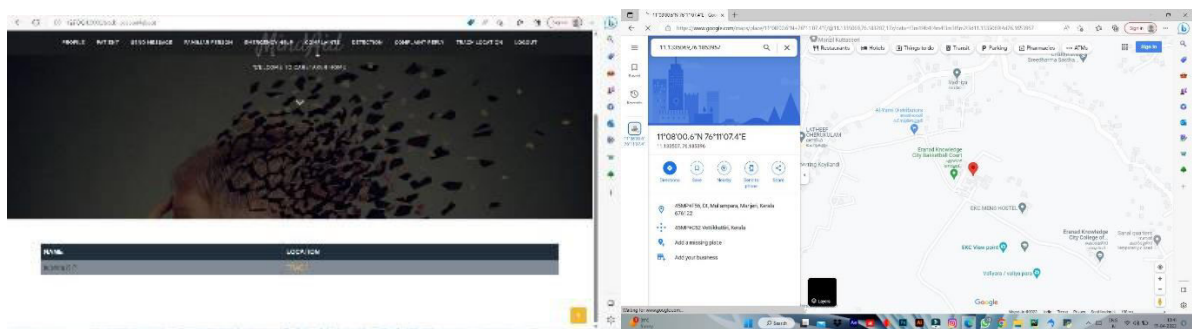
(b)



(c)



(d)



(e)

Fig. 2 Alzheimer's patient monitoring website (a) shows the image of homepage of website. (b) shows the image of caretaker registration page. (c) shows the familiar person management page. (d) shows image of anomalies detected by the camera module in the home environment. (e) shows the page where location of the patient is tracked.



Fig. 3 Alzheimer's patient application with location update.



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## V. CONCLUSION

In order to protect the person with Alzheimer's disease, this article developed a prototype that offers support and monitoring services. Our prototype successfully detects the familiar person and also sends a video call to the caretaker in case of emergency. We have tested our prototype in different cases and found that it successfully implemented all the features.

## REFERENCES

- [1] M. B. Mendoza, C. A. Bergado, J. L. B. De Castro and R. G. T. Siasat, "Tracking system for patients with Alzheimer's disease in a nursing home," TENCON 2017 - 2017 IEEE Region 10 Conference, Penang, Malaysia, 2017, pp. 2566-2570, doi: 10.1109/TENCON.2017.8228294..
- [2] McCullagh, P., Carswell, W., Augusto, J., Martin, S., Mulvenna, M., Zheng, H., Wang, H., Wallace, J., McSorley, K., Taylor, B., Jeffers, W.: State of the Art on Night-Time Care of People with Dementia. In: Proc. of the Conf. on Assisted Living 2009. IET, London (2009)
- [3] H. Yang and X. Han, "Face Recognition Attendance System Based on RealTime Video Processing," in IEEE Access, vol. 8, pp. 159143-159150, 2020, doi: 10.1109/ACCESS.2020.3007205.
- [4] Lin Wan, Claudia M Müller, Dave Randall, and Volker Wulf. 2016. Design of a GPS monitoring system for dementia care and its challenges in academia-industry project. ACM Trans. Comput.-Hum. Interact. 23, 5, Article 31 (October 2016), 36 pages.
- [5] A motion based object detection method Chen Zhaoyang, Gao Haolin, Wang Kun Zhengzhou Xinda Institute of Advanced Technology Zhengzhou, China
- [6] Viviana Perilli, Giulio E. Lancioni, Nirbhay N. Singh, Mark F. O'Reilly, Jeff Sigafos, Germana Cassano, Noemi Cordiano, Katia Pinto, Mauro G. Minervini, Doretta Oliva, Persons with Alzheimer's disease make phone calls independently using a computer-aided telephone system, Research in Developmental Disabilities, Volume 33, Issue 4, 2012, Pages 1014-1020, ISSN 0891-4222, <https://doi.org/10.1016/j.ridd.2012.01.007>. (<https://www.sciencedirect.com/science/article/pii/S089142221200008X>)
- [7] <https://www.mayoclinic.org/diseases-conditions/alzheimers-disease/symptomscauses/syc-20350447>
- [8] <https://www.cdc.gov/aging/aginginfo/alzheimers.htm>
- [9] <https://pjreddie.com/yolo/>
- [10] <https://www.geeksforgeeks.org/how-to-install-dlib-library-for-python-in-windows-10/>
- [11] <https://www.analyticsvidhya.com/blog/2019/09/feature-engineering-images-introduction-hog-feature-descriptor/>
- [12] <https://www.w3schools.com/java/>
- [13] <https://www.javatpoint.com/mysql-tutorial>
- [14] <https://www.tutorialspoint.com/flask/index.htm>
- [15] [https://en.wikipedia.org/wiki/Android\\_Studio](https://en.wikipedia.org/wiki/Android_Studio)
- [16] <https://www.jetbrains.com/help/pycharm/quick-start-guide.html>