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Review: Smart Wearable Devices

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Abstract— A speedy improvement in the splendid wearable industry is making it dynamically fundamental to send customers' tendency of association (QoE) requirements to end customers. This paper endeavors to show the association between human experience and quality in the splendid wearable part. For this, the thoughts of nature of data (QLD) and nature of information (QoI) are used. While QLD is stressed over the precision and exactness of the data assembled by the wise wearable contraption. A theoretical investigation containing 40 individuals and 5 wearable devices is acted in a free-everyday climate to make the QoE model. Four unmistakable techniques are presented in this paper: we have proposed hand signal affirmation using OpenCV python.

Keywords— Hand gesture recognition, OpenCV python, smart wearable devices.

INTRODUCTION

Since humanity has begun to continue on the way of progress innovation s grown bit by bit. In any case, as of late, some progressive changes like t innovation of electronic chips, GPS frameworks, Wi-Fi frameworks, the web, PCs, sensors, and headways in nanotechnology have changed the whole world at a remarkable rate. . Wearable advances are one of the main fields in the shrewd gadget which have developed from these constant innovative progressions (Tao, 2005). Even though there is n clear and settled definition in the surviving writing, in the most straightforward structure wearable innovation can be characterized as " Smart Wearable mechanical gadgets" that are worn on a client's body (Nugroho, 2013, p. 6). Wearable innovative gadgets have been existing for many years, even hundreds of years, Since wearable advances have been well known as of late, the plans and elements of wearable advances are still generally neglected (Dunne, 2004). Hence, innovation organizations and college research labs together have committed a lot of work to upgrade and work on wearable advancements (Tao, 2005). The extent of wearable innovation is a lot expansive and shapeless, and deciding the qualities and determinations of wearable advances is exceptionally prickly. Thusly, understanding the grouping of wearable advancements dependent on the essential qualities will be exceptionally useful. The writing indicates that wearable advancements might be isolated into three principle classifications. These classifications can be called as Wearable innovations. Wearable innovations might be worn like eyeglasses, wristwatches, wristbands, a ring, an identification, gems, shoes, or attire (Tao, 2005). In any case, to improve the utilization of wearable innovation gadgets, organizations and foundations are striving to plan more agreeable, solid, valuable, incorporated, lighter, more modest, tasteful and vogue items Hereby, the business volume of wearable gadgets will increment and individuals will coordinate these gadgets into their everyday exercises. These figures would demonstrate the significance of wearable advances. Later the multiplication of wearable advances, there will be an advancement change for individuals, organizations, and the cooperations between the various elements. In this unique situation, this review expects to demonstrate how wearable advancements will lead to an advancement change in the future both for society and the method of doing organizations through representations.

ALGORITHMS AND TECHNIQUES

Support Vector Machines –A support vector machine algorithm [9] is used to evaluate classification accuracy. SVM is a classifier using a decision boundary to separate two classes defined by solving a quadratic optimization problem. SVM finds an optimal solution that maximizes the distance between the hyperplane and the most critical training samples. The decision boundary is then specified by a subset of critical training samples named support vectors that lie on the edge. SVM extends to multi-class classification using several methods. SVM has been used in many applications because its design is well suited to complex large datasets. SVM is one of the best performers for a number of classification tasks ranging from text to microarray data Suppose we have two features, *x*1, and *x*2, and want to classify all the elements that appeared. We can see the class red and the class black. The goal of the SVM is to design a hyperplane that classifies all training vectors into two categories. The black line is defined as the hyperplane that classifies all the training vectors in the two classes and has multiple hyperplanes that can classify all the instances correctly in this feature set. The best choice will be the hyperplane that leaves the maximum margin from both classes.

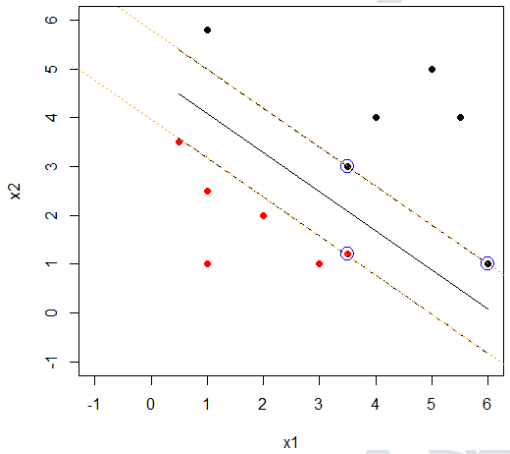

Fig. 1: SVM applied onto two features, *x*1 and *x*2

SVM Classifier uses a large margin for classification.
It separates the tweets using a hyperplane. SVM uses the a
A discriminative function is defined as g(X) = wt _(X) + b (2) 'X' is the feature vector, 'w' is the weights vector and 'b' is the bias vector. () is the nonlinear mapping from input space to high dimensional feature space. 'w' and 'b' are learned automatically on the training set. Here we used a linear kernel for classification. It maintains a wide gap between the two classes.

Feature Extraction – Feature Extraction is which it is a part of a machine learning algorithm in which it starts from an initial set of measured data and builds derived values. The technique of extracting the features is useful when you have a large data set and need to reduce the number of resources without losing any important or relevant information. Feature extraction helps to reduce the amount of redundant data from the data set.

TOOLS AND TECHNOLOGIES

1) **Python** - Python is a high-level programming language. It was created by Guido van Rossum and released in 1991. It is also used for web development, software development, mathematics, system scripting. Python can be used on a server to create web applications. It can be used to handle big data and perform complex mathematics. Python can be used for rapid prototyping or production-ready software development.

2) **OpenCV** – OpenCV is a huge open-source library for computer vision, machine learning, and image processing. OpenCV supports a wide variety of programming languages like Python, C++, Java, etc. It can process images and videos to identify objects, faces, or even the handwriting of a human. It is integrated with various libraries, such as NumPy, a highly optimized library for numerical operations.

ADVANTAGES

A. It can increase productivity

The best wearable innovation is intended to make ordinary errands simpler and more helpful.

Fig 2:Advantages

In the working environment, such innovation can be put to use in an assortment of ways. For instance, specialists can utilize wearable tech in the medical services industry to glimpse inside a patient's veins there and afterward, without sitting tight for outputs or X-beams. In development, arising wearables are empowering laborers to take a look inside channeling taken cover behind dividers, along these lines eliminating the need to embrace costly fix work.

Wearable innovation in business should assist us with taking care of issues faster and in manners that essentially benefit both the organization and its customers.

B. It may increase employee satisfaction

There's no getting away from the way that infusions of innovation inside work environments that have involved similar cycles and frameworks for a long time can be fairly problematic and mark representative fulfillment, yet the right innovation can raise their spirits significantly Ponder whenever you first had the option to utilize WiFi at work, or when you were given admittance to a cell phone application that made your work 20% more straightforward. At the point when something like that occurs, you feel undeniably more fulfilled working, and your efficiency levels will generally increment at a similar rate.

Pick the right wearable innovation for your business, and there's a solid possibility that you'll see a huge elevate in representative fulfillment and commitment, which alone makes the speculation more than worth the effort.

C. It could create fitter employees

A big part of wrist-born wearable technology such as smartwatches and fitness trackers is the health benefits they offer. As any HR professional will tell you, fit employees are productive employees, and if the introduction of a company smartwatch as a perk of working for the business results in staff spending more time in the gym their performance at work should step up several gears.

D. It'll help you make the most of other tech investments

One of the most important aspects of wearables is their ability to connect to other systems. In fact, many smart devices of this kind will need some form of integration with a larger platform in order to provide real benefits.

If you've spent big on a new CRM, production system, or project management tool, it pays whether or not it has wearable support. If so, investing in said wearable technologies will extend the effectiveness of your investment and ensure you're getting the most bang for your buck.

DISADVANTAGES

A. It can be a distraction

Just like smartphones, wearable technology offers up plenty of distractions. For example, if a smartwatch is an undoubtedly cool piece of kit, and the many features included by the manufacturers (and an increasing number of updates) means there's always something new to play with.

Their size can be a particular issue, too, because most wearable technology is very pretty small, and small stuff is easy to play with discreetly.

Fig 3: Disadvantages

B. They are not cheap

Sure, you can pick up a fitness tracker for very little money these days, but wearable devices that offer a genuine benefit in the workplace are often rather expensive.

C. Size and battery limitations prevail

Despite the huge advances in smart wearable technologies, most devices are still pegged back and governed by technical limitations.

Most outstandingly, the size of such gadgets and the restricted battery limit managed the cost of means they can be both precarious to utilize and untrustworthy. Envision a piece of wearable innovation that gives fabulous business benefits yet needs charging like clockwork – it basically wouldn't cut it inside a bustling association.

D. Size and battery limitations prevail

Despite the huge advances in smart wearable technology, most devices are still pegged back and governed by technical limitations. Most notably, the size of such devices and the limited battery capacity afforded means they can be both tricky to use and unreliable. Imagine a piece of wearable technology that provides fantastic business benefits but which needs charging every three hours – it simply wouldn't cut it within a busy organization

RELATED WORK

During implementation one thing was clear[11] that a system is going to be developed which can capture a hand gesture, performed by the user in front of a web Cam, this captured image is then processed to identify the valid gesture through a specific algorithm & execute the corresponding operation. The overall implementation of the process is described as follows:

1. Human Generated Gesture

In the first step of implementation, the user will show one gesture. The gesture should be constant for some period of time, which is necessary for dynamic processing. These gestures should be already defined as valid gestures for processing.

2) Web Camera

The purpose of a Web camera is to capture the human-generated hand gesture and store its image in memory. The package called Java Media Framework is used for storing the image in memory and again calling the same program after a particular interval

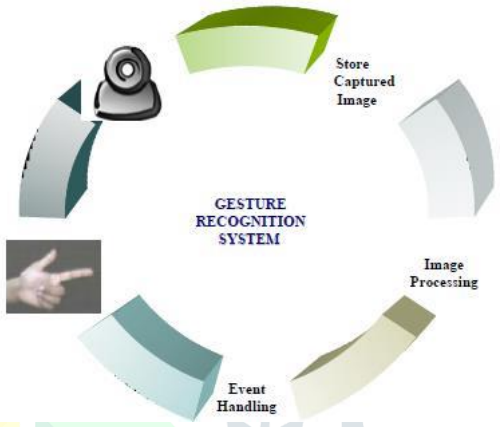

Fig 4 Interaction among the components

3) Image Processing Algorithm

This carries the major portion of implementation. First, the captured image is preprocessed by techniques like real-time hand tracking and extraction algorithm, feature extraction, hidden Markov model(hmm) training, and gesture recognition.

4) Event Handling

Once the gesture is identified the appropriate command for it will be executed. This includes controlling the mouse, performing its various applications like selecting, dragging, and pasting any folder from one place to another, both left and right clicks, and scrolling. This also includes controlling all traffic signals through different gestures for each signal.

CHALLENGES

- Technological dependence created by augmented reality and automatic processing
- Advances in software architecture to make up for the challenges of navigating on such small-screen interfaces
- Management of wireless and personal area networks (PAN);
- Sufficient security from hackers with the potential to control the data stores on the device, if not the device itself while in use.

- Also the wifi problem would occur.
- Network Connection Problem
- Battery issues

CONCLUSIONS

Wearable advances have developed continuously in corresponding with mechanical headways like electronic chips, GPS frameworks, Wi-Fi frameworks, the web, PCs, and sensors. The significant uses of wearable advances are in the wellbeing business, material industry, and shopper gadgets industry. Today, the dispersion of wearable advances is exactly at the early adopter stage both for society and organizations. Notwithstanding, right away the development of wearable innovations, particularly brilliant glasses and smartwatches, will nearly be finished advancements and these mechanical gadgets will be embraced by social orders and organizations The review's goal is to call attention to how wearable advancements will be an achievement both for the regular routines of individuals and the method of doing organizations of the organizations later on. In this paper, it is suggested that wearable advancements will facilitate the existence of individuals with weaknesses; empower organizations to cooperate with other finance managers simpler, direct statistical surveying all the more adequately, apply deals and administration techniques all the more productively; empower police officers, firefighters, military individuals to give public and individual wellbeing; upgrade the computer-generated simulation in games, and empower the specialists to screen the wellbeing marks of individuals consistently. To summarize, the future will be more secure, more straightforward, better, faster, and more engaging with wearable advancements.

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