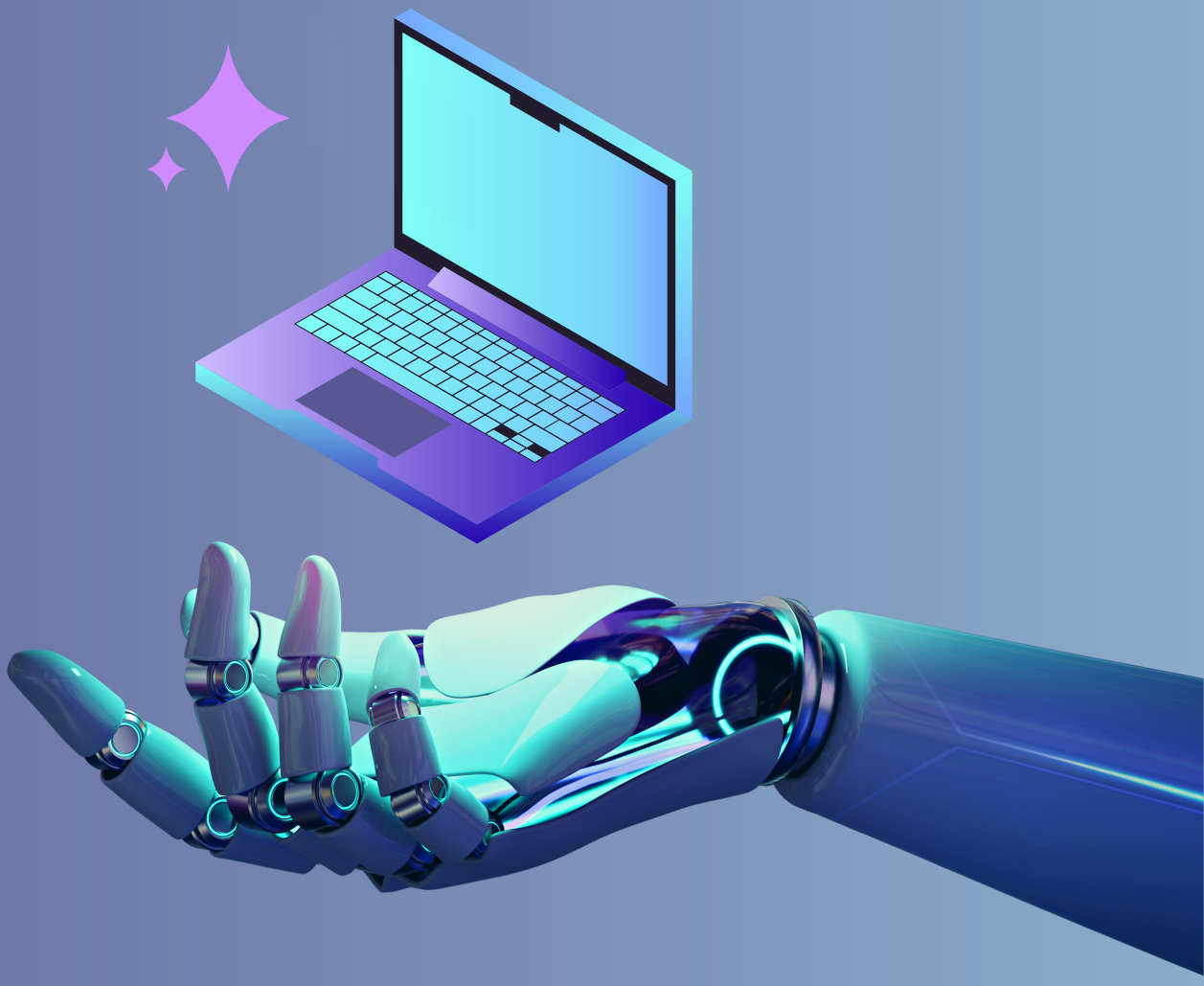
LAPTOP RECOMMENDATION SYSTEM



EXPERT SYSTEM

USING PROLOG

INTRODUCTION

Nowadays, expert systems are widely used and considered necessary to raise the quality of life. Increasing the choices make the decision-making process more difficult and complicated, especially when it comes to choosing the right laptop that fits your need. Choosing a laptop needs your knowledge about the features of each laptop to decide which of them meets your needs. This problem leads us to develop a Laptop Recommendation System.

With the Laptop Recommendation System, the process of choosing the best laptop now is most easy than ever. This recommendation system work on the base of previous knowledge and databases. Using a prolog makes the process of writing the rules and facts to build this expert system easy and clear. Basically, the laptop Recommendation System works by asking the user many questions and based on the answer, it leads the user to another specific question to ensure that we are providing the user with a laptop that fits the requirements.

PROBLEM STATEMENT

Selecting the best laptop to fit their needs might be a difficult procedure for those who are unfamiliar with the product's specs. A laptop is a product with numerous functionalities, and many consumers are unaware of its technical details, like its RAM, computer memory, and processor. Additionally, laptops keep improving their technology with different specifications in order to attract customers, but the diversity of laptops makes it difficult for certain users to make a decision. Moreover, there are many laptop manufacturers that satisfy every need. Furthermore, many customers also lack the time to research laptop characteristics that are appropriate for their needs.

MOTIVATION

Our motivation for this system can be identified as the following:

- **Users who are unfamiliar with the technical specifications of a laptop take a long time to choose the ideal laptop for their needs. We then decided to assist them by developing a laptop recommendation system.**
- **Our system guides users in selecting the ideal laptop for their needs, saving them time and reduces the confusion of the selecting process.**

OBJECTIVE AND GOALS

Our system's primary goal is to help non-technical people select the best laptop that fits their needs to perform their duties in the best way with the correct device. And these objectives are accomplished by:

- **Develop an interactive expert system that will help non-technical people select the correct device without needing to search for the device's technical features.**
- **Choose and narrow the scope of the available devices by asking consecutive questions based on the user's answer.**
- **Suggest an accurate device for users to make their work go correctly.**

METHODOLOGY

1. CRITERIA FOR PERFORMANCE EVALUATION

Evaluating a system's efficiency and performance is a critical task for any system. As a result, we measured our system's performance by ensuring that it runs without errors. In addition, based on the user's responses, only one laptop will be provided.

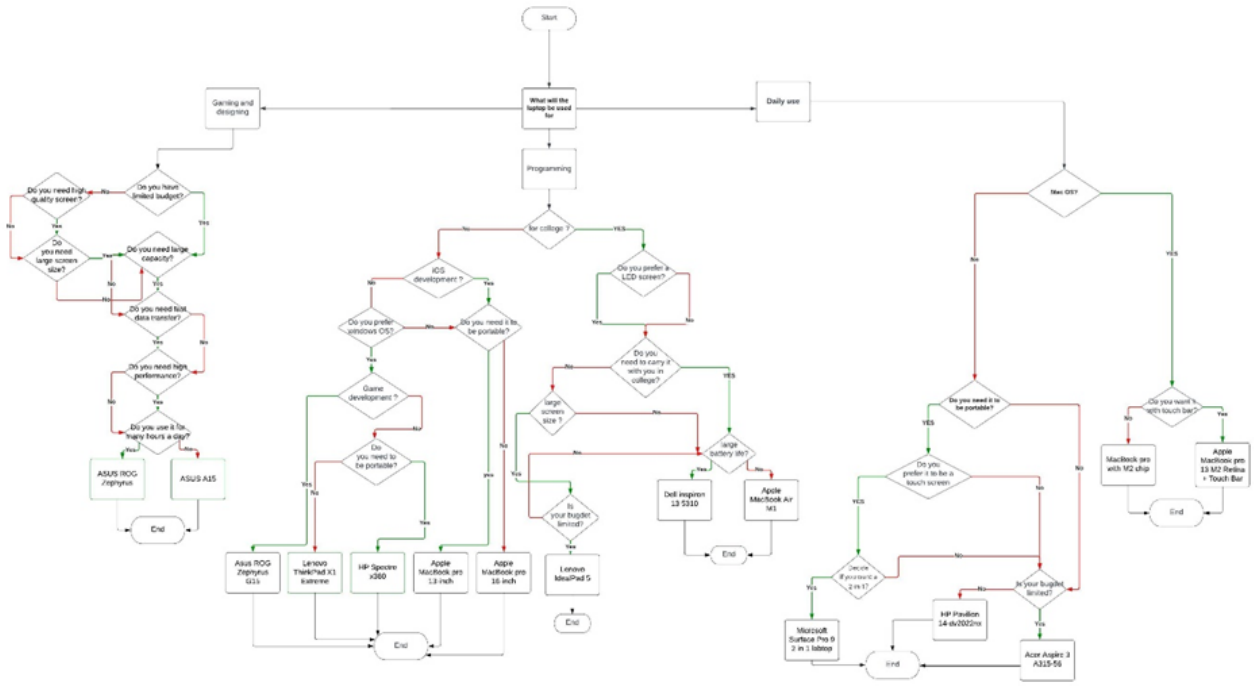
2. DATA

Our expert system is about laptop recommendations. Therefore, we collected our data from trusted sources such as Jarir and Amazon website. Our dataset contains the names of laptops that could be recommended to the user. Also, our expert system contains 27 Rules that are used to recommend the appropriate laptop for the user after answering the questions shown in the figure below.

3. TOOLS

We used SWI Prolog declarative programming language to write all the code.

4. THE FLOW OF QUESTIONS



IMPLEMENTATION

We implemented our expert system using SWI prolog programming language which works by the rules and facts written in it. The following figures show is the rules that we used in our system.

1. START RULE

Start rule which displays a welcome message for the user and then invokes the menu rule.

```
start:-
    writeln("***************************** Laptop Selection Recommendation System *****************************"),
    writeln("******************** here you can know the ideal laptop for you in a few minutes! ********************"),nl,
    menu.
```

2. SYSTEM'S MENU

system's menu which lets the user select among three categories, daily use, programming, or gaming and designing. As well it shows the error handling technique used if the user enters invalid input. After the user input is acquired the appropriate category rule will be invoked.

```
menu:-
    writeln('Please choose the category you intrested in: '),
    writeln('1- Daily Use'),
    writeln('2- Programming'),
    writeln('3- Gaming and Designing'),
    read(A),
    (not(A==1),not(A==2),not(A==3) ->
        writeln("Incorrect entry! choose a number between 1-3."), menu;
        category(A)).
```

3. DAILY USE (CATEGORY 1)

```
category(1):-
    writeln('Mac OS?'),
    writeln('(yes/no)'),
    read(A),
    (not(A=='yes'), not(A=='no') ->
        writeln("Invalid Input! You must write either yes or no."),category(1);
        ((A=='yes') ->
            q1_DU;
            q2_DU)
    ).
```

4. PROGRAMMING (CATEGORY 2)

```
category(2):-
    writeln('For college?'),
    writeln('(yes/no)'),
    read(A),
    (not(A=='yes'), not(A=='no') ->
        writeln("Invalid Input! You must write either yes or no."),category(2);
        ((A=='yes') ->
            q10_PRG;
            q20_PRG)
    ).
```

5. GAMING AND DESIGNING (CATEGORY 3)

```
category(3):-
    writeln('Do you have limited budget?'),
    writeln('(yes/no)'),
    read(A),
    (not(A=='yes'), not(A=='no') ->
        writeln("Invalid Input! You must write either yes or no."),category(3);
        ((A == 'yes') ->
        question3_1;
        question3_2)
    ).
```

6. SAMPLE OF A QUESTION RULE

The sample of question rule, it will gather the user input to the presented question, then the next appropriate rule will be invoked based on information collected from the user. As well it shown the error handling technique used if the user enters invalid input.

```
q23_PRG:-
    writeln('Game Development?'),
    writeln('(yes/no)'),
    read(A),
    (not(A=='yes'), not(A=='no') ->
        writeln("Invalid Input! You must write either yes or no."),q22_PRG;
        ((A=='yes') ->
            (   writeln('The Ideal Laptop for you is:'),
            writeln('Asus ROG Zephyrus G15'),
            writeln('Thank you for utilizing our system!'), abort);
            q24_PRG)
    ).
```

7. SAMPLE OF A QUESTION AND ACTION RULE

The sample of question and action rule, it will gather the user input to the presented question, then the suggested laptop will show based on information collected from the user. As well it shown the error handling technique used if the user enters invalid input.

```
q24_PRG:-
    writeln('Do you need it to be portable?'),
    writeln('(yes/no)'),
    read(A),
    (not(A=='yes'), not(A=='no') ->
        writeln("Invalid Input! You must write either yes or no."),q24_PRG;
        ((A=='yes') ->
            (   writeln('The Ideal Laptop for you is:'),
            writeln('HP Spectre x360'),
            writeln('Thank you for utilizing our system!'), abort);

            (   writeln('The Ideal Laptop for you is:'),
            writeln('Lenovo ThinkPad X1 Extreme'),
            writeln('Thank you for utilizing our system!'), abort )
        )
    ).
```

TESTING AND EVALUATION

1. START OUTPUT

```
****************************** Laptop Selection Recommendation System ****************************
******************** here you can know the ideal laptop for you in a few minutes! ********************

Please choose the category you intrested in:
1- Daily Use
2- Programming
3- Gaming and Designing
```

2. TEST CATEGORY 1: DAILY USE

```
****************************** Laptop Selection Recommendation System ****************************
******************** here you can know the ideal laptop for you in a few minutes! ********************

Please choose the category you intrested in:
1- Daily Use
2- Programming
3- Gaming and Designing
1
Mac OS?
(yes/no)
no
Do you need it tp be portable?
(yes/no)
yes
Is your bugdet limtited?
(yes/no)
yes
The Ideal Laptop for you is:
Acer Aspire 3 A315-56
Thank you for utilizing our system!
```

3. TEST CATEGORY 2: PROGRAMMING

```
****************************** Laptop Selection Recommendation System ******************************
******************** here you can know the ideal laptop for you in a few minutes! ********************

Please choose the category you intrested in:
1- Daily Use
2- Programming
3- Gaming and Designing
        2
For college?
(yes/no)
        no
iOS Development?
(yes/no)
        yes
Do you need it to be portable?
(yes/no)
        no
The Ideal Laptop for you is:
Apple MacBook pro 16-inch
Thank you for utilizing our system!
```

4. TEST CATEGORY 3: GAMING AND DESIGNING

```
****************************** Laptop Selection Recommendation System ******************************
******************** here you can know the ideal laptop for you in a few minutes! ********************

Please choose the category you intrested in:
1- Daily Use
2- Programming
3- Gaming and Designing
        3
Do you have limited budget?
(yes/no)
        yes
Do you need large capacity ?
(yes/no)
        no
Do you need fast data transfer ?
(yes/no)
        yes
Do you need high performance ?
(yes/no)
        yes
Do you use it for many hours a day?
(yes/no)
        yes
The Ideal Laptop for you is:
ASUS ROG Zephyrus
Thank you for utilizing our system!
```

5. ERROR HANDLING TECHNIQUE

The figure displays a test example for the error handling technique used when user provide invalid input, the system addresses this error smoothly and offered the user with recommended laptop based on his/her input.

```
****************************** Laptop Selection Recommendation System ****************************
******************** here you can know the ideal laptop for you in a few minutes! ********************

Please choose the category you intrested in:
1- Daily Use
2- Programming
3- Gaming and Designing
2
For college?
(yes/no)
1
Invalid Input! You must write either yes or no.
For college?
(yes/no)
yes
Do you prefer a LED screen?
(yes/no)
no
Do you need to carry it with you in college?
(yes/no)
yes
Do you need it to be large battery life?
(yes/no)
yes
The Ideal Laptop for you is:
Dell inspiron 13 5310
Thank you for utilizing our system!
```