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Wearable Device Providing Personal Assistance to Alzheimer Patients using Raspberry PI

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Abstract: Alzheimer's disease may be a serious disease occurring in most of the population. Taking care of the patients with Alzheimer disease are often both physically and mentally demanding. At an equivalent time, it's also important to permit the patients to measure on an independent life. the foremost widely known sort is Alzheimer's infection, which delete the individual's memory that creates the well-known encompassing new for them. handling the overall population with Alzheimer seems to be exceptionally troublesome and trying for his or her family, this infection regularly prompts to wandering which may be a stern sympathy toward numerous families who stress that the patient could be lost or stroll into slippery conditions. To affect such situation, this autonomous device will provide a private assistance to the patients affected by Alzheimer.
Keywords: Alzheimer Disease, wearable technology, Dementia, amnesia, Health care, forgetfulness, face recognition, etc.

I. INTRODUCTION

Dementia is that the commonest neuropsychiatric disorder that have an impact on an outsized portion of the elderly population across the world. It mainly affects cognitive functions and memory. Alzheimer's disease is taken into account a more specific sort of Dementia because it mainly affects the memory of the individual. amnesia or forgetfulness is merely few of the various symptoms that indicate the start of Dementia or Alzheimer's disease. a possible explanation for injury to elderly individuals is that the increased risk of falling. Falls at such an age cause fractures which may eventually to rapid degradation of health and even death in some cases. An elderly individual who is affected by Dementia or Alzheimer's disease will presumably be under the care of family or a home nurse within the case that the individual is at their own residence. Elderly individuals affected by Dementia or Alzheimer's are going to be disoriented and confused when left alone. a tool which will address these issues is that the need of the hour. Various devices already alive utilize technologies that are either complicated or highly unreliable. The proposed system is aimed to be reliable and price effective in comparison to existing systems. the value cutting is achieved using already existing software and hardware infrastructure and mixing it to service our requirement within the most reliable way. The system will contains only a Raspberry Pi , and a transportable power supply unit for the Raspberry Pi.

II. LITERATURE REVIEW

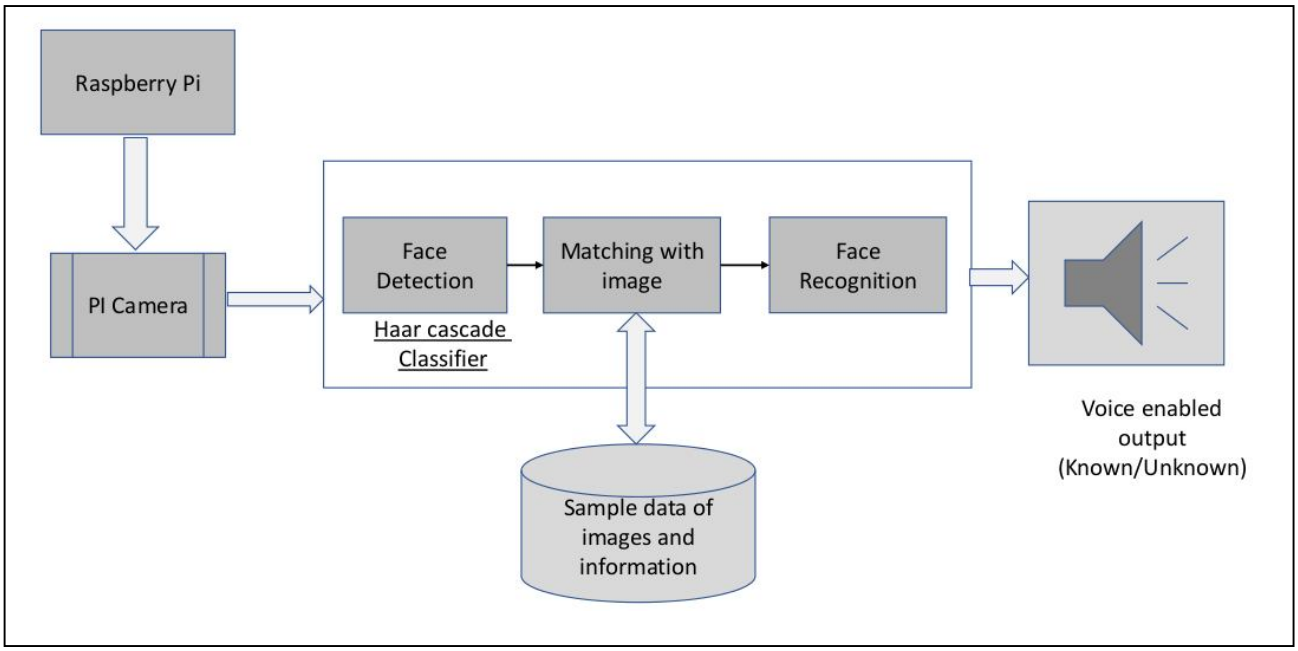
This is often overview of research paper for Alzheimer's disease which describes that within the early stages of this disease, the patient will have difficulty in remembering names of friends and relations, along side increased forgetfulness. the center stage involves difficulty in remembering the recently learned information and problems with sleep. Language problems increases due to shrinking vocabulary. because the disease progresses to an next stage the patient becomes increasingly paranoid. there's complete loss of speech, with an increased sense of disconcert and confusion, also as a bent to reply poorly to attempts by the caretaker to speak and supply needful care. because the disease may be a heavy burden on the patient also because the caregiver as around the clock care of the patients is required. In most cases, the caregiver has got to hand over a profession or means of livelihood so as to require care of patients, resulting in heavy financial problems. In paper[1] Another proposed method involved locating wireless devices and determining whether a tool has entered or exited a pre -provisioned 2-dimensional or 3-D dimensional geographic zone and alerting the caregiver whenever they're outside the geo fenced area. In paper[2] author have described about the products for patients with Alzheimer disease , wearable technologies are found useful to watch the track prisoners, children with Autism and youngsters with mongolism. In paper [3] author have described about Wearable Sensor Health Technology (WSHT). The term "Wearable" indicates a versatile and mobile sensor which will be worn constantly on the patient's body and used reception independently without the help of a physician and therefore the word "Sensor" represents some quite sensor technology twhich measures and collects vital parameters of the user.
The paper[4] provides the overview of research into the utilization of technology for people aged 65 and over with mild cognitive impairment and also the prototype solutions developed and tested.

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III. SYSTEM ARCHITECTURE

A. Proposed System



B. Algorithm Used: LBPH (Local Binary Patterns Histogram) Algorithm

LBPH considers texture descriptor which is beneficial to symbolize Faces. Because face data are often split as compositions of patterns of micro textures. Basically LBPH is administered in 3 stages they're

1) *Feature Extraction:* Feature extraction is that the process by which certain features of interest within a picture are detected and represented for further processing.
2) *Matching:* This is the method done after feature extraction that images in dataset are matched with extracted features.
3) *Classification:* In this stage, Matched images are classfied consistent with the output.

The face recognition is administered within the following stages, first stage the image capturing and converting into grey scale then the haar features are checked if they're present then they're considered as face, then the pixels are mapped.

Local Binary Pattern (LBP) may be a simple yet very efficient texture operator which labels the pixels of a picture by thresholding the neighborhood of every pixel and considers the result as a binary number.

The following notation is employed for the LBP operator: LBPP,Ru2. The subscript represents using the operator during a (P,R) neighborhood. Superscript u2 stands for using only uniform patterns and labeling all remaining patterns with one label. After the LBP labeled image fl(x,y) has been obtained, the LBP histogram are often defined as

$Hi=\sum x,yI\{fl(x,y)=i\},i=0,\ldots,n-1,$

In which n is that the number of various labels produced by the LBP operator, and I{A} is 1 if A is true and 0 if A is fake.

When the image patches whose histograms are to be compared have different sizes, the histograms must be normalized to urge a coherent description:

$Ni=Hi\sum n-1j=0Hj.$

C. Classifier : Haar Cascade

Haar Cascade is employed to detect objects in other images. Haar cascade offers pre-trained algorithms, organized into categories (nose, eyes then forth), counting on the pictures they need been trained on. the thought is passing these filters on the image, inspecting one portion (or window) at the time.

The Haar Cascade is trained by superimposing the positive image over a group of negative images. The training is usually done on a server and on various stages. Better results are obtained by using top quality images and increasing the quantity of stages that the classifier is trained.

This algorithm has following four stages:

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1) *Haar Feature Selection:* A Haar-like feature considers adjacent rectangular regions at a selected location during a detection window, sums up the pixel intensities in each region and calculates the difference between these sums. This difference is then wont to categorize subsections of a picture.
2) *Creating Integral Images:* The goal is reducing the amount of computations needed to get the summations of pixel intensities within a window.
3) *Adaboost Training:* It selects the simplest features and trains the classifiers that use them. This algorithm constructs a "strong" classifier as a linear combination of weighted simple "weak" classifiers.
4) *Cascading Classifiers:* The cascade classifier consists of a set of stages, where each stage is an ensemble of weak learners.

IV. RESULT

The aim of this paper is to create a tool for the private assistance to Alzheimer patients, that might act as a virtual assistant for the patient in their daily activities. While it runs on Raspberry Pi mini-computer, the device will take information, process it, and autonomously assist the patient. Alzheimer patients would hopefully be ready to use this product to measure more independently.

V. CONCLUSION

In this paper,we presented a fresh notion of a tracking device that helps the alzheimer's patients to cope up with their day to day activities along side a GPS tracker and Pills Reminder as an addition to the prevailing system. We defined an answer to the matter of Alzheimer and developed a system that permits a support to such patients affected by this disease.
Overall, we built a system that would provide as a hand to the patients who are handling alzheimer to form them catch up their regular lives.

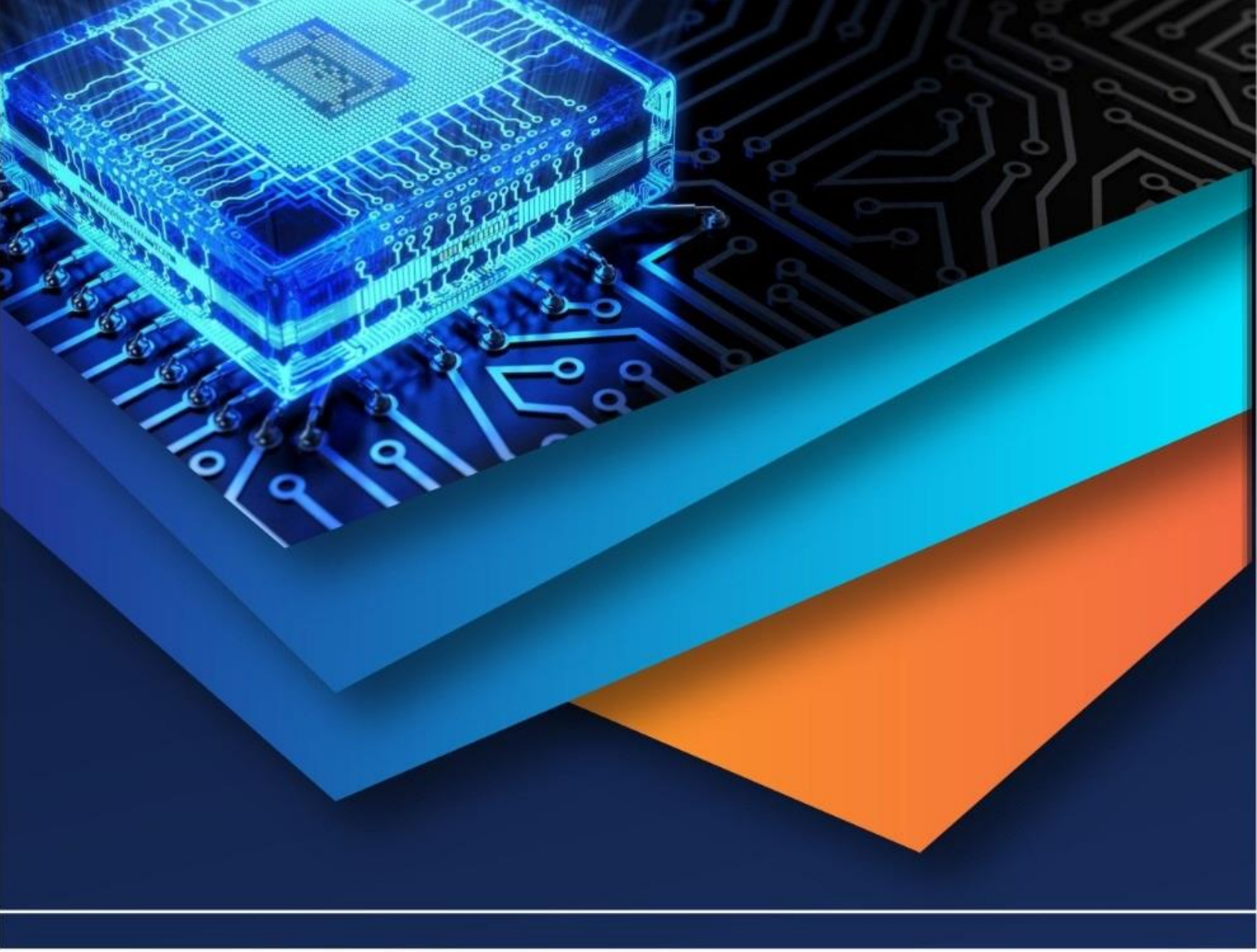
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