











**Military Institute of Science and Technology (MIST)**  
**Integrated Design Project (IDP-II)**  
**Course Code: CSE – 460**

**SYSTEM DEVELOPMENT REPORT**  
**(GROUP – A1)**  
**Project Name: NextGen Wheelchair**

**Group Members:**

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## 1. Required Platform

Name	Description
<b>Visual Studio Code</b> 	Visual Studio Code is a code editor redefined and optimized for building and debugging modern web and cloud applications. We used Visual Studio Code to build and run our frontend user interface.
<b>Bootstrap</b> 	Bootstrap is a framework to design websites faster and easier. The HTML and CSS codes which build the frontend of the websites are included in Bootstrap. We used it for making our user – interface responsive.
<b>Javascript</b> 	It's an object – oriented programming language. We used it for dynamic web design and taking video captures of user's head position. Also used for recognizing the user's voice inputs and manual controlling of the system.
<b>Python</b> 	Python is a computer programming language often used to build websites and software, automate tasks, and conduct data analysis. We used Python to generating a local server which can send data from the interface to the microcontroller device.
<b>Arduino</b> 	It's an IDE for microcontrollers. We used ESP32 as microcontroller. The data from the user interface is sent by creating a 'websocket' server by Python to this IDE.
<b>Github</b> 	Git and GitHub are used for collaborating the whole project and the team can work remotely then merge it centrally. We used this open-source platform for continuous collaboration among the group members.
<b>Jira</b> 	Jira software is used to keep track of the project update according to the schedule. We used it to make proper schedule for implementing the project and assigning the tasks among group members.
<b>Raspberry Pi</b> 	Raspberry Pi is a series of small single-board computers. We used it to integrate the system smoothly and save up space.

## **Front End:**

**1. Hyper Text Markup Language (HTML):** Hyper Text Markup Language (HTML) is the backbone of any website development process. A markup language indicates text can be turned into images, tables, links, and other representations. It is the HTML code that provides an overall framework of how the site will look.

**2. Cascading Style Sheets (CSS):** CSS controls the presentation aspect of the site and allows your site to have its own unique look. It does this by maintaining style sheets which sit on top of other style rules and are triggered based on other inputs, such as device screen size and resolution.

**3. Bootstrap:** Bootstrap is a framework to design websites faster and easier. The HTML and CSS codes which build the frontend of the websites are included in Bootstrap. Bootstrap is the framework that gives the website responsive look to any devices.

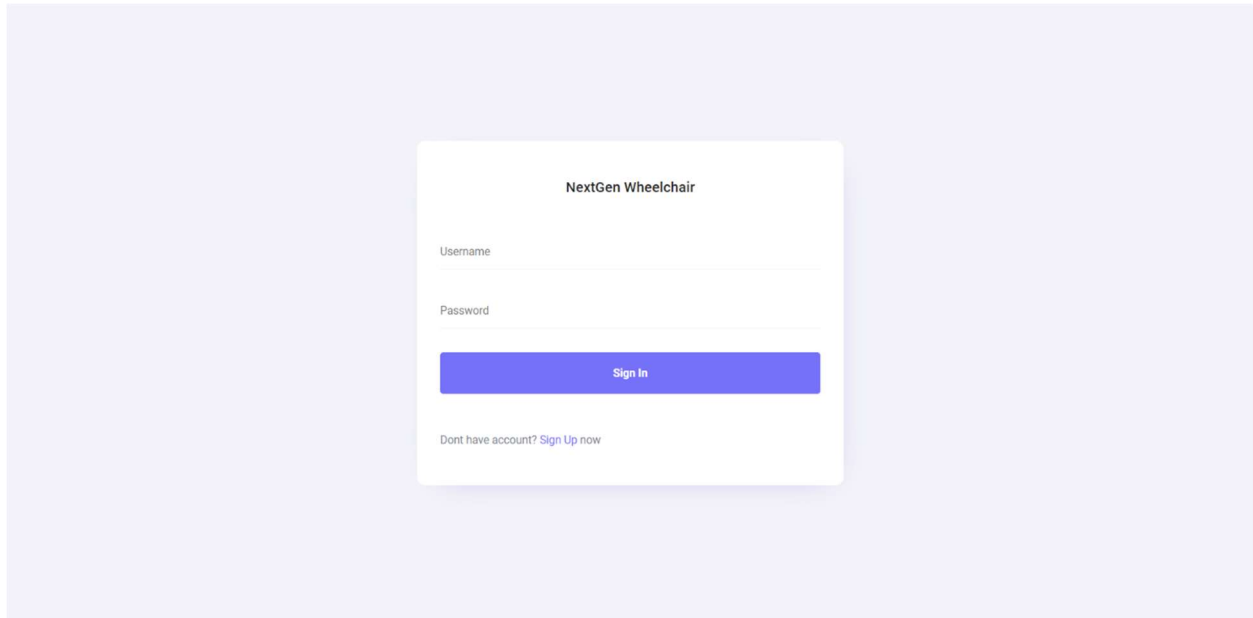
**4. JavaScript:** JavaScript is an event-based imperative programming language that is used to transform a static HTML page into a dynamic interface. JavaScript code can use the Document Object Model (DOM), provided by the HTML standard, to manipulate a web page in response to events, like user input.

## **Back End:**

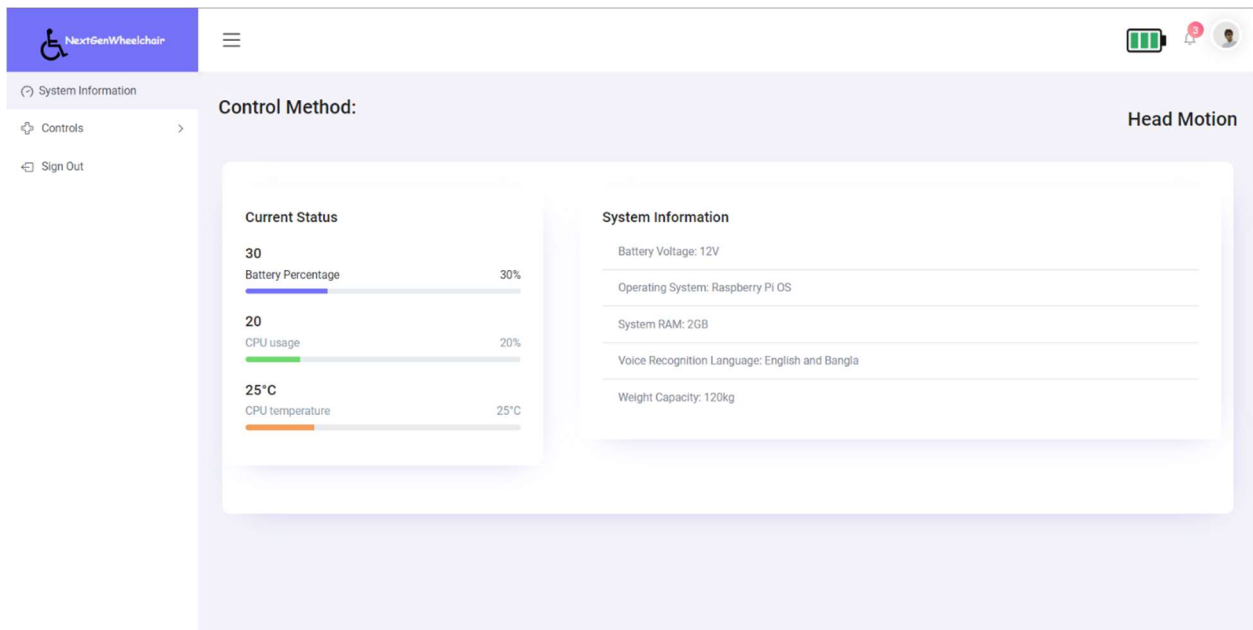
There is no specific platform used as Back-End in our system. But we used Python to make a local server in our system which will receive the required data from the website and send the data in Arduino IDE from where the required code for driving the system will be uploaded to the microcontroller. This can be looked as a back – end interface in our system. Besides, for the login page, a default username and password will be set for different users.

## 2. Snapshots of UI

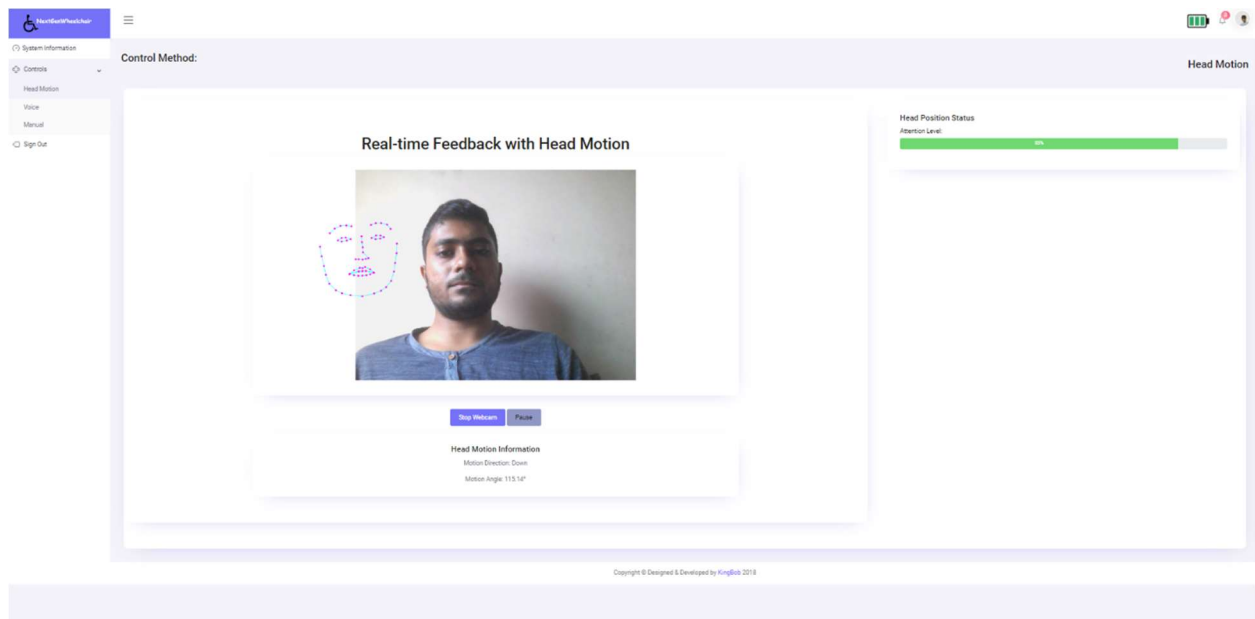
### Sign In Page:



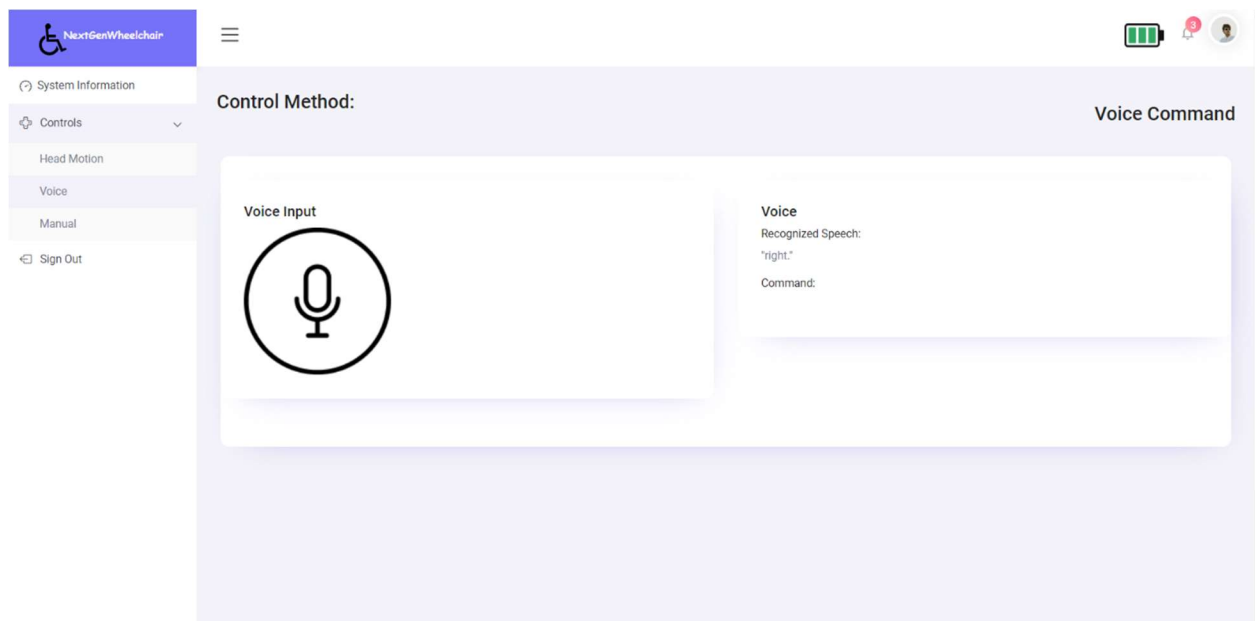
### System Information Page:



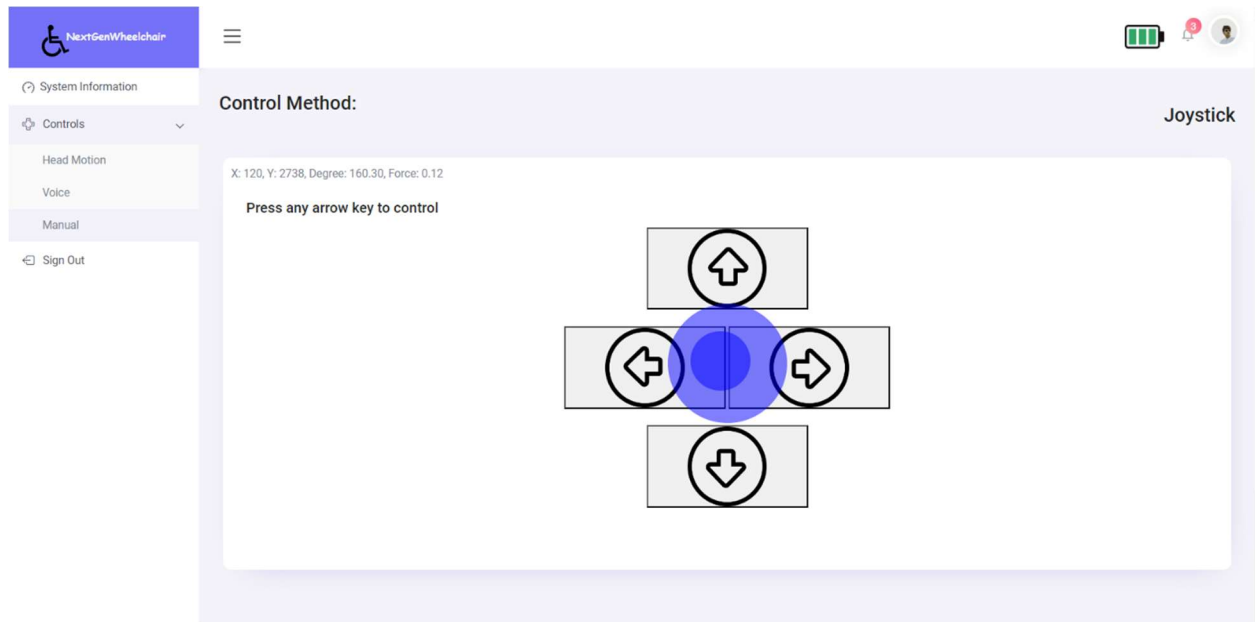
## Control Method: Head Motion:



## Control Method: Voice Command:



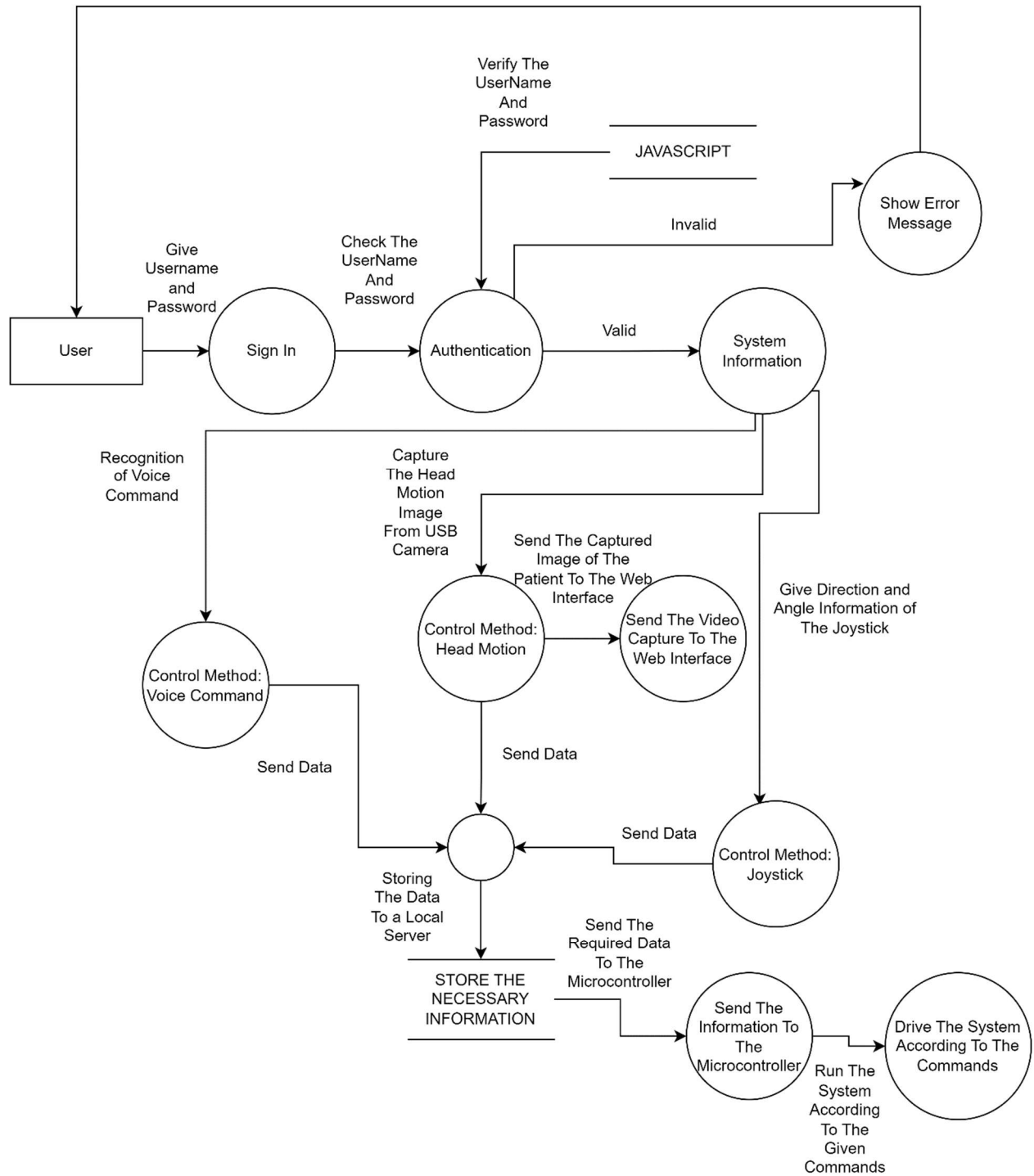
## Control Method: Joystick



## **3. Scenario and DFD:**

### **Scenario – 1:**

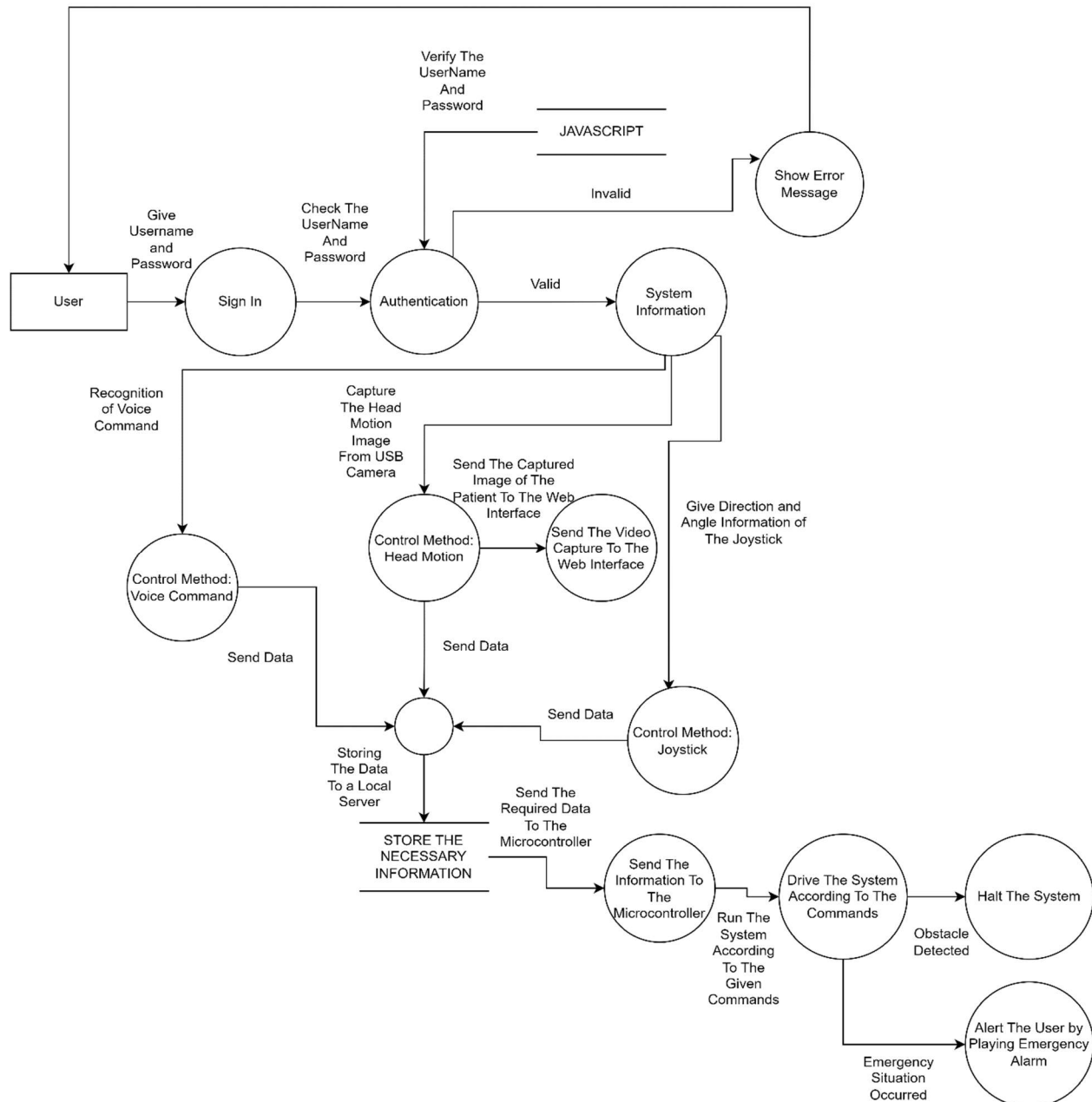
Mr. Rahim is a relative of Mr. Karim. Mr. Karim is a middle-aged quadriplegic patient and can not move majority parts of his body. So, Mr. Rahim plays the role of a caregiver of Mr. Karim. This caregiver role puts a lot of physical strain on him. So, he thought, why not using a system by which Mr. Karim can move independently and also, he can monitor his relative from a far distance. He used NextGen Wheelchair web application to do so.



**Fig:** Data Flow Diagram for Scenario – 1

## Scenario – 2:

Mr. Rahim is a happy person, he wanted to have a system by which he can monitor his relative from a far distance. Also, the patient can move independently by using head motion. He got a web-based application, 'NextGen Wheelchair', by which he could do so. He noticed another thing; the system could halt if any obstacle is detected while driving the system and alert him whenever any emergency situation occurs. This feature of the system relieved him from many worries.



**Fig:** Data Flow Diagram for Scenario – 2