FOOD RECOMMENDATION FOR

WEIGHT GAIN

(U18PRIT7P1) PHASE I REPORT

Submitted by
in partial fulfilment for the award of the degree of

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BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY

UNDER GUIDELINE
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BHARATH INSTITUTE OF SCIENCE AND TECHNOLOGY

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U18PRIT7P1 - PHASE I REPORT

BONAFIDE CERTIFICATE

Certified that this Report titled "**FOOD RECOMMENDATION FOR WEIGHT GAIN**" is the bonafide work of **KAMESH(U19IT022), ABDUL RIYAZ(U19IT701), BALAJI(U19IT009)** who carried out the work under my supervision. Certified further that to the best of my knowledge, the work reported herein does not form part of any other thesis or dissertation based on which a degree or award was conferred on an earlier occasion on this or any other candidate.

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Project Phase- I Viva Voce
Examination on

INTERNAL EXAMINER

EXTERNAL EXAMINE

DECLARATION

We declare that this project report titled **FOOD RECOMMENDATION** submitted in partial fulfillment of the degree of **B.Tech in (Information Technology)** is recorded original work carried out by us under the supervision of **DR.A.KUMARAVEL**, and has not formed the basis for the award of any other degree or diploma, in this or any other Institution or University. In keeping with the ethical practice of reporting scientific information, due acknowledgments have been made wherever the findings of others have been cited.

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ABSTRACT

The collection of problems depending on fuzzy measures is considered as it gives accurate results. One such result is mapping between the food or health parameters to the weight gain of the consumer is challenging.

Since the rules for constructing this mapping are not discrete or crisp, we recommend the **fuzzy interference system** based on the **rule base** for implementing the food recommendation system which will help the nutrition dieticians. The primary result is to vary the formats of fuzzy systems and **defuzzification** methods and get the optimal model.

Keywords: Fuzzy interference system, rule base, Defuzzification, Fitness

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CHAPTER-1

1.1 INTRODUCTION

In this world most of them Although being lean can often be healthy, being underweight can be a concern if it's the result of poor nutrition or if you are pregnant or have other health concerns. So, if you're underweight, see your doctor or dietitian for an evaluation. Together, you can plan how to meet your goal weight.

Here are some healthy ways to gain weight when you are underweight:

- **Eat more frequently.** When you are underweight, you may feel full faster. Eat five to six smaller meals during the day rather than two or three large meals.
- **Choose nutrient-rich foods.** As part of an overall healthy diet, choose whole-grain bread, pasta and cereals; fruits and vegetables; dairy products; lean protein sources; and nuts and seeds.
- **Try smoothies and shakes.** Don't fill up on diet soda, coffee, and other drinks with few calories and little nutritional value. Instead, drink smoothies or healthy shakes made with milk and fresh or frozen fruit, and sprinkle in some ground flaxseed. In some cases, a liquid meal replacement may be recommended.
- **Watch when you drink.** Some people find that drinking fluids before meals blunts their appetite. In that case, it may be better to sip higher-calorie beverages along with a meal or snack. For others, drinking 30 minutes after a meal, not with it, may work.
- **Make every bite count.** Snack on nuts, peanut butter, cheese, dried fruits, and avocados. Have a bedtime snack, such as a peanut butter and jelly sandwich, or a wrap sandwich with avocado, sliced vegetables, and lean meat or cheese.
- **Top it off.** Add extras to your dishes for more calories — such as cheese in casseroles and scrambled eggs, and fat-free dried milk in soups and stews.
- **Have an occasional treat.** Even when you're underweight, be mindful of excess sugar and fat. An occasional slice of pie with ice cream is OK. But most treats should be healthy and provide nutrients in addition to calories. Bran muffins, yogurt and granola bars are good choices.
- **Exercise.** Exercise, especially strength training, can help you gain weight by building up your muscles. Exercise may also stimulate your appetite.

1.2 NEED FOR THE STUDY

The food recommendation for weight gain is very less compared to the weight loss recommendation Because all of them are over-weighted so they are likely to reduce their weight. In this world, most people are ready to lose weight in that case they are so many **applications** to reduce weight or fat loss, But most of them are not like to get fit or maintain weight. In that way were looking to provide a weight gain process for what the consumer is requiring for the body goal of those who like to get fit or in good body shape.

1.2 OBJECTIVES OF THE STUDY

Though weight loss schemes are plenty in existence in physiology, the same for weight gain is rare. Hence we address this issue for solving based on machine learning techniques like the decision rules method. However, crisp inputs may not be feasible in most of real systems. Fuzzy logic helps us to eliminate this limitation and improve the readability and interpretation of outputs feasible to end users.

CHAPTER - 2
LITERATURE SURVEY

- **AUTHOR: Thi Ngoc Trang Tran, ET AL, Proposed**. An overview of the recommended systems in the healthy food domain in the Journal of Intelligent information systems. Recently, food recommender systems have received increasing attention due to their relevance for healthy living. Most existing studies on the food domain focus on recommendations that suggest proper food items for individual users based on considering their preferences or health problems. These systems also provide functionalities to keep track of nutritional consumption as well as to persuade users to change their eating behavior in positive ways. Also, group recommendation functionalities are very useful in the food domain, especially when a group of users wants to have dinner together at home or have a birthday party in a restaurant. Such scenarios create many challenges for food recommender systems since all group members' preferences must be taken into account adequately. In this paper, we present an overview of recommendation techniques for individuals and groups in the healthy food domain. In addition, we analyze the existing state-of-the-art food recommender systems and discuss research challenges related to the development of future food recommendation technologies.
- **Author: Anilkumar Kothalil Gopalakrishnan, ET AL.., proposed** A Food Recommendation System Based on BMI, BMR, *k*-NN Algorithm, and a BPNN. A novel food recommendation system is presented for recommending a proper calorie daily food for an overweighed person to gain a healthy body status by using his or her Body Mass Index (BMI), Basal Metabolic Rate (BMR), k-Nearest Neighbors (k-NN) algorithm, and a back-propagation neural network (BPNN). The system estimates the overweight status of a person by using the BMI value. By using the BMR value, the

system calculates the Daily Needed Food calories (DNC) of a person.

- The k-NN algorithm selects a proper calorie daily food set from the food dataset by using the saturated value of the DNC as its test object.
- The system predicts the days required for a person to gain a healthy BMI status with the recommended food by using overweight and saturated DNC values.

Finally, the system evaluates its user's satisfaction level based on the BPNN. The presented food recommendation system could be an effective way of propagating healthy weight awareness among common people.

- **Author: Rung-Ching Chen, ET AL,** constructing a Diet Recommendation System Based on Fuzzy Rules and Knapsack Method
- Many people suffer from three chronic diseases (diabetes, hypertension, and cholesterol), and they often use a search engine to collect related information.
- However, most of the dietary information on the networks is not convenient for users to collect diet recommendations. This paper suggests a diet recommendation system that can recommend a rational diet for users.
- We design a diet recommendation system that has expert knowledge of three highly chronic diseases. We use Protégé to establish ontology and OWL DL to construct the structure of knowledge.
- The system uses fuzzy logic as a guide before inference. According to the patient's health information, the system infers daily calories requirement and then uses the JENA inference device and JENA rule format to build our knowledge of the rules.
- The Knapsack-like algorithm is used to recommend suitable foods for users. The system was evaluated by nutritionists to prove it is effective.

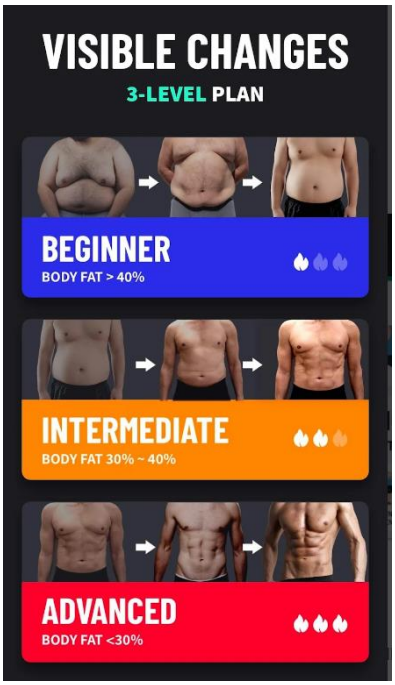
CHAPTER - 3

EXISTING PROPOSED SYSTEM

3.1 EXISTING SYSTEM

Research suggests that weight loss apps can be effective for weight loss and may even help improve lab values, such as triglyceride levels. Still, keep in mind that the research is limited and inconclusive, with some studies showing no benefit of mobile apps for weight loss. Furthermore, several studies note that the effectiveness of weight loss apps largely depends on the individual's level of engagement with the app, which appears to be low in many instances. For example, factors such as age, health literacy, socioeconomic status, and other disparities have been shown to affect users' level of engagement, which in turn could make weight loss will cause less effective for certain populations in the world compare to gaining weight

- Ex: HealthifyMe
- Loss of weight for men/women



3.2 PROPOSED SYSTEM:

Though weight loss schemes are plenty in existence in physiology the same for weight gain is rare. Hence, we address this issue for solving based on machine learning techniques like the decision rules method. However, crisp inputs may not be feasible in most real systems. Fuzzy logic helps us to eliminate this limitation and improve the readability and interpretation of outputs feasible to end users.

Eating food is vital when you are on an exercise regime. However, different people have different body types and metabolism systems. There cannot be a single diet chart for everyone. We need to follow the protocol for every end user.

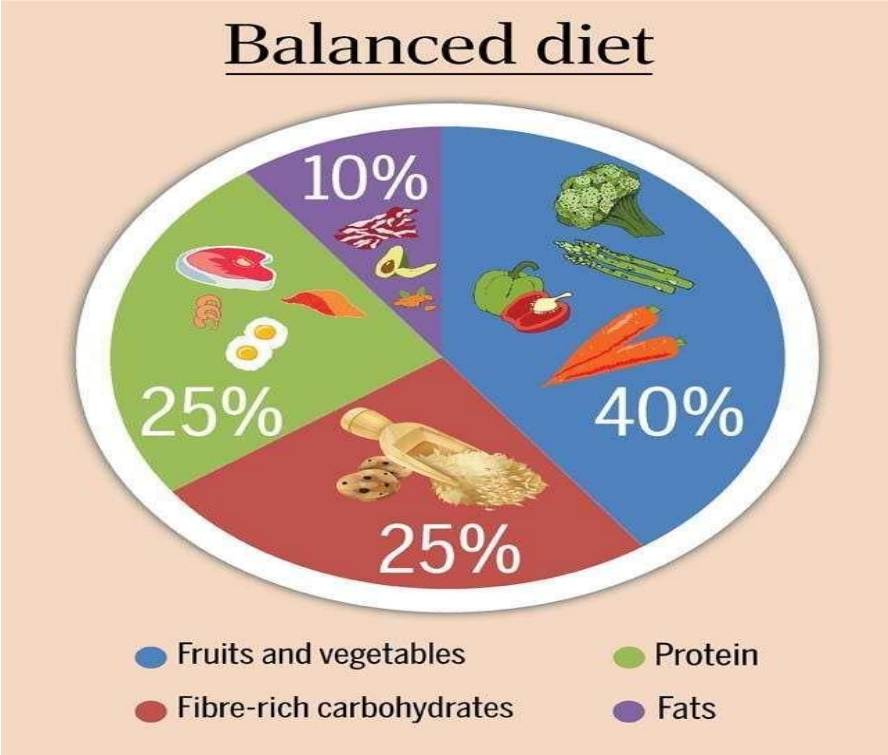
This recommendation for weight gain suggests along with workout regime for building muscle to get fit. It records the calorie intake then if they think to lose weight to be in good shape they must maintain or deficient calories t get the results.

This recommendation provides the flexibility:

This is the need of the hour, I guess. This is because of your hectic life schedule of yours. But don’t worry this recommendation is no longer required to hit the gym at a particular time. These recommendation apps chalk out the exercise routine for you based on the specifics of your body type. All you need to do is take some time out from your routine and follow them according to your convenience

Thus this recommendation will help the fitness industry or nutrition to get easily gain weight.

Eat wisely:


Balanced diet
10%
25%
40%
25%
Fruits and vegetables
Protein
Fibre-rich carbohydrates
Fats


Weight Gain Diet Chart
9:00 AM
11:00 AM
1:00 PM
4:00 PM
8:00 PM
TOTAL CALORIES
(kcals/Day)
2000-2200
Total Fat
Calcium
Iron
Sodium
Protein
Carbohydrate
20-25 gm
600 mg
17 mg
1200 mg
60-65 gm
400gm

CHAPTER-4

SOFTWARE AND HARDWARE REQUIREMENTS

4.1 SOFTWARE REQUIREMENT:

Operating system: Windows 8 and above
Language: python
Platform : MATLAB-(Rule base) , Colab, CSV sheet, GitHub

Domain:
Fuzzy logic
Machine learning
Decision rule

4.2 HARDWARE REQUIREMENT:

Processor – core I3 above
Ram – 4Gb and above
Hard disk – 250Gb space required and above.

CHAPTER-5
IMPLEMENTATION

What is Matlab?

MATLAB is a software package for high-performance mathematical computation, visualization, and programming environment. It provides an interactive environment with hundreds of built-in functions for technical computing, graphics, and animations.

MATLAB stands for **Matrix Laboratory**. MATLAB was written initially to implement a simple approach to matrix software developed by the **LINPACK** (Linear system package) and **EISPACK** (Eigen system package) projects.

MATLAB is a modern programming language environment, and it has refined data structures, includes built-in editing and debugging tools, and supports object-oriented programming.

MATLAB is **Multi-paradigm**. So, it can work with multiple types of programming approaches, such as Functional, Object-Oriented, and Visual.

Besides an environment, MATLAB is also a programming language.

As its name contains the word Matrix, MATLAB does its' all computing based on mathematical matrices and arrays. MATLAB's all types of variables hold data in the form of the array only, let it be an integer type, character type or String type variable.

MATLAB is a dynamic and weakly typed programming language.

MATLAB environment handles tasks of the declaration of the data type of the variables and provision for an appropriate amount of storage for the variables.

The development of the MATLAB started in the late 1970s by Cleve Moler, the chairman of the Computer Science department at the University of New Mexico. Cleve wanted to make his students able to use LINPACK & EISPACK (software libraries for numerical computing, written in FORTRAN), and without learning FORTRAN. In 1984, Cleve Moler with Jack Little & Steve Bangert rewrote MATLAB in C and founded MathWorks. These libraries were

known as JACKPAC at that time, later these were revised in 2000 for matrix manipulation and named as LAPACK.

MATLAB's built-in functions provide excellent tools for linear algebra computations, data analysis, signal processing, optimization, numerical solution of ordinary differential equations **(ODEs)**, quadrate, and many other types of scientific calculations. Most of these functions use state-of-the-art algorithms. These are numerous functions for 2-D and 3-D graphics, as well as for animations.

What is python?

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991. Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

- **Python is Interpreted** − Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.
- **Python is Interactive** − You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- **Python is Object-Oriented** − Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
- **Python is a Beginner's Language** − Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

Python Features

- **Easy-to-learn** − Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
- **Easy-to-read** − Python code is more clearly defined and visible to the eyes.
- **Easy-to-maintain** − Python's source code is fairly easy-to-maintain.
- **A broad standard library** − Python's bulk of the library is very portable and cross-platform compatible on UNIX, Windows, and Macintosh.
- **Interactive Mode** − Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.

- **Portable** − Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
- **Extendable** − You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.
- **Databases** − Python provides interfaces to all major commercial databases.
- **GUI Programming** − Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.
- **Scalable** − Python provides a better structure and support for large programs than shell scripting.

Apart from the above-mentioned features, Python has a big list of good features, few are listed below −

- It supports functional and structured programming methods as well as OOP.
- It can be used as a scripting language or can be compiled to byte-code for building large applications.
- It provides very high-level dynamic data types and supports dynamic type checking.
- It supports automatic garbage collection.
- It can be easily integrated with C, C++, COM, ActiveX, CORBA, and Java.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.

Python can do

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

What is MS EXCEL?

MS EXCEL

MS Excel, also known as Microsoft Excel, is a widely used software in most companies or businesses worldwide. It provides various tools, functions, and features to make this software profitable for global companies in various fields. Therefore, to learn and properly organize data using Excel, we must know the definition and basics of this powerful software.

This article discusses the definition of MS Excel and its basics to help us become familiar with this powerful software.

MS Excel is one of the oldest spreadsheet software programs and has run through several upgrades and fixes. This powerful spreadsheet program was initially released in 1985 for Macintosh-based systems. Later, it was released for other popular platforms, including Windows.

Features of MS Excel

In starting days, Excel played a crucial role in performing various financial operations for the enterprises, including bookkeeping and record-maintaining. However, it has received several updates over time, which typically helped in making excel a must-have software for business processes. The latest version of Excel comes with a wide range of features.

Some of the essential features of Microsoft Excel include the followings:

Header and Footer: Like Word documents, we can also use a header/ footer in our excel documents. It is located on the top and the bottom of each page of a spreadsheet document.

Find and Replace: MS Excel allows us to find the desired data, such as text or numbers, using the Find feature in the worksheet. Besides, we can also replace the existing data with custom updated data.

Password Protection: By using the password, we can protect our excel workbook from unauthorized access. This feature ultimately helps us to keep our data secured.

Data Filtering: Data filtering is a faster way to find and continue work with a subset of data in a selected range. The data filtering feature is handy and comes with AutoFilter and Advanced Filter options.

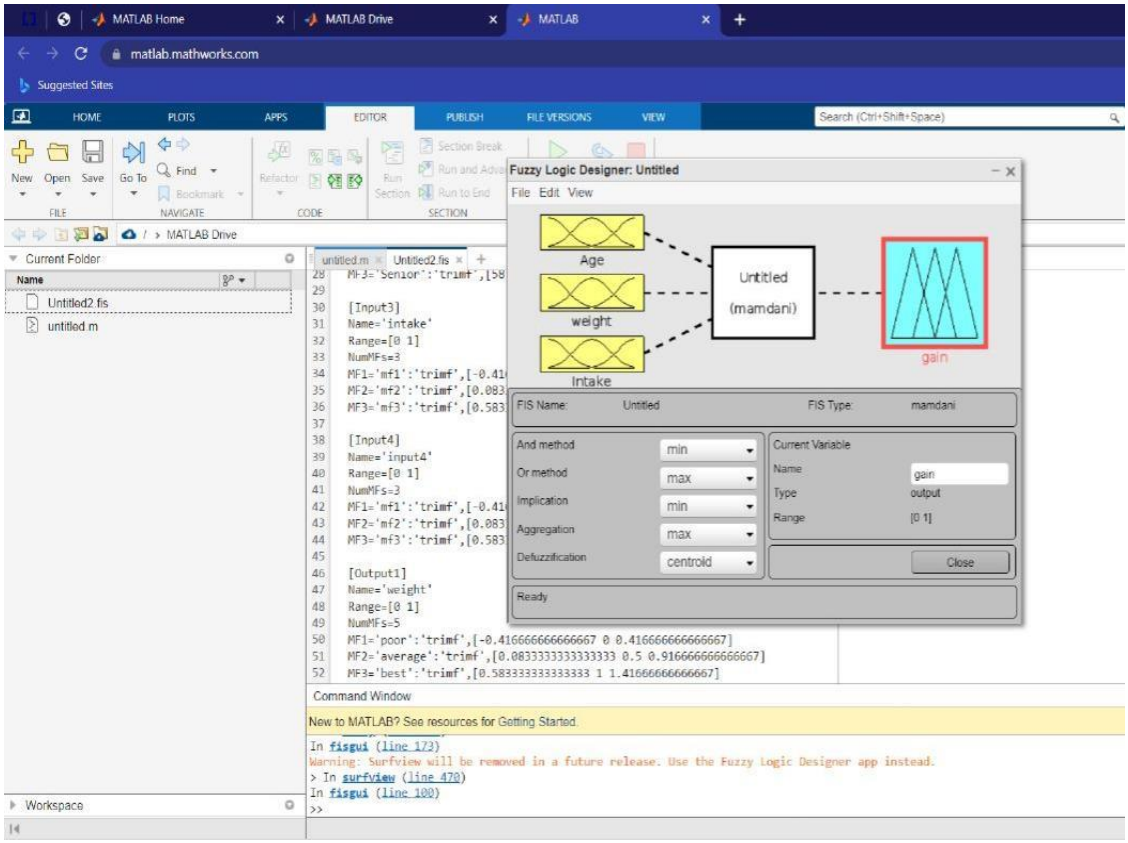
Data Sorting: Using the data sorting feature, we can arrange the data of excel worksheets in some logical order. Excel typically allows us to sort data in various ways, including ascending or descending order.

Inbuilt Formulae: MS Excel contains a wide range of formulae that we can use for performing easy to complex calculations. Some basic formulae include sum, subtract, multiply, divide, average, minimum, etc.

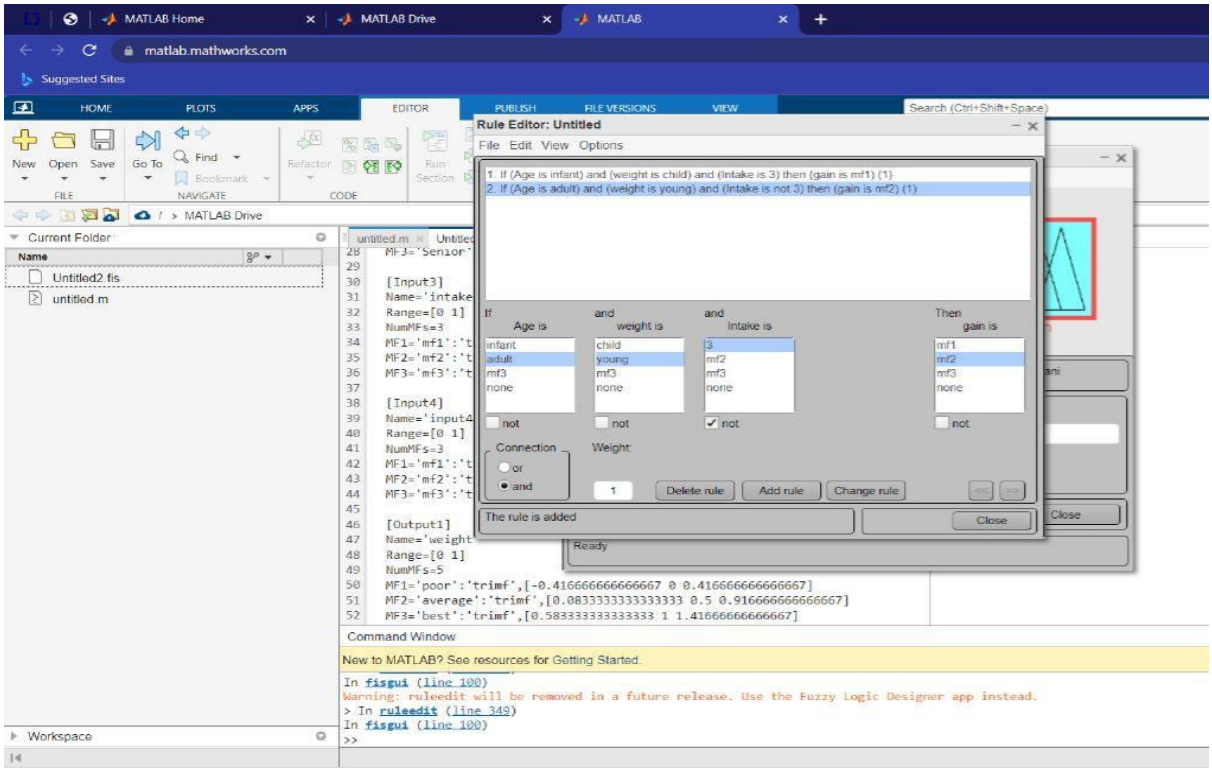
Real-time Data Update: In excel, we apply different functions to calculate values and get the desired results. If we replace some existing values with new ones, Excel automatically updates the results in the corresponding cells.

Insertion of Charts: One of the prominent features of Excel is the availability of various charts, such as pie charts, bar graph charts, line charts, and more. These charts can sometimes make a huge difference in the analysis and comparison of data.

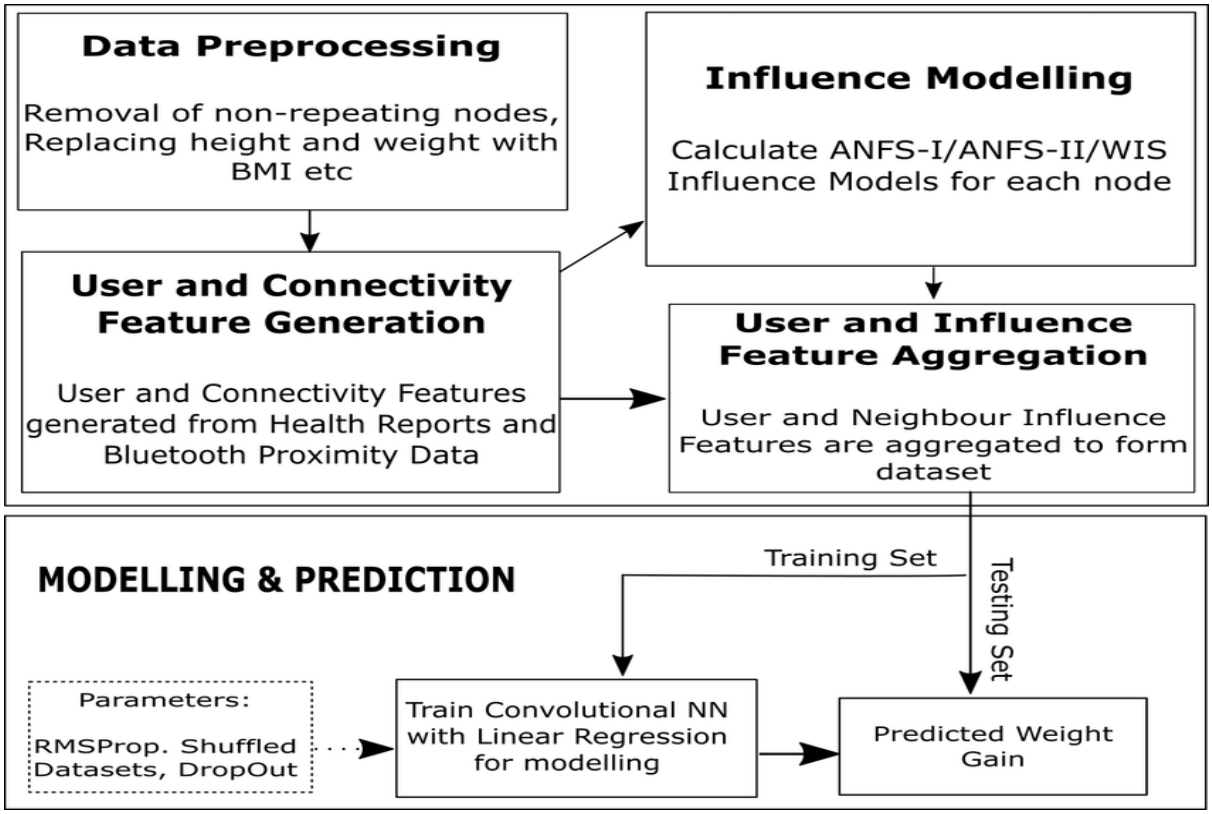
EXAMPLE: Fuzzy logic



Example: Rule decision



FLOW DIAGRAM



CHAPTER-6

CONCLUSION AND FUTURE SCOPE

6.1 Conclusion:

This is how our project works. Hope this helps users to view their health condition and performance of the gain and keep track of a healthy life. Remember this is a mini project future updates will make to improve and increase the efficiency of our project.

6.2 Future Scope

This a recommendation which every people should have to improve their diet and healthy weight gain results not only include with doctor's Advice, even every user can maintain or gain weight by themselves using this recommendation.

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