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R&D Institute of Science and Technology
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SCHOOL OF COMPUTING
10214CS601 MINOR PROJECT -1
SUMMER SEMESTER(2024-2025)
REVIEW-1

"AI – DRIVEN HEALTH MANAGEMENT"

PRESENTED BY

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OVERVIEW

- ABSTRACT
- OBJECTIVES
- TIMELINE OF THE PROJECT
- INTRODUCTION
- LITERATURE REVIEW
- DESIGN AND METHODOLOGIES
- IMPLEMENTATION
- CONCLUSION
- REFERENCES

ABSTRACT

- Health literacy is crucial for effective healthcare, but many individuals struggle to understand and act upon health information.
- AI-driven personalized health literacy tools can address this challenge by tailoring health information to individual needs, abilities, and preferences.
- This project aims to develop and evaluate AI-driven personalized health literacy tools to enhance health understanding and empowerment among diverse populations.
- We employed a user-centered design approach, leveraging natural language processing, machine learning, and expert input to create personalized health content and resources. assessing its effectiveness in improving health literacy and empowerment.
- More confident in their ability to manage their health. More in control of their decisions and actions. Better equipped to take care of themselves. More motivated to make positive changes in their lives. Better understanding of health information. More frequent visits or logins. Increased interaction with content.

- This project demonstrates the potential of AI-driven personalized health literacy tools to transform health education and empowerment.
- By providing accessible, understandable, and relevant health information, we can bridge the health literacy gap and improve health outcomes.
- Future development and implementation of such tools can have a profound impact on public health.

OBJECTIVE

1.Aim of the project :

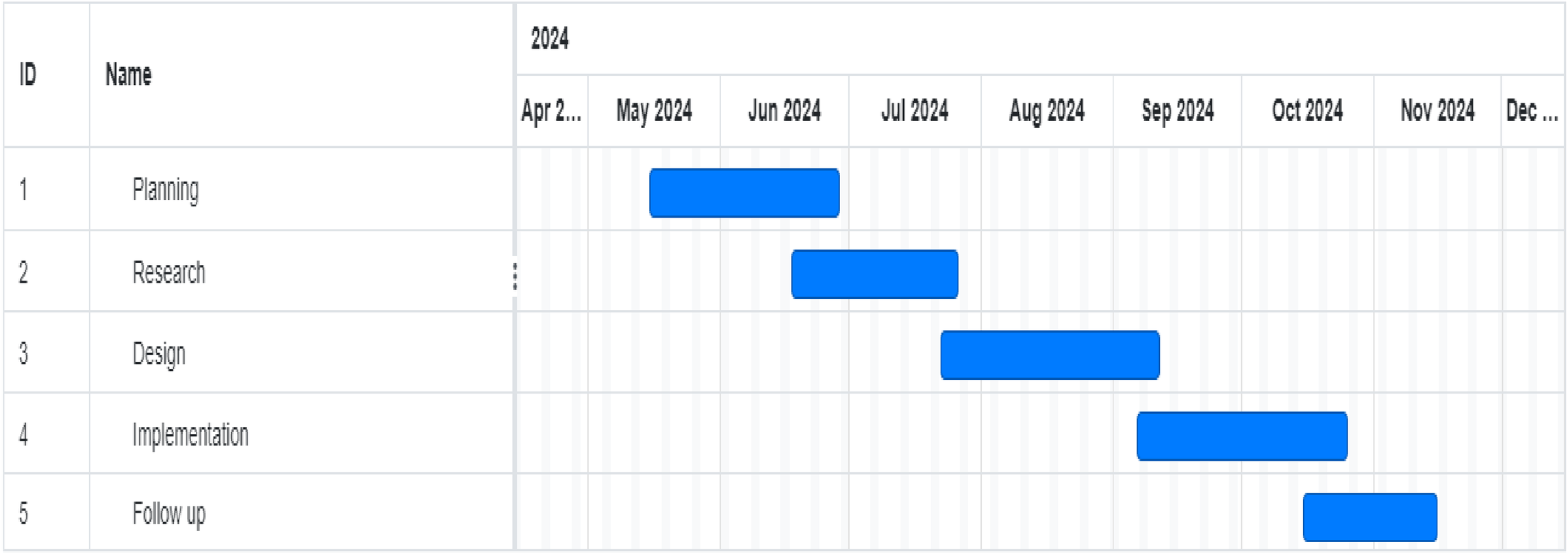
The main aim is to helping the people having chronic diseases to give personalized nutrition plans and offers health education in multiple languages, making it easy to the patients who won’t speak English.

2.Scope of the project :

- **Literature Review :** Conducting a comprehensive review of existing health literacy tools, AI-powered health solutions, and personalized health education platforms.
- **User Research :** Conducting user interviews, surveys, and focus groups to understand the health literacy needs, preferences, and behaviors of diverse populations.
- **Tools Development :** AI and machine learning algorithms for personalized nutrition planning. Natural Language Processing (NLP) for multilingual support. Data integration and analytics for personalized recommendations. User-friendly interface for patient engagement.

TIMELINE OF THE PROJECT

Sample Gantt Chart



INTRODUCTION

- Health literacy is a critical component of health care, enabling individuals to navigate the complex health system, make informed decisions, and manage their health effectively.
- However, many individuals struggle to understand and act upon health information due to limited health literacy skills.
- This can lead to poor health outcomes, increased healthcare costs, and health disparities .
- The rapid growth of digital health technologies and artificial intelligence (AI) presents an unprecedented opportunity to address health literacy challenges.
- AI-driven personalized health literacy tools can tailor health information to individual needs, abilities, and preferences, empowering users to take control of their health.

- Health literacy is crucial for effective healthcare, but many individuals struggle to understand and act upon health information.
- AI-driven personalized health literacy tools can address this challenge by tailoring health information to individual needs, abilities, and preferences.
- This project aims to develop and evaluate such tools, exploring their potential to improve health literacy and empowerment among diverse populations.

LITERATURE REVIEW

Author's Name	Paper name and publication details	Year of publication	Main content of the paper
Andri Färber;Alexandre de Spindler;Adrian Moser;Gerhard Schwabe	Closing the Loop for Patients with Chronic Diseases - from Problems to a Solution Architecture	2023	There is growing evidence that mobile health (mHealth) applications can assist patients with chronic conditions. However, most mHealth apps are isolated from healthcare professional (HCP) workflows and IT infrastructure. The resulting fragmentation of digital support in healthcare calls for integrating architectures. They would benefit patients, HCPs, product managers, and software developers. Our analysis of existing architectures has revealed valuable architectural elements, but none of the analyzed architectures provided sufficient integration for the chronically ill.

Author’s Name	Paper name and publication details	Year of publication	Main content of the paper
Xi Jiang,Lingyu Wang,Tuaner Zhang,K S Shashidhar	Artificial Intelligence-Based Health Education and Management System for Patients with Chronic Diseases	2022	Promoting self-health management of patients with chronic diseases is of great value for controlling medical expenditure and innovating industrial service mode. However, self-health management of chronic disease patients in China has obvious deficiencies in consciousness, capital investment and resource allocation for a long time.

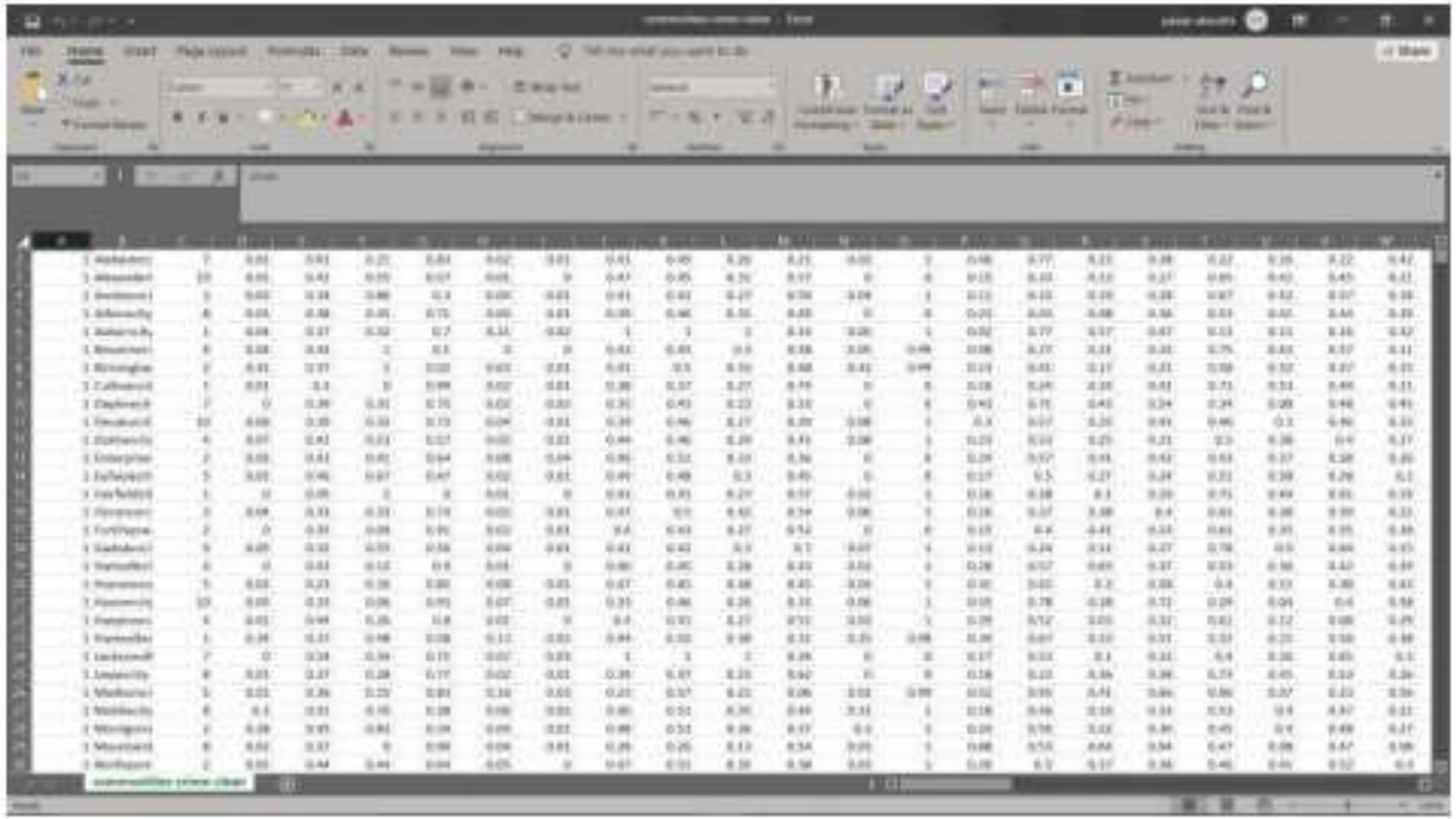
Author's Name	Paper name and publication details	Year of publication	Main content of the paper
Lerato Mahloko;Funmi Adebesin	**Influence of Health Social Network Sites on Chronic Disease Management: A Systematic Review**	2022	Chronic non-communicable diseases (NCDs) are the main cause of death globally and account for 74% of mortality. Low-and middle-income countries (LMICs) are disproportionally impacted by the burden of NCDs, with 77% of all deaths from chronic NCDs being from LMICs. Due to the increasing burden of diseases and shortage of healthcare professionals, more people are turning to health social network sites (HSNs) to seek information on managing their diseases.

Author's Name	Paper name and publication details	Year of publication	Main content of the paper
Arpana Prasad;V. Asha;A.P. Nirmala;Akash V;Chethan S G;Chintan S Naik	**CKD NET: Chronic Kidney Disorders Distinction Model**	2021	Habitual Renal complaint is a condition that causes a progressive drop in renal function. It refers to a clinical reality that causes renal dysfunction, indecorous complaint opinion, and treatment can affect in unrecoverable renal complaint with veritably short chances of survival. Artificial Intelligence (AI) technologies equip healthcare providers with a rich set of algorithms to prognosticate the habitual development of conditions.

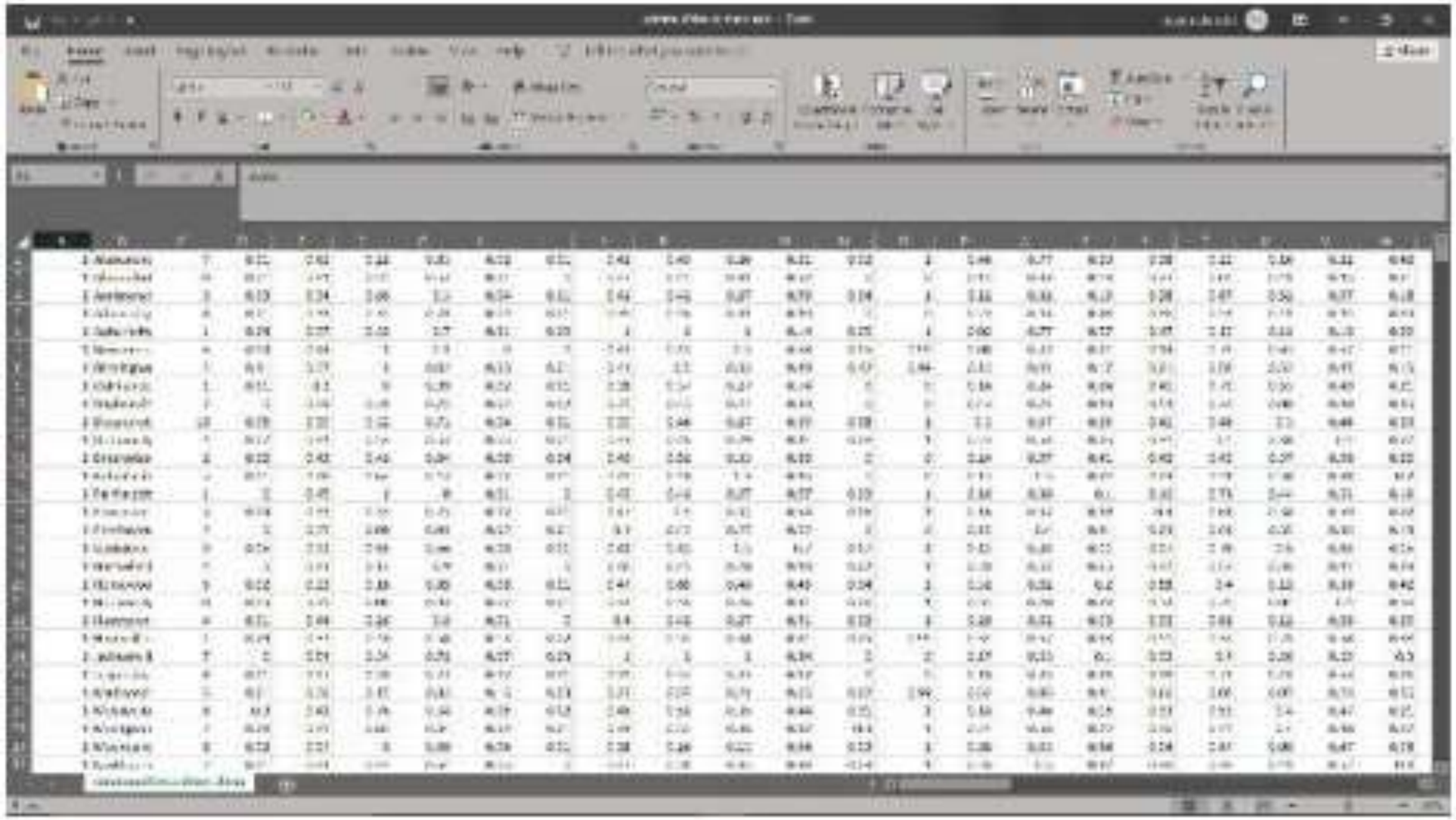
DESIGN AND METHODOLOGIES

- **Module 1:** Data Collection and Integration
- **Module 2:** Processing the data
- **Module 3:** Knowledge graphs
- **Module 3:** AI and ML algorithms
- **Module 4:** Building chatbot for communication

MODULE 1:Collection of data



Step 2: Processing the data



Module 2- Mention the algorithm

- Natural Language Processing (NLP) Algorithms
- Machine Learning (ML) Algorithms
- Content Recommendation Algorithms
- User Modeling Algorithms
- Personalization Algorithms

Step 3: Using algorithm's name algorithm

chatbot - Notepad

File Edit Format View Help

```
<style>
  #chatbox {
    background-color: aquamarine;
  }
  #textInput {
    width: 87%;
    border: none;
    border-bottom: 3px solid #009688;
    font-family: monospace;
    font-size: 17px;
  }

  #buttonInput {
    padding: 3px;
    font-family: monospace;
    font-size: 17px;
  }

  .userText {
    color: white;
    font-family: monospace;
    font-size: 17px;
    text-align: right;
    line-height: 30px;
  }

  .userText span {
    background-color: #009688;
    padding: 10px;
    border-radius: 2px;
  }

  .botText {
    color: white;
    font-family: monospace;
    font-size: 17px;
```

chatbot - Notepad

File Edit Format View Help

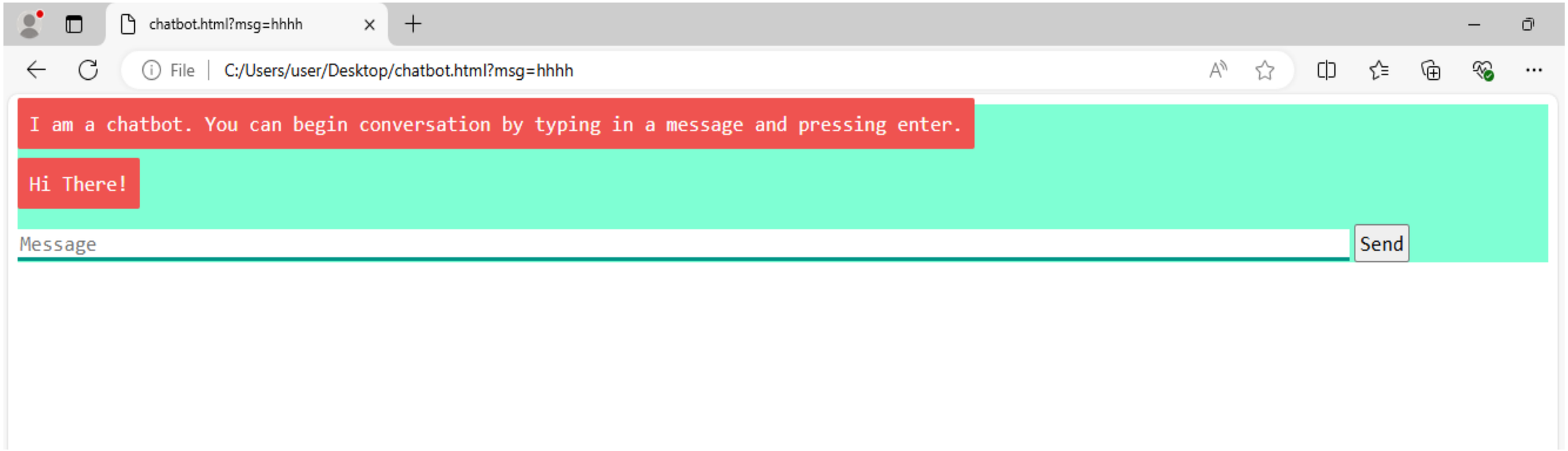
```
  #tidbit {
    position: absolute;
    bottom: 0;
    right: 0;
    width: 300px;
  }
</style>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.2.1/jquery.min.js"></script>
<div>
  <div id="chatbox">
    <p class="botText">
      <span
        >I am a chatbot. You can begin conversation by typing in a message and
        pressing enter.</span
      >
    </p>
    <p class="botText"><span>Hi There!</span></p>
  <div id="userInput">
      <input id="textInput" type="text" name="msg" placeholder="Message" />
      <input id="buttonInput" type="submit" value="Send"></input>
    </div>
</div>



  <script>
    var element=document.getElementById('chatbox');
    window.onload = function(){
    element.scrollIntoView(false); }

    function getBotResponse() {
          var rawText = $("#textInput").val();
          var userHtml = '<p class="userText"><span>' + rawText + '</span></p>';
          $("#textInput").val("");
          $("#chatbox").append(userHtml);
          window.location.href="?msg="+rawText
          document.getElementById('userInput').scrollIntoView({block: 'start', behavior: '
          $.get("/chatbot", { msg: rawText }).done(function(data) {
            var botHtml = '<p class="botText"><span>' + data + '</span></p>';
            $("#chatbox").append(botHtml);
            document.getElementById('userInput').scrollIntoView({block: 'start', behavior:
          });
        }
        $("#textInput").keypress(function(e) {
            if(e.which == 13) {
                getBotResponse();
            }
        });
        $("#buttonInput").click(function() {
          getBotResponse();
        })
  </script>
</div>
```

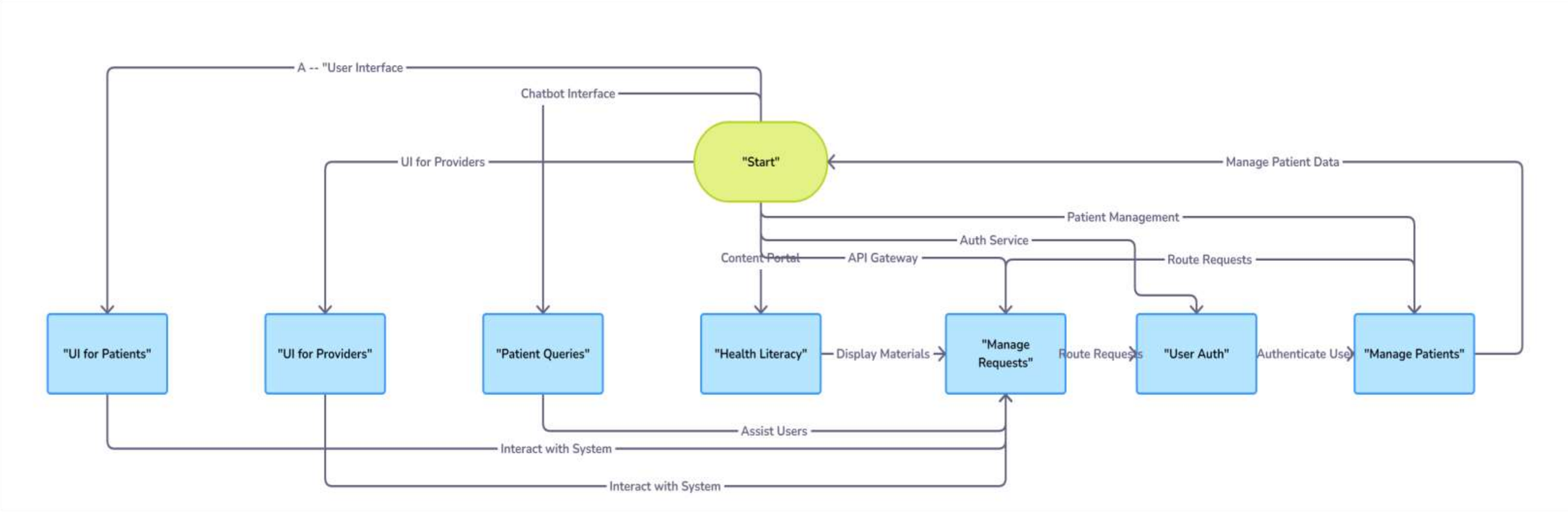
Step 4: The output



IMPLEMENTATION

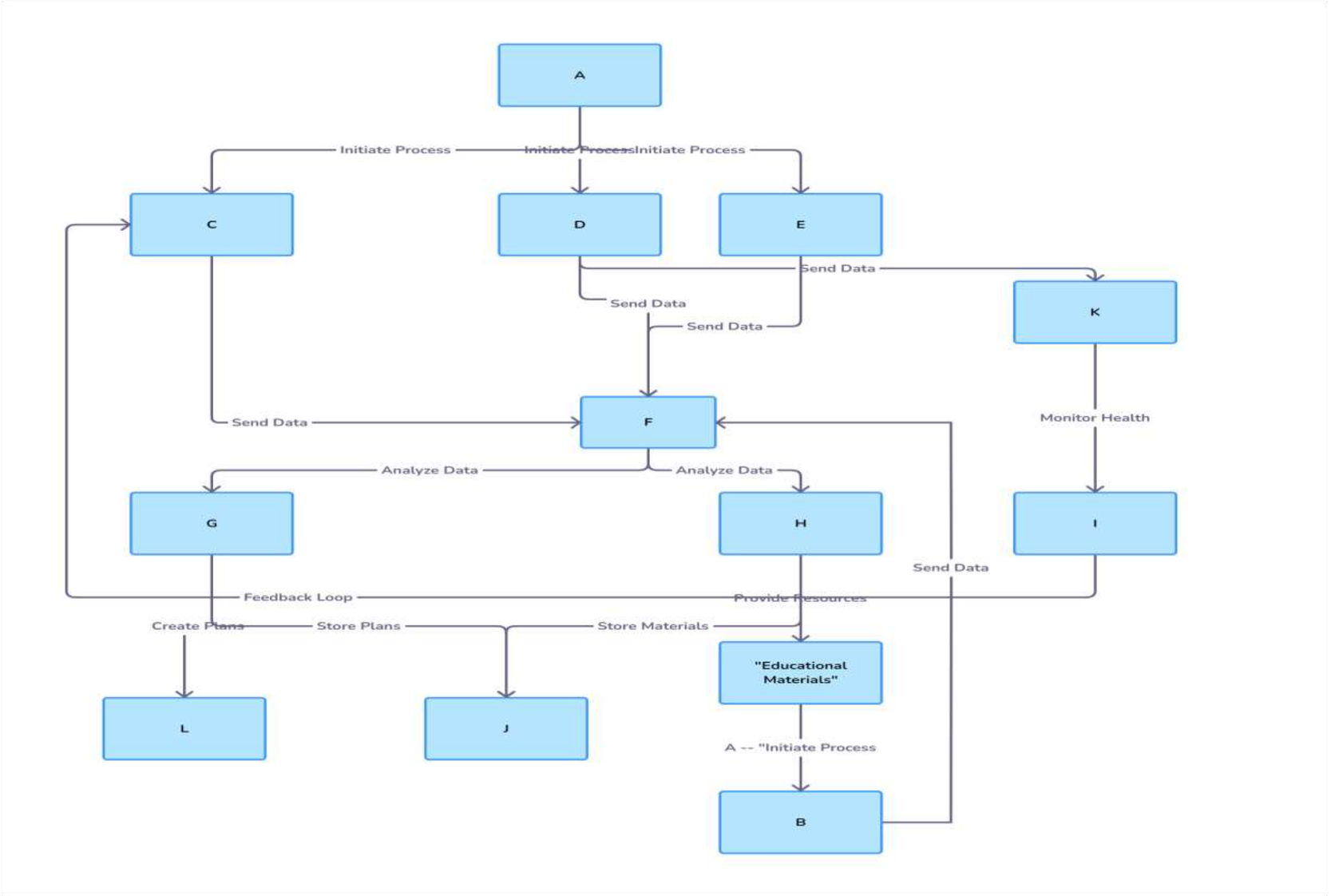
- Architecture Diagram
- Data –Flow Diagram
- Use Case Diagram
- Class Diagram
- Activity Diagram
- Sequence Diagram
- Collaboration Diagram(If applicable)
- E-R Diagram

Architecture Diagram



- The central oval labeled “Start” represents the beginning of the process.
- Various rectangular nodes branch out from the central oval, including functions like “User Problems,” “User Requests,” and “Patient Queries.”
- References to health services are present, such as “Health Service Request” and “Manage Health Data.”
- Management functions like “Project Management” and system interaction points like “Interact with System" are also included.

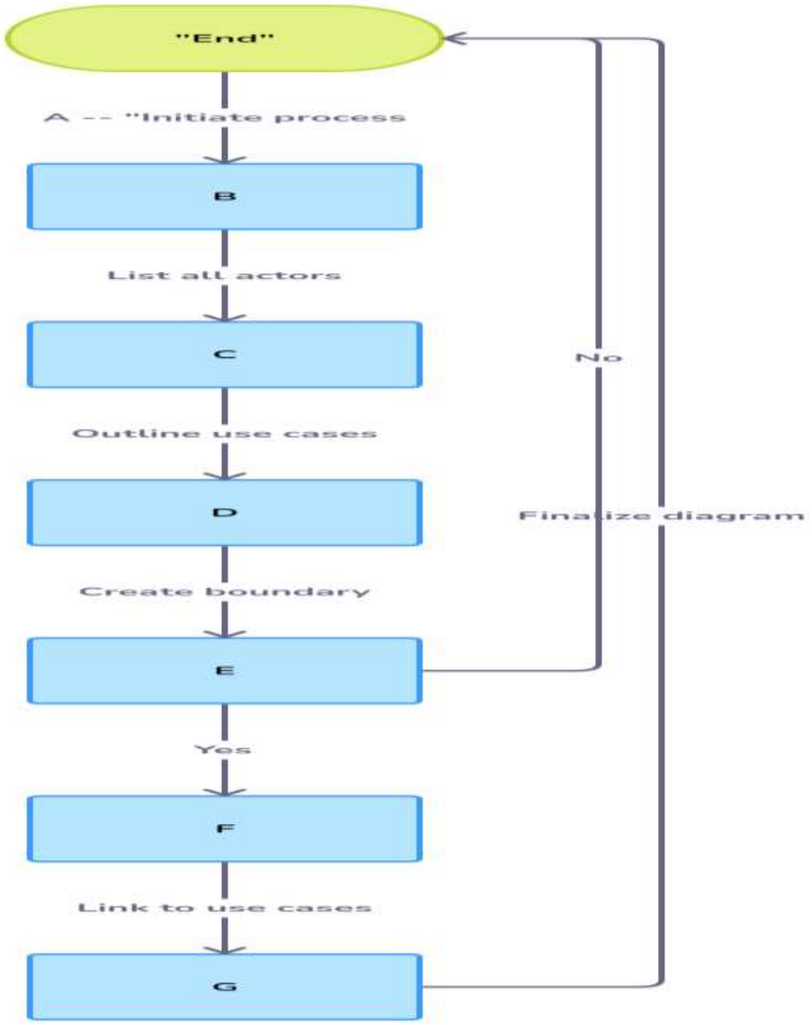
Data –Flow Diagram



Data –Flow Diagram

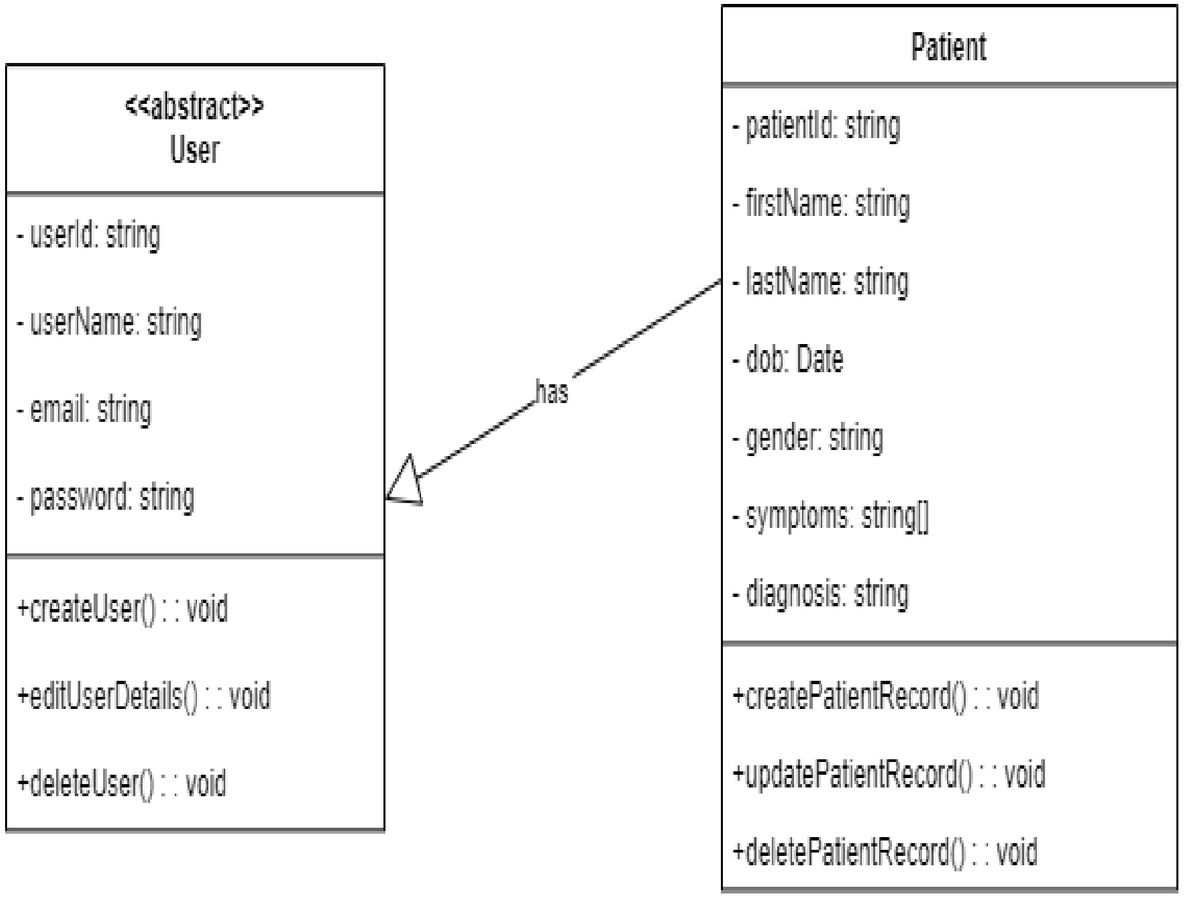
- **Initiate Process**: The flowchart begins with this step.
- **Intermediate/Responsible Process**: This step follows the initiation and leads to various branches.
- **Send Data**: One of the branches involves sending data.
- **Analyze Data**: Another branch focuses on analyzing data.
- **Monitor Health**: This step is part of the process.
- **Feedback Loop**: Arrows indicate feedback loops, which return to earlier steps like “Create Plans” and “Store Plans.”
- **Storage Points**: The chart includes storage symbols labeled as “Store Plans” and “Store Materials.”

Use Case Diagram



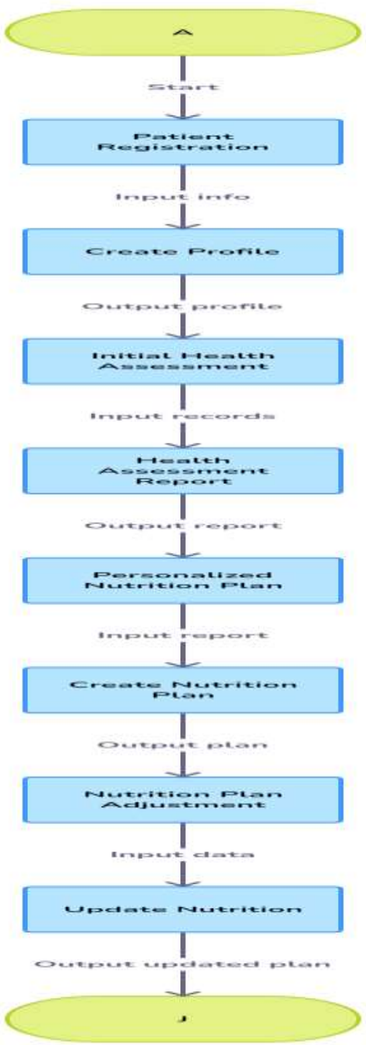
- **Initiate Process**: The flowchart begins with this step.
- **List all actors**: This step involves identifying all relevant actors or stakeholders in the system.
- **List use cases**: Next, the flowchart suggests listing all the use cases or scenarios that the system needs to handle.
- **Decision Point (“End?”)**: A diamond-shaped decision point asks whether the process should end. If the answer is ‘No,’ the flowchart loops back; if ‘Yes,’ it proceeds.
- **Outline use cases**: Assuming the process continues, this step involves outlining the use cases in more detail.
- **Create boundary**: Further steps include creating boundaries or defining the scope of the system.

Class Diagram



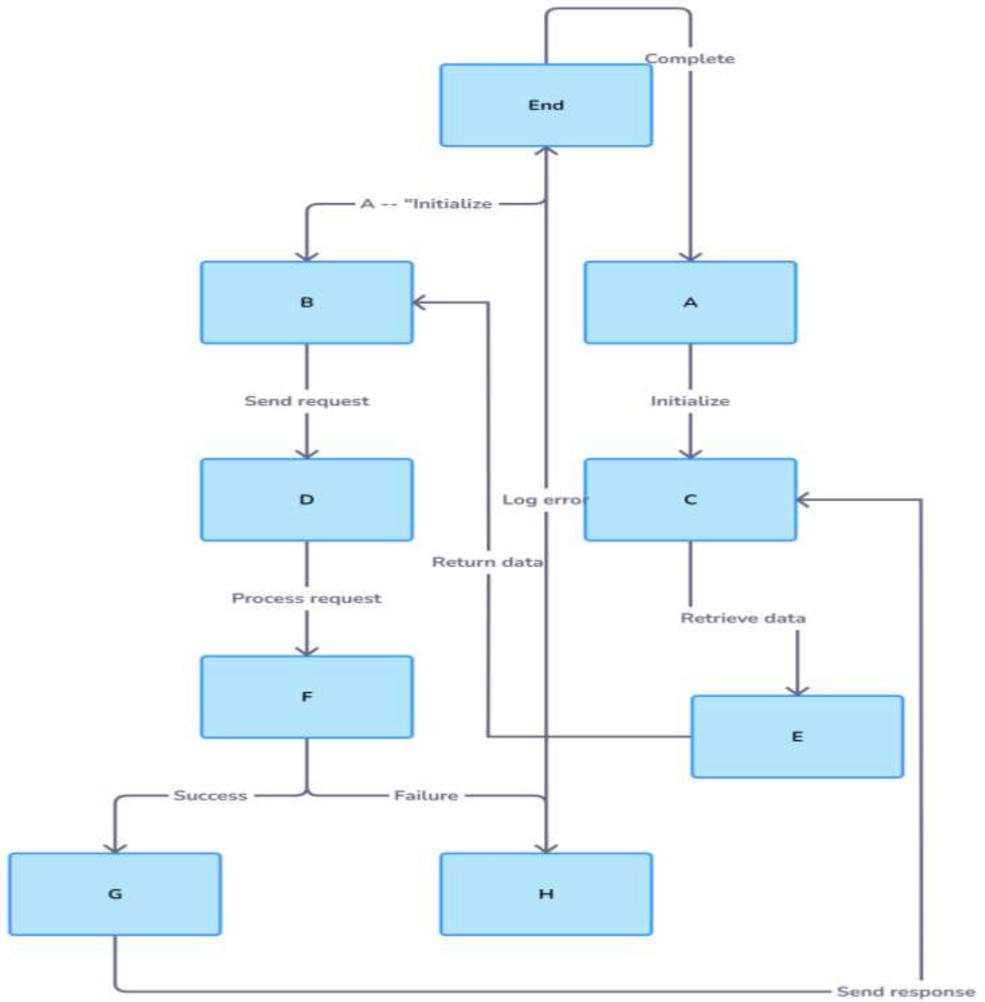
- The class diagram consists of two essential classes: “User” and “Patient.” The “User” class captures user-related data.
- including attributes like userId, userName, password, and email. It also offers methods such as createUser(), editUserDetails(), and deleteUser().
- On the other hand, the “Patient” class focuses on patient-specific information, with attributes like patientId, firstName, lastName, dob (date of birth), gender, and diagnosis.
- Methods associated with patients include createPatientRecord(), updatePatientRecord(), and deletePatientRecord This diagram is particularly relevant for healthcare software systems, ensuring efficient management of user and patient data

Activity Diagram



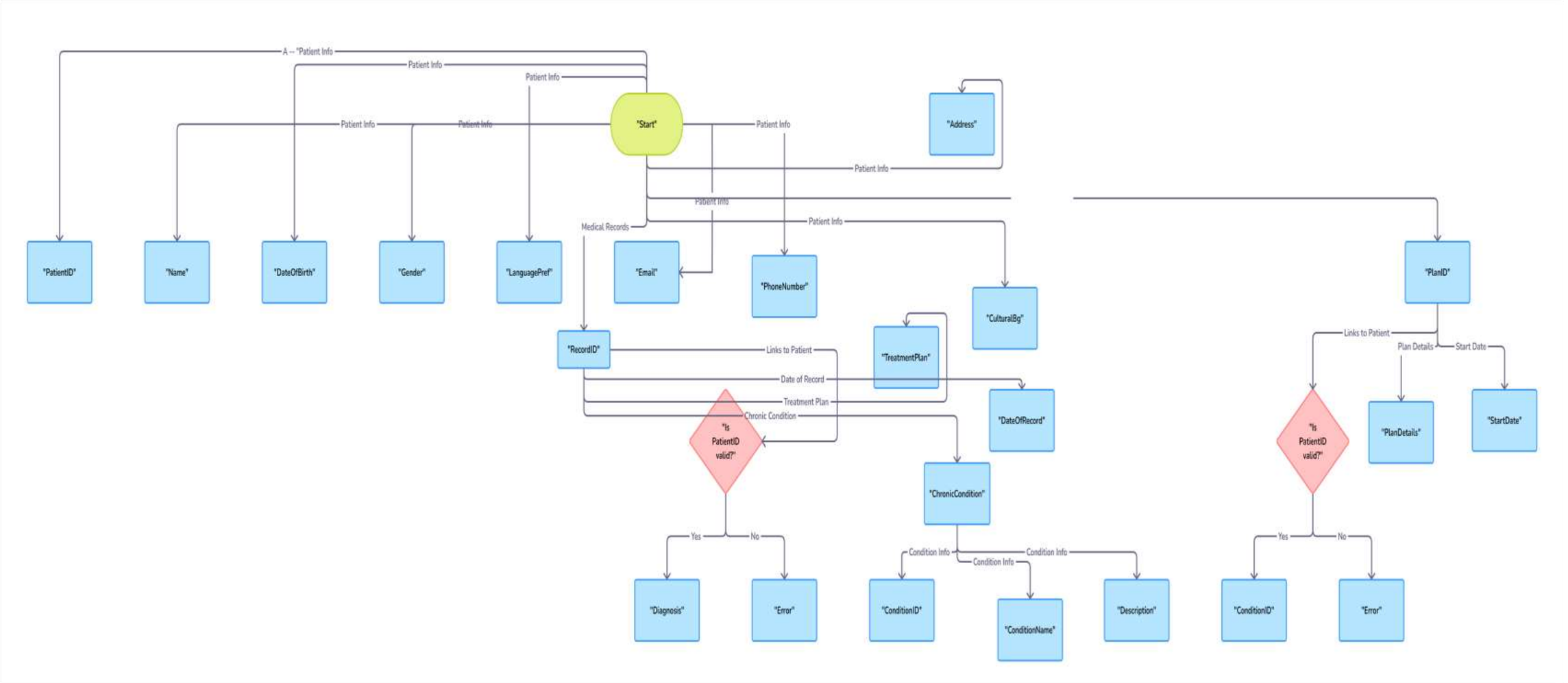
- **Start**: The process begins here.
- **Input data**: Data relevant to the process is collected.
- **Create profile**: A profile is generated based on the input data.
- **Output profile**: The created profile is the output.
- **Correct?**: A decision point checks if the profile is correct. If yes, it proceeds; if no, it loops back to “Create profile.”
- **Input needs**: Additional needs or requirements are gathered.
- **Analyze data**: The system processes the input data and needs.
- **Personalized?**: Another decision point determines if personalization is required. If yes, it moves to “Create options”; if no, it loops back to “Analyze data.”
- **Create options**: Options or solutions are generated based on the analyzed data.
- **Output options**: The generated options are the output.
- **Output correct?**: A check ensures the options are correct. If yes, it proceeds to “Input data”; if no, it loops back.
- **Update action plan**: The final step updates the action plan.
- **Stop**: The process ends.

Sequence Diagram



- **Initialization**: The process begins with an “Initiate” step.
- **Request and Data Input**: The system receives a request and collects relevant data.
- **Profile Creation**: Based on the input data, a profile is created.
- **Profile Output**: The generated profile becomes the output.
- **Validation Check**: The system verifies if the profile is correct. If yes, it proceeds; if not, it loops back to profile creation.
- **Data Analysis**: The system processes the input data and additional needs.
- **Personalization Decision**: A decision point determines if personalization is necessary. If yes, it moves to “Create Options”; if not, it loops back to data analysis.
- **Option Generation**: Options or solutions are generated based on the analyzed data.
- **Option Output**: The system provides the generated options as output.
- **Action Plan Update**: The final step involves updating the action plan.
- **Completion**: The process concludes with a “Stop.”

E-R Diagram


A -- "Patient Info
Patient Info
Patient Info
Patient Info
Patient Info
"Start"
Patient Info
"Address"
Patient Info
Patient Info
Medical Records
Patient Info
"PatientID"
"Name"
"DateOfBirth"
"Gender"
"LanguagePref"
"Email"
"PhoneNumber"
"CulturalBg"
"PlanID"
"RecordID"
Links to Patient
"TreatmentPlan"
Date of Record
Treatment Plan
Chronic Condition
"DateOfRecord"
"Is PatientID valid?"
"ChronicCondition"
Links to Patient
Plan Details
Start Date
"Is PatientID valid?"
"PlanDetails"
"StartDate"
Yes
No
Condition Info
Condition Info
Condition Info
Yes
No
"Diagnosis"
"Error"
"ConditionID"
"ConditionName"
"Description"
"ConditionID"
"Error"

E-R Diagram

- **Initialization**: The process begins with an “Initiate” step.
- **Request and Data Input**: The system receives a request and collects relevant data.
- **Profile Creation**: Based on the input data, a profile is created.
- **Profile Output**: The generated profile becomes the output.
- **Validation Check**: The system verifies if the profile is correct. If yes, it proceeds; if not, it loops back to profile creation.
- **Additional Needs**: Further needs or requirements are considered.
- **Data Analysis**: The system processes the input data and additional needs.
- **Personalization Decision**: A decision point determines if personalization is necessary. If yes, it moves to “Create Options”; if not, it loops back to data analysis.
- **Option Generation**: Options or solutions are generated based on the analyzed data.
- **Option Output**: The system provides the generated options as output.
- **Validation Check (Again)**: The options are checked for correctness. If valid, it proceeds to input data; otherwise, it loops back.
- **Update Action Plan**: The final step involves updating the action plan.
- **Completion**: The process concludes with a “Stop.”

REFERENCES

[1] A Smart Research Framework for Local Undergraduate Colleges' Health Literacy Survey Based on Distributed Data Collection System Zili Niu 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS)

[2] Exploring the Role of the Internet, Care Quality and Communication in Shaping Mental Health: Analysis of the Health Information National Trends Survey Avishek Choudhury;Onur Asan;Turki Alelyani IEEE Journal of Biomedical and Health Informatics

[3] Measuring Digital Health Literacy in Hungary: A Scoping Review Mariann Békésy 2022 IEEE 20th Jubilee International Symposium on Intelligent Systems and Informatics (SISY)

[4] Artificial Intelligence-Based Health Education and Management System for Patients with Chronic Diseases Lingyu Wang;Xi Jiang;Tuaner Zhang;Xiaozhu Wang;K S Shashidhar 2022 International Conference on Knowledge Engineering and Communication Systems (ICKES)

THANK YOU

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