
IllnessID



an illness identifier and symptom checker

CIS129 Final Project by Maddy Simonds

What is an Illness Identifier?

IllnessID could serve as a tool for those who need guidance determining the symptoms they are experiencing. By asking the user a series of questions, the program will determine possible illnesses or causes.

The identifier is not meant to replace a doctor, but merely to help find a possible explanation.

For those without insurance, or those just looking to avoid the cost of a doctor for minor issues, IllnessID is a completely free alternative to evaluate your situation.

This symptom checker can also help alleviate unnecessary worry by suggesting common causes prior to seeking extensive care.

Current software solutions

A virtual symptom checker is just a small piece of telehealth. Telehealth and virtual doctors appointments are rising in popularity as they offer a convenient alternative to a doctor's office. Furthermore, using telehealth can help prevent the spread of infectious diseases, and it can also benefit health assessments by allowing the practitioner to see the patient in their home environment. Additionally, telehealth can improve access to and the quality of healthcare across the globe. It is likely that in the future, patients could have the choice for telehealth for nearly every doctor's visit. There are already a few popular software solutions for a symptom checker program; for example, WebMD and the Mayo Clinic each provide a free online symptom checker.

WebMDSM

<https://symptoms.webmd.com/>

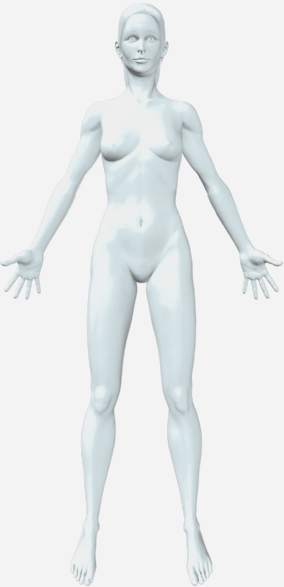
MAYO
CLINIC



<https://www.mayoclinic.org/symptom-checker/select-symptom/itt-20009075>

User Interface

As shown below, users are given a body diagram appropriate to their selected gender, and they can hover over the section where they are experiencing a symptom. This method is incredibly user friendly and I would likely use a similar design in my own program.



As the user selects symptoms, there is a bar tracking the likelihood of the results the program will provide, this is a clever way to provide the user with an estimation of accuracy and assurance.

A screenshot of the WebMD Symptom Checker interface. It features a list of symptoms under the heading "My Symptoms". The symptoms listed are "fever", "cough", and "itchy throat", each with a trash icon to its right. At the bottom, there is a "Results Strength" section showing "MODERATE" in teal text, accompanied by a horizontal bar that is approximately two-thirds full of teal color.

My Symptoms	
fever	
cough	
itchy throat	

Results Strength: MODERATE

WebMD Symptom Checker

WebMD provides a visually pleasing user interface, and a seemingly thorough process when collecting patient information. This software is simple, easy-to-use, and the results are understandable for users.

The Mayo Clinic Symptom Checker

The Mayo Clinic Symptom Checker had a much different approach. When compared to WebMD, this symptom checker is less visually appealing and it is quite tedious for the user to enter all of their symptoms.

User Interface



As shown above, The Mayo Clinic Symptom Checker follows a three step process. First, the user will choose their primary symptom, and then the program provides categories of related symptoms that the user can add.

Under step one, there is a long list of various symptoms, and the user must identify which best matches their condition. Step two's design is almost identical, but with symptoms related to the primary choice. This design is time-consuming for the user and, overall, inefficient.

Adult Symptoms

[Abdominal pain in adults](#)
[Blood in stool in adults](#)
[Chest pain in adults](#)
[Constipation in adults](#)
[Cough in adults](#)

[Diarrhea in adults](#)
[Difficulty swallowing in adults](#)
[Dizziness in adults](#)
[Eye discomfort and redness in adults](#)
[Eye problems in adults](#)

[Foot pain or ankle pain in adults](#)
[Foot swelling or leg swelling in adults](#)

Child Symptoms

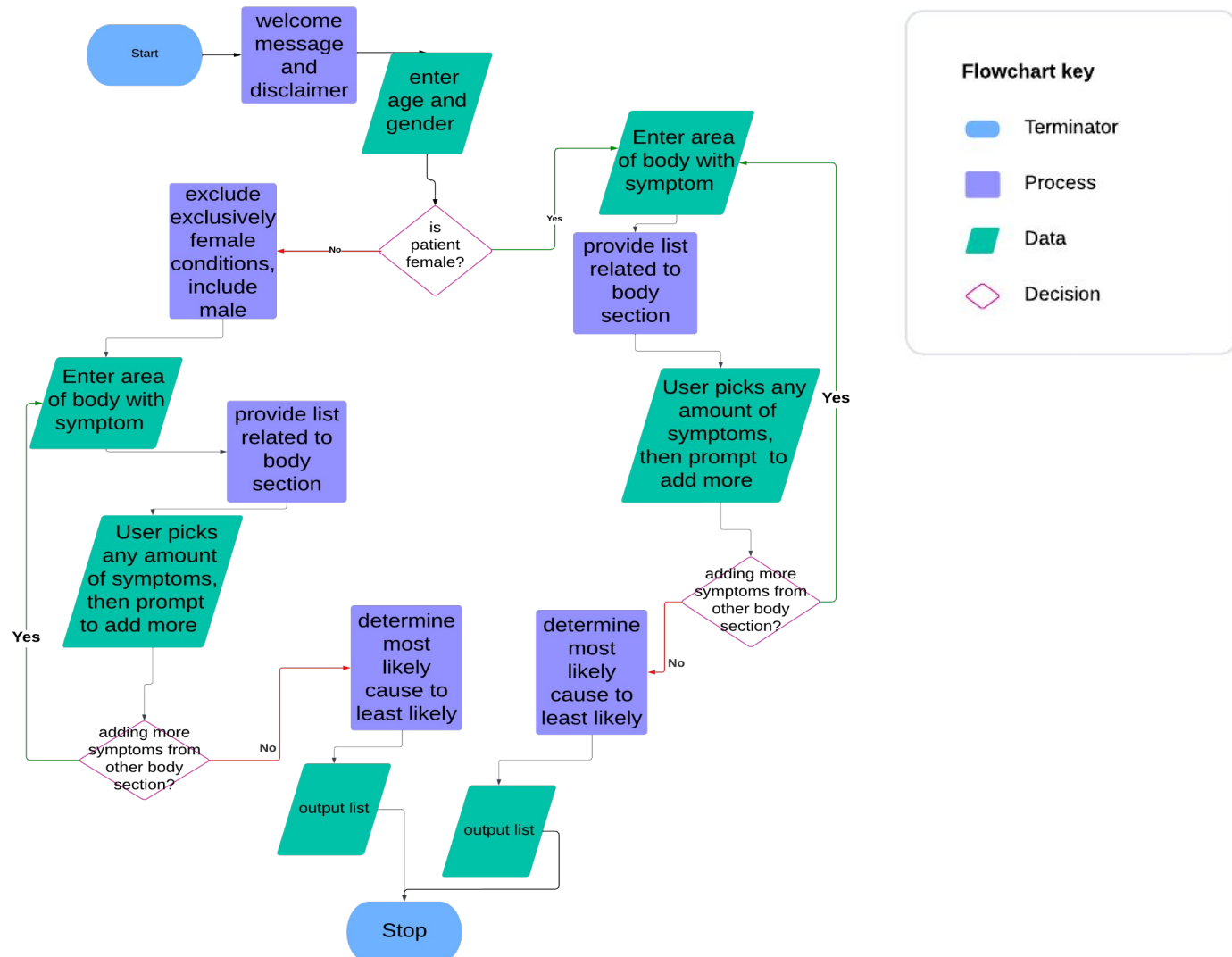
[Abdominal pain in children](#)
[Constipation in children](#)
[Cough in children](#)
[Diarrhea in children](#)
[Ear problems in children](#)

[Earache in children](#)
[Eye discomfort and redness in children](#)
[Eye problems in children](#)
[Fever in children](#)
[Headaches in children](#)

[Joint pain or muscle pain in children](#)
[Nasal congestion in children](#)
[Nausea or vomiting in children](#)

Flow chart

This is a cursory flow chart demonstrating the basic process outline of IllnessID.



Application Design and User Interface

While thinking through my potential software design, I wanted to make sure I took into account three major areas: simplicity, accuracy, and user-efficiency. Since medicine is a very specific and delicate field, it is imperative to stay accurate and cover all fields of possibility; which is also why a disclaimer is so important.

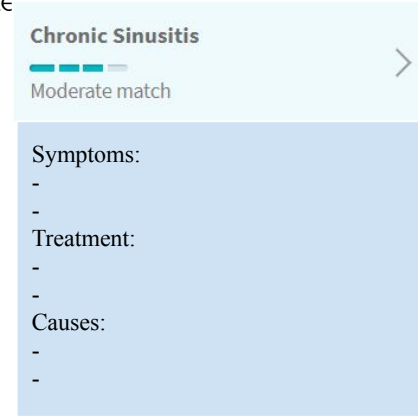
For the program itself, I envisioned a simple three step process. First, the program gathers relevant user information. Then, the user provides their symptoms and the program determines likely conditions. Lastly, the program will display the results in order of most-to-least likely.

As my software is a medical app, ensuring accuracy is the highest priority. Given that I was uncertain how to guarantee precise results from the users input, I decided on implementing an accuracy bar as a solution. This feature is helpful because it provides user with a clear, visual representation of the likelihood of their results; ultimately helping the user make more informed decisions.

Lastly, keeping a visually pleasing, user-efficient, and easy-to-use program was one of my top priorities as well. Given that my software is a medical app with a wide-ranging audience, a poor design could lead to misinterpretations of vital health information.

Interface Examples

My software will include a clickable dropdown arrow beside each condition when presenting the results. When clicked, more information about the condition and other symptoms, causes, and treatments will be displayed. This design will help users rule out conditions that have unrelated causes or conditions to what they are experiencing. To the right is a rough example of what this could look like.



Additionally, including a disclaimer and helpful resources for users to reach out to is a crucial part of the app. By incorporating these features, the app could help users feel more supported. A disclaimer is essential to clarify that the app is not a substitute for a professional diagnosis, and that its purpose is just to assist users in finding a possible explanation. Here is a rough example of what a disclaimer could look like:



IllnessID is not intended to replace the advice, diagnosis, or treatment of a medical professional. The information provided by this app is for informational purposes only. If you are experiencing a medical emergency, call 911 or seek medical attention.

Pseudocode

Basic outline of functionality:

- Gather patient information:
 - Get age, weight, gender
 - Get current medications and relevant medical history
 - If patient is male, exclude exclusively female conditions and include male.
- Gather symptoms:
 - Allow user to pick body section where experiencing symptoms
 - Allow user to enter any number of symptoms
 - Implicitly keep track of symptom-to-cause accuracy percentage
 - Present likelihood bar as entered symptoms affect rate of accuracy
- Present results:
 - If an illness has two or more symptoms in common with user, add to list.
 - Program determines most accurate to least accurate cause based off % of symptom similarities
 - Present list of possible causes in order; each with a clickable element to present stowed information about each illness.

```
begin
import conditions file
#gather patient info
input age, weight, gender
    #get patient history
input current medications, relevant medical history
    #account for gender specific conditions
create empty list relevantConditions
copy all conditions to list if value of condition is both genders
if patientGender is male
    update relevantConditions with male values
if patientGender is female
    update relevantConditions with female values
#gather symptoms
display body diagram appropriate to gender
allow user to choose section experiencing symptom
create empty list patientSymptoms #use to track all symptoms
create variable symptomAccuracy #use to track accuracy
display list of symptoms related to chosen body section
display initial symptom-to-cause accuracy percentage bar # 0%
while user wants to add symptoms:
    allow user to choose symptom
    if user chooses a symptom:
        append symptom to patientSymptoms
        #calculate likelihood bar
        update symptomAccuracy if symptom matches cause
        calculate new accuracy percentage
        display updated accuracy percentage bar
    ask if user wants to add more symptoms
end while
#present results
function presentResults
create empty list possibleCauses
for each condition in relevantConditions:
    if condition has >= two symptoms matching with patientSymptoms
        append condition to possibleCauses
display results from possibleCauses in order
display likelihood bar of accuracy percentage
end
```

* pseudocode assumes one main json file for conditions with a sub-dictionary for gender-specific conditions

Reflection

Developing a medical application is a complex and involved process. As I began my research, I quickly realized there are numerous factors that need to be carefully considered, especially in a sensitive and high-stakes domain like healthcare.

I found myself constantly thinking of new ideas, and then encountering a roadblock when contemplating how to practically implement them. One example was the concept of compiling a vast list of diagnosable illnesses and then managing the detailed information for each one. This became quickly overwhelming and difficult to organize effectively. Additionally, thinking through the design process while considering the need for medical accuracy and user-efficiency was challenging.

Questions

Here are unanswered questions from my research that I would still like to know more about:

- Could AI be implemented to review patient information like medications, conditions, or past surgeries to determine other possible conditions? Or, could AI adjust the likelihood of any condition based on the users responses?
- Is it possible for this software to hold the contents of all diagnosable illnesses, and if so, could it hold all of the detailed information for each illness? Could AI be used to collect and provide that information?

Thank you.

Linked below is the GitHub repository containing the pseudocode and presentation for IllnessID.

<https://github.com/maddymo11/CIS129-Final-Project>

Works Cited

WebMD. *Symptom Checker*. WebMD Symptom Checker,

<https://symptoms.webmd.com/>. Accessed 9 Dec. 2024.

Mayo Clinic. *Symptom Checker*. Mayo Clinic Symptom Checker,

<https://www.mayoclinic.org/symptom-checker/select-symptom/itt-20009075>. Accessed 9 Dec. 2024

“The Evolution of Telehealth: Where Have We Been and Where Are We

Going?” *NCBI*, 2012,

<https://www.ncbi.nlm.nih.gov/books/NBK207141/>. Accessed 9

December 2024.