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Fitness Monitoring and Health Tracking System

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ABSTRACT: Maintaining a healthy weight is essential for one's health. It can lower the risk of heart disease, stroke, diabetes, and high blood pressure, as well as a number of cancers. Eat less calories and move more. Using this technique and a simple image captured by the mounted camera, we will be able to determine a participant's weight. The system is akin to a fully automated system. Fill out a registration form with your name, current weight, biceps scan, and whether you want to lose or gain weight to get started. Then log in with the credentials provided. The biceps weight is measured and compared to the original figure to see if the person's weight has increased or decreased. Diet, exercise, and workouts are all suggested depending on that value. Keywords: Diet Recommendations, Python, Pre-processing, Image Processing, CNN (Convolutional Neural Network)

I. BACKGROUND

The International Dietary Data Expansion (INDDX) Project aids in the development and implementation of more effective food, nutrition, and agricultural policies and programmes that improve people's health, well-being, and livelihoods around the world. The INDDX24 Dietary Evaluation Platform is part of a global infrastructure for dietary data assessment that combines cutting-edge technologies with existing data, strengthens institutions, and demonstrates the policy value of better food consumption statistics. The quality of one's diet contributes to one's food security. With rapidly changing diets and mounting worries about all forms of malnutrition, food quality is becoming more essential than energy sufficiency or single nutrients. Because individual nutrient tracking is insufficient for understanding the causes and consequences of poor health and nutrition outcomes, dietary patterns are gaining popularity. Despite the widespread use of the term "diet quality," it is poorly defined, with little agreement on how to measure it. One of the reasons it's difficult to define is that the exact composition of a healthy diet changes based on dietary practices, cultural context, geographically available foods, and individual needs (e.g. age, sex, and physical activity level). A common way of thinking about diet quality is to divide foods into healthy and harmful components, with adequate levels of excellent foods and nutrients consumed. (e.g. fruits, vegetables, whole grains, fibre etc.) and a moderate (or very limited) intake of bad foods and nutrients (e.g., saturated fat, sugar, salt, etc.) (WHO Healthy Diet Factsheet, Guenther et al. 2013). Diversity can be regarded of as either a component or a proxy for diet quality, based on the assumption that a diverse diet contains both sufficient nutrients (adequacy) and will inevitably limit other nutrients (moderation).

II. MOTIVATION

Maintaining a healthy weight is essential for one's health. It can lower the risk of heart disease, stroke, diabetes, and high blood pressure, as well as a number of cancers. Eat less calories and move more. Simple steps to get started include turning off the television and avoiding sugary drinks. Your health is affected by your weight, waist size, and the amount of weight you've gained since your mid-20s. These factors can have a significant impact on your risk of having the following diseases and conditions: Heart disease, heart attack, and stroke are all examples of cardiovascular disease. Diabetes, Cancer, Arthritis, Gallstones, Asthma, Cataracts, Infertility, Snoring, Sleep apnea. Also, in times of pandemic when people had to stay indoors, a system like this could have helped them to track and maintain their fitness.

III. INTRODUCTION

It is more effective to lose weight by combining exercise and a nutritious diet than depending alone on calorie restriction. Exercise can help to prevent or even reverse certain diseases. Exercise can help you avoid a heart attack by lowering your blood pressure and cholesterol. Exercising also lowers your risk of developing certain cancers, such as colon and breast cancer. Exercise has also been demonstrated to boost self-esteem and happiness, as well as reduce anxiety and depression. Exercise is beneficial for weight loss and weight maintenance. Your metabolism, or the number of calories you burn each day, can be boosted by exercise. It can also aid in the maintenance and growth of lean body

mass, allowing you to burn more calories throughout the day. If you're in a healthy weight range and haven't gained more than 10 pounds since turning 21, try to keep it off by watching what you eat and exercising regularly. Because most people between the ages of 18 and 49 gain 1-2 pounds per year, stopping and avoiding weight gain should be a goal. As you get older, gaining weight raises your risk of acquiring one or more chronic diseases.

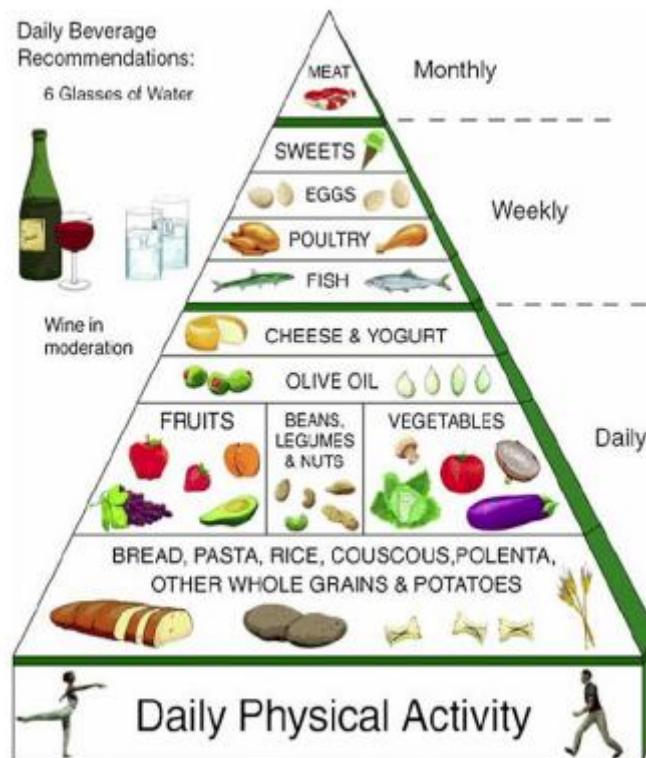


Figure 3.1: Daily diet plan and physical activities

IV. LITERATURE SURVEY

DivyaMogaveera [1], In this People are being diagnosed with illnesses that are becoming chronic as a result of not adhering to a proper food pattern, not exercising properly on a constant basis, or not focusing totally on their ailments due to other commitments. As a result, they propose a framework that focuses on improving the strength of patients suffering from various illnesses by recommending healthier eating and exercise regimens, as well as breaking down and watching wellbeing boundaries and qualities from their most recent infection reports. [2], In this day and age, people are excessively preoccupied with their daily nutrition and their entire lives. Infections and medical problems linked to body weight have increased. A proper dietary pattern and regular exercise can result in improved health, more vitality, and a longer life expectancy. For this project, we created a recommender system that supports clients in meeting their calorie goals based on their BMI and provides food suggestions based on the client's experience and preferences. Customers can input their BMI as well as their dietary proclivities and sensitivities, and a daily calorie target will be suggested. We assist clients by creating meal recommendations based on their personal preferences, using collaborative Filtering and Fuzzy logic to create a recommender system. Clients can use the Android-based application's Step Counter or Pedometer to track their steps as part of an activity or exercise.

Butti.Gouthami et.al [3], Diet proposal framework is expected to provide a better solution for people with smart dieting habits. It is overlooked to eat proclivities as a result of a busy way of life. We get medical problems as a result of our poor dietary habits. This framework provides functionality to help people improve their eating habits in certain ways. Nowadays, healthy living is a major factor. A small alteration can have a big impact on our happiness.

CELESTINE IWENDI et.al [4] provides a deep learning solution for health data that, as a result, recognizes which food should be supplied to which patient based on the infection and other factors such as age, orientation, weight, calories, protein, fat, sodium, and cholesterol. This exploration structure is focused on conducting machine and deep learning calculations such as strategic relapse, gullible bytes, Recurrent Neural Network (RNN), Multilayer Perceptron

(MLP), Gated Recurrent Units (GRU), and Long Short-Term Memory (LSTM) (LSTM). The clinical dataset consists of 30 patients' information, 13 highlights of various ailments, and 1000 objects obtained through the internet and medical facilities. There are eight elements in the item segment. Prior to using profound and machine and learning-based norms, the highlights of these IoMT data were studied and further encoded.

Dr. Samuel Manoharan et.al [5] There are a couple of frameworks that are meant to suggest. The proposing framework has become well-known in the clinical field for recommending patient feeding regimens, medications to be taken for longer periods of time, and so on. The proposal framework generally improves a person's power, broadens their protection against a variety of illnesses, and works on their way of life. As a result, the paper advances k-club inserted profound learning classifier proposal framework for suggesting weight management plans for patients in light of their diseases and the degree of sugar, circulatory strain, protein, fat, cholesterol, age, and so on. The K-coterie was incorporated into the proposal architecture in order to improve the accuracy and precision of the profound learning classifier (gated intermittent units).

Akash Maurya et.al [6] Constant kidney disease (CKD) is a type of kidney disease in which kidney function gradually deteriorates over months or years. Perhaps the most important concern in the clinical field is the expectation of this infection. As a result, a robotized device that will employ AI algorithms to determine the patient's kidney state will be valuable to specialists in predicting the occurrence of chronic kidney disease and, as a result, better treatment. The suggested framework eliminates the factors that cause CKD, after which AI interaction can automate the management of the chronic kidney infection in various stages depending on its severity. The goal is to use AI to prescribe a realistic dietary regimen for CKD patients based on order calculations on clinical trial records. The potassium zone, which is established by blood potassium levels, will make dietary recommendations for the patient in order to slow the progression of CKD.

Caroline J. Fold et.al [7] The case series interviewed FGID patients who went to a gastroenterology facility with a previous suggestion to try the low FODMAP diet, examining who recommended it and what their rate of improvement was. Questions about the length of the starting limitation and food information (Phase 1), the number of food sources challenged (Phase 2), and food reintroduction as endured (Phase 3) were developed in light of current writing and clinical rules to assess execution of the eating routine's three stages. The detailed dietary evaluation poll revealed FODMAP consumption on a day-to-day basis. Chisquared tests were used to examine the data.

Catrina M. Steele et.al [8] the International Dysphagia Diet Standardization Initiative Functional Diet Scale (IDDSI-FDS), another useful result scale expected to catch the seriousness of or pharyngeal dysphagia, as addressed by the level of diet surface limitation suggested for the patient, to survey consensual legitimacy, between rater dependability and model legitimacy CELESTINE IWENDI et.al [9] The provides a deep learning solution for health-related clinical datasets that recognizes which meal should be supplied to which patient based on the condition and other factors like as age, orientation, weight, calories, protein, fat, sodium, and cholesterol. This exploration system is focused on doing machine and deep learning calculations such as strategic relapse, guileless bayes, Recurrent Neural Network (RNN), Multilayer Perceptron (MLP), Gated Recurrent Units (GRU), and Long Short-Term Memory (LSTM) (LSTM).

Amelie Gyrarda et.al [10] they have a strategy I AM HAPPY is an innovative IoT-based prosperity suggestion framework that aims to increase people's happiness on a regular basis. The framework aids persons in managing everyday distresses (e.g., minor side effects such as cerebral pain, fever) through the use of home remedies and related elective medications (e.g., naturopathy, fragrance-based treatment), pressure-lowering activities, and so on. To achieve this goal, we create an electronic data repository for feelings, with a focus on happiness and prosperity. The data warehouse evaluates data generated by IoT devices to determine clients' sentiments and well-being. The semantics-based information vault works in tandem with a standard-based motor to generate ideas for achieving regular people's happiness. The current state of naturopathy applications supports the proposal architecture.

V. PROBLEM STATEMENT

To develop a system that calculates BMI and gives personalized diet-exercise plans and can detect weight gain or loss according to the bicep as an added feature. Fitness tracking software comes with a powerful set of tools that will save your staff time while also improving member satisfaction. This software allows you to arrange all parts of your business in one place and do many important operations on your computer or tablet. Using management software, rather than managing your business on paper, which can result in lost information or manual error, is one of the finest methods to help streamline your operation.

VI. PROPOSED SYSTEM

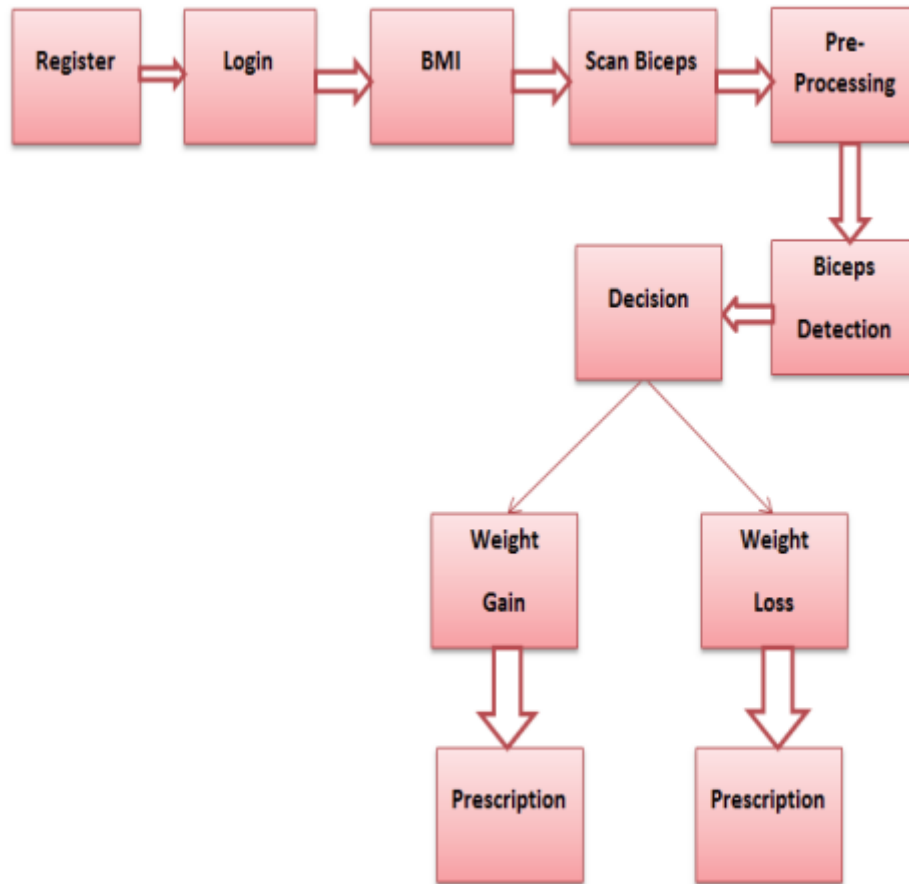


Figure 6.1: Architecture of proposed system

Figure shows a block diagram of "Biceps-based image processing and diet suggestion." They must be registered by the user. The system is similar to a system that has been automated. To begin, fill out a registration form with your name, current weight, biceps scan, and whether you intend to lose or gain weight. Then use the credentials provided to log in. Take a look at your biceps. The biceps image is then pre-processed to remove flaws and enhance it. The biceps have been identified as a location of interest. The weight of the biceps is then calculated and compared to the initial figure to determine if the person's weight has increased or decreased. Diet, workout, and exercise are all recommended based on that value.

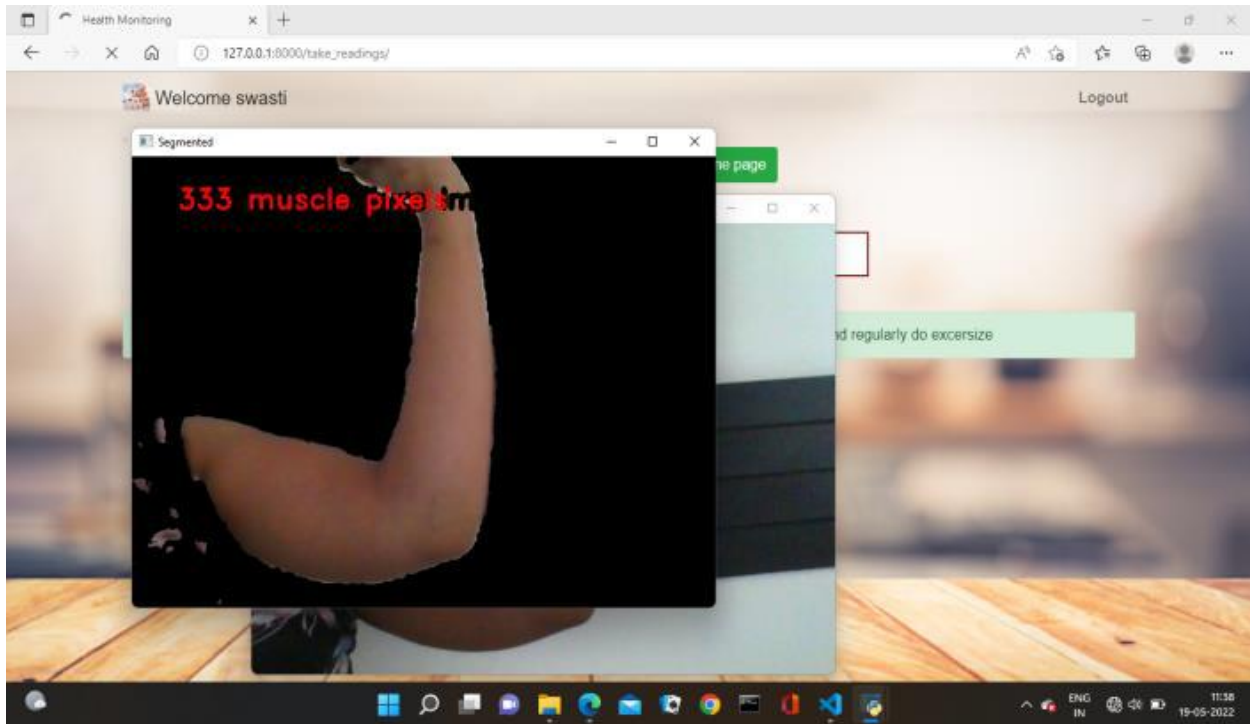


Figure 6.2: System Design

Image Processing Techniques

Picture processing is a technique for applying operations on an image in order to improve it or extract relevant information from it. It's a sort of image processing in which the input is an image and the output is either an image or the image's characteristics/features. Image processing is one of the most quickly evolving technologies today. It is also a critical research field in engineering and computer science.

Image processing basically includes the following three steps:

Importing the image via image acquisition tools;

Analyzing and manipulating the image;

Output in which the result can be altered image or report that is based on image analysis.

Image processing is a technique for improving raw images acquired from cameras or sensors aboard satellites, space probes, and aircraft, as well as photographs taken in everyday life, for a variety of applications. Various Image Processing techniques have been developed throughout the previous five decades. The majority of the techniques were created to improve photographs captured by unmanned spacecraft, space probes, and military inspection aircraft. Image processing systems are becoming more common as powerful personal computers, big memory devices, and graphics software become more readily available. Remote sensing, medical imaging, textiles, material science, military, film industry, document processing, and graphic arts are just a few of the uses for image processing.

CNN (Convolutional Neural Network)

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning calculation which can take in an information picture, allocate significance (learnable loads and inclinations) to different perspectives/objects in the picture and have the option to separate one from the other.

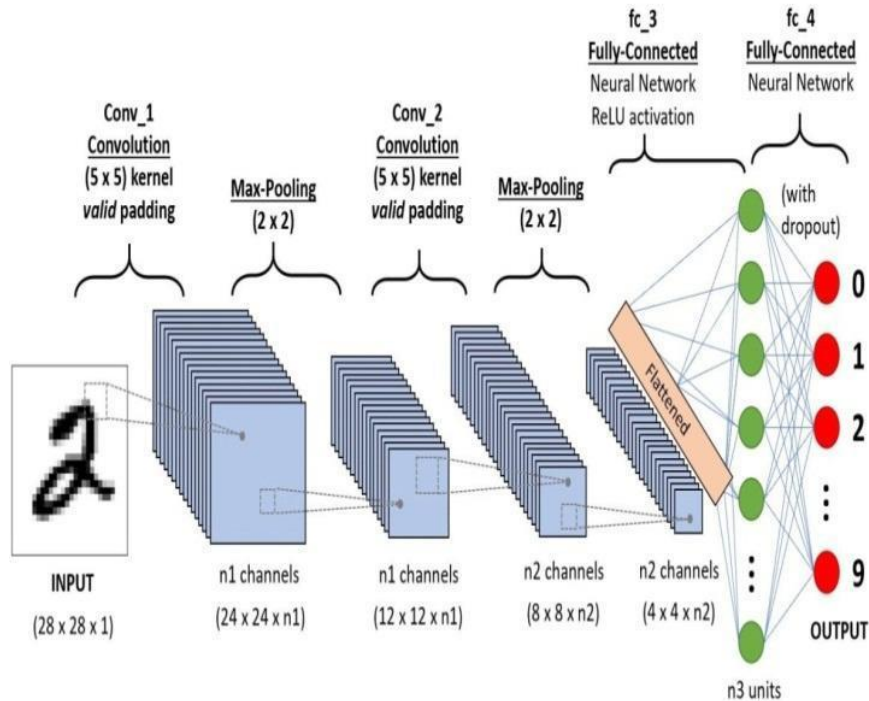


Figure 6.3: A CNN sequence to classify handwritten digits

The pre-handling expected in a ConvNet is a lot of lower when contrasted with other grouping calculations. While in crude strategies channels are hand-designed, with enough preparation, ConvNets can get familiar with these channels/qualities. The engineering of a ConvNet is similar to that of the network example of Neurons in the Human Brain and was enlivened by the association of the Visual Cortex. Individual neurons answer upgrades just in a limited district of the visual field known as the Receptive Field. An assortment of such fields cross-over to cover the whole visual region.

VI. CONCLUSION

We will be able to determine the weight of a participant using this technique using a basic image acquired by the mounted camera. The system is similar to a system that has been automated. To begin, fill out a registration form with your name, current weight, biceps scan, and whether you intend to lose or gain weight. Then use the credentials provided to log in. The image of the biceps has been de-noised and improved. The weight of the biceps is determined and compared to the initial figure to determine if the person's weight has increased or decreased. Diet, workout, and exercise are all recommended based on that value.

VII. FUTURE WORK

This system will be converted to Android and made available for use on Android devices. External Outlook plug-in integration. Integration with third-party plug-ins to boost system performance and functionality. Graphical report generating that is both dynamic and simple. Integration with a plug-in for the workplace.

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