University of Engineering & Technology Mardan

Department of Electrical Engineering

FYP Title: - Voice activated, body detecting and auto temperature adjusting IoT shower Valve.

(Augest-2023)

FYPD Group No: -

Group Members: -

Name : - M.Ibrahim shah
Reg No: - 20MDELE193
Email : - muhammadibrahimshah2000@gmail.com

Proposed Supervisor:

Name: - Dr. Jawad khan

Signature: -_____

Co-Supervisor:-

Name: -_____

Signature: -_____

Contact Number: (0347-1196230)

Table of Contents

Contents

1 Introduction:

The integration of the Internet of Things (IoT) has brought about significant changes in different sectors of human existence, during a time marked by rapid technical progress and a growing need for personalized experiences. In the context of the ongoing digital revolution, conventional tasks are being conceptualized with a focus on inventive approaches, thereby presenting prospects for augmenting convenience, effectiveness, and ecological soundness. The current undertaking stems from a strong aspiration to bring about a transformative impact on a fundamental but frequently disregarded everyday activity—the act of showering—by offering an innovative notion of a Voice-Activated, Body Detecting, and Auto Temperature Adjusting Internet of Things (IoT) Shower Valve.

The choice of this project topic arises from a profound drive to tackle the constraints and inefficiencies inherent in conventional showering systems. The act of showering is a common practice across cultures, but it can be hindered by the pain caused by fluctuating water temperatures and the inefficient use of valuable resources. Furthermore, traditional manual controls frequently lack the ability to offer a customized and instinctive user experience, especially in environments that are shared by multiple individuals. The objective of this project is to address these issues by integrating advanced technology to provide an intelligent shower valve that effectively adapts to user preferences, presence, and sustainability considerations.

Within the wider framework of societal impact, the project holds relevance due to its capacity to enhance the act of showering to unprecedented levels, all the while advocating for the conservation of water and energy resources. In a global context characterized by diminishing natural resources and an increased focus on environmental consciousness, each individual action taken towards the promotion of sustainable living holds significance. The IoT Shower Valve, which is being presented, represents a significant advancement in technology that not only enhances personal comfort but also coincides with the principles of sustainable resource utilization, thereby reflecting the values of modern society.

The core premise that forms the foundation of this initiative centers on the interconnectedness of the Internet of Things (IoT), automation, and human engagement. The project effectively caters to the demand for touch less and hygienic control interfaces by empowering users to manipulate their showers using voice commands. The use of body detecting technologies enhances the notion of human-centric design, enabling the system to anticipate and adapt to the user's presence, thus enhancing the user experience. Nevertheless, the focal point of this innovation is the system for automatically adjusting temperature, so eliminating the requirement for manual intervention and thereby reducing water loss.

This is particularly significant in countries facing water scarcity, where the conservation of water resources is of utmost importance.

Although the objective is big, the road is not devoid of its hurdles. The complex amalgamation of voice recognition, sensor technologies, automated actuators, and Internet of Things (IoT) connectivity presents a significant technical challenge. Furthermore, it is imperative that the design takes into consideration the varying tastes of users and the broad range of showering behaviors exhibited by individuals. The achievement of a smooth and prompt experience that caters to diverse situations while upholding water efficiency necessitates meticulous algorithmic development and optimization.

In summary, the selection of this project arises from a deep aspiration to improve the overall quality of everyday existence through the implementation of technology advancements. The objective of the Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve project is to solve the limitations of conventional showering systems and promote sustainable living. This project aims to enhance user comfort, conserve resources, and encourage environmental awareness. During the process of traversing the complex stages of design, execution, and integration, the project team demonstrates unwavering dedication to developing a solution that revolutionizes the showering experience for a society that values technology and environmental sustainability.

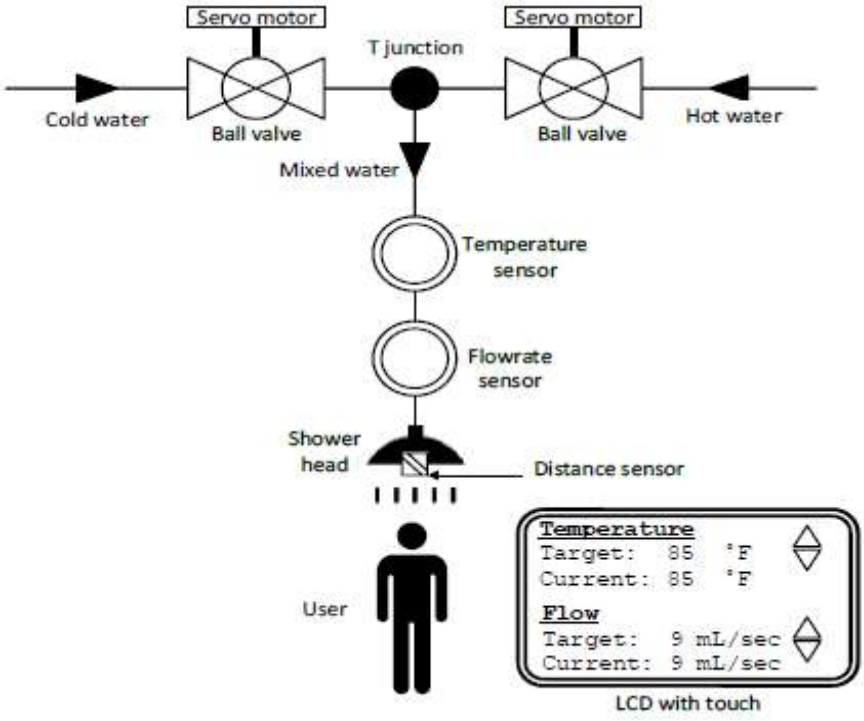

Figure 1. The proposed smart showering system.

2 Problem statement

The "Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve" project aims to address several challenges in conventional shower systems:

1. Inconsistent Water Temperatures: Traditional showers often struggle to maintain a consistent water temperature, causing discomfort.

2. Inefficient Water Usage: Frequent manual temperature adjustments lead to water wastage.

3. Internet of Things (IoT): Leveraging IoT technology, this project seeks to revolutionize the showering experience by integrating advanced technology, enhancing comfort, and promoting responsible resource usage, aligning with modern living ideals and sustainability.

4. Hygiene Concerns: Manual controls pose hygiene issues in shared spaces.

5. Resource Depletion: In an era of water scarcity and environmental concerns, there's a need for sustainable solutions.

6. Lack of Personalization: Existing systems don't adapt to individual preferences.

3 Objectives of the Project:

Project's aims and objectives are strategically aligned to address the multifaceted challenges posed by traditional showering systems, while harnessing the potential of IoT technology to redefine user experience and promote sustainable practices. The main objective of this project is:

1. To design IoT based adjustable Shower value for upgrading existing system.
2. To enable the hardware developed to adjusting water temperature with body temperature.
3. To enhance the functionality by voice commands.

4 Literature Review

In order to maintain a consistent temperature and flow rate, a potential mechanical approach involves the utilization of thermostatic valves [1][2]. Within this valve, a wax element undergoes expansion and contraction in response to thermal stimuli, thereby regulating the proportion of hot and cold water. However, the system lacks digital sensors and displays, which prevents the user from setting specific temperature values in Fahrenheit or flow rates in L/min units.

[3].The authors provide an adaptive assistive smart shower system in [4]. This system utilizes a classifier to identify the user's abilities and disabilities, and subsequently delivers the appropriate help in an automated manner. The study described in [5] presents a novel approach for optimizing water consumption during showers through the utilization of a smart water heating system. This system is implemented utilizing an open-source Asterisk-based IP-PBX using cloud computing technology. The study presented in [6] discusses the application of support vector machines (SVMs) in the identification of hot water facilities, specifically the kitchen sink, bathroom sink and shower.

The commercial device mentioned in [7] employs a mechanism that illuminates the water spray with varying colors in correspondence to the quantity of water utilized. This innovative feature serves the purpose of fostering consciousness and understanding among individuals regarding their water consumption. In [8], a liquid crystal display (LCD) is utilized to display the present temperature. The LCD's background and water spray undergo color variations in accordance with the temperature.

The products [9] and [10] feature a display that presents information on both water usage and temperature.

The LED display in [11] indicates the present temperature. Nevertheless, it should be noted that the aforementioned components (9-13) lack the capability of automatic temperature and flow adjustment. The study conducted by the authors in [12] employs a distance sensor to detect the user's position within the shower, then adjusting the water flow levels accordingly. Additionally, it demonstrates water consumption and duration of showers through the establishment of a Bluetooth connection with a smartphone application.

The smart shower, as described in [13], is capable of establishing a connection with a Smartphone using Wi-Fi. This connection enables users to initiate the showering process from their phone, ensuring that the water temperature is set to their chosen level and allowing for a pause during the initial start-up phase. The device exhibits the present temperature and is capable of regulating temperature in response to variations in the supply water. Nevertheless, it lacks the capability to regulate or manipulate the water's rate of flow; its functionality is limited to initiating or terminating the flow.

In contrast to previous studies, the present study introduces a novel smart shower system that utilizes user-provided temperature and flow rate inputs to autonomously regulate both the temperature and flow, even in the presence of fluctuations in the water supply. The shower prototype exhibits the instantaneous display of both the prevailing temperature and flow rate. The device employs a distance sensor to automatically deactivate the shower when the user is absent during the process of applying soap or shampoo, with the intention of conserving water. Additionally, it produces information regarding water consumption and the duration of showers in order to raise awareness about the importance of water conservation.

5 Methodology for Implementation of Project:

The methodology for implementing the Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve project encompasses a holistic approach that blends theoretical insights, experimental setup, algorithmic design, and hardware integration. The core methodologies and stages of implementation are elucidated below:

5.1 Theoretical Studies and Conceptual Framework:

- **Literature Review Utilization:** Draw from the comprehensive literature review to establish the foundation for the project's theoretical underpinnings. Incorporate insights from studies on IoT, smart appliances, voice recognition, sensor integration, and energy efficiency.
- **Conceptual Framework:** Develop a robust conceptual framework that outlines the integration of voice activation, body detection, and automatic temperature adjustment within the shower system.

Hardware Component: -

1. Temperature Sensor
2. Motion sensor
3. Voice Recognition module
4. Microntroller(Adriano or Raspberry Pi
5. Actuator (Motorized valve actuators and Pump)
6. Communication Modules (Wife/Bluetooth)
7. Power Supply and Wiring
8. Pipes, Connectors and Enclosure
9. Display Interface (if applicable)
10. Multimeter
11. Thermometer

5.2. Experimental Setup:

- **Sensor Integration:** Assemble temperature sensors, motion sensors, and microcontrollers to create a sensor network capable of gathering relevant data.
- **Voice Recognition Module:** Integrate a voice recognition module to convert voice commands into digital instructions.
- **Actuator Control:** Connect motorized valve actuators and pumps to the microcontroller for regulating water flow and temperature.
- **IoT Connectivity:** Establish connectivity through Wi-Fi or Bluetooth modules to enable remote control and monitoring.

5.3. Algorithm Development:

- **Voice Command Interpretation:** Will be design algorithms to process and interpret voice commands, converting them into actionable instructions for temperature and flow adjustment.
- **Body Detection Logic:** Will be develop algorithms that analyze data from motion sensors to detect user presence and initiate appropriate settings.
- **Temperature Regulation:** To create algorithms that monitor temperature sensor data and regulate water temperature by controlling the actuators.

5.4. Software Simulations and Testing:

- **Software Development:** Programming languages (such as Python or C++) will be Utilize to develop software components, including voice recognition, sensor data processing, and actuator control.
- **Simulations:** Employ software simulations to verify the effectiveness of algorithms and control mechanisms, ensuring accurate voice recognition, body detection, and temperature adjustment.

5.5. Hardware Integration:

- **Prototyping:** Assemble the designed system using microcontrollers, sensors, actuators, and communication modules on a physical prototype.
- **Integration Testing:** Test the integration of different hardware components to ensure seamless communication and interaction.
- **Functional Testing:** Validate the prototype's functionality through various scenarios, including voice-activated commands, user presence detection, and automatic temperature adjustment.

5.6. Block Diagram and Flow Chart:

- **Block Diagram:** Create a comprehensive block diagram that illustrates the interaction between hardware components, sensors, microcontrollers, actuators, and communication modules.
- **Flow Chart:** Develop flowcharts outlining the sequence of operations, including voice command processing, body detection, and temperature regulation.

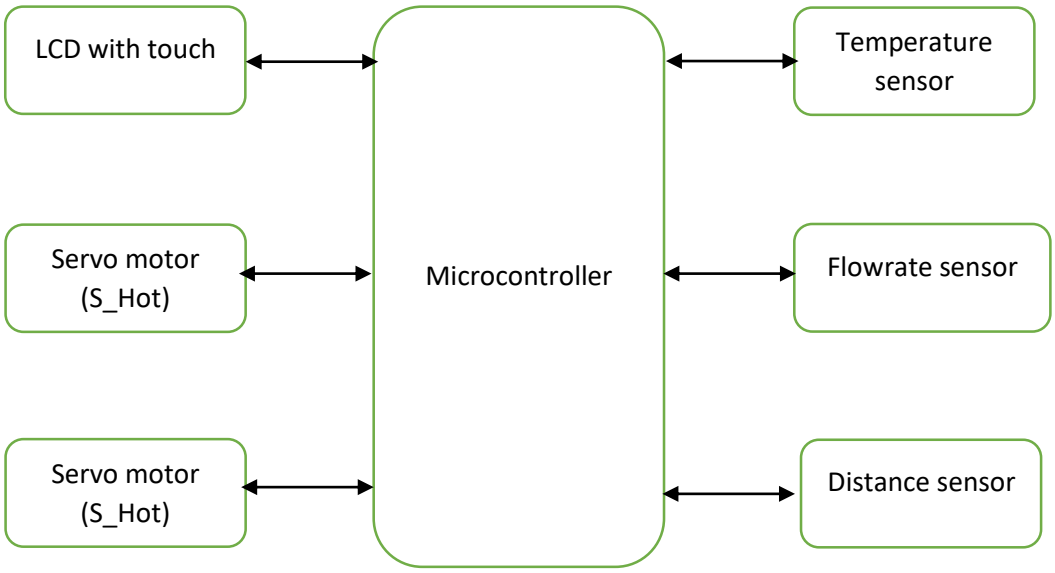

Figure . Block diagram of the hardware unit.

5.7. Expected Outcome:

- **Seamless Voice Control:** Users will be able to adjust temperature and flow settings using voice commands, enhancing convenience and hygiene.
- **Intuitive Body Detection:** The system will detect user presence and initiate personalized settings, ensuring an intuitive shower experience.
- **Automated Temperature Adjustment:** Algorithms will maintain consistent water temperature, eliminating fluctuations and enhancing user comfort.
- **Remote Monitoring and Control:** IoT connectivity will allow users to monitor and control the shower system remotely through mobile applications or voice assistants.

6 Budget Details

The he budget for the implementation of the Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve project, in Pakistani Rupees, is allocated based on the cost of sub-modules and components required for each stage of development. The estimated budget is as follows:

S.No	Devices/Components	Specification	Quality	Prices
1	Temperature Sensor	$10°C–100°C$	2	5,000
2	Motion sensor	7 meters (120 degree cone)	1	3,500
3	voice Recognition module	Support maximum 80 voice commands, with each 1500ms (one or two words speaking).	2	8,000
4	Microntroller(Adriano or Raspberry Pi	we can do a lot of coding and development with the Raspberry Pi	1	6,000
5	Actuator (Motorized vale actuators and Pump)	To a motor rotation, thus opening or closing value of device.	1	7,000
6	Communication Modules (Wifi/Bluetooth)	Devices that are used to transmit and receive radio signals.	1	5,000
7	Power Supply and Wiring	Efficiency and standby power	1	8,000
8	Pipes, Connectors and Enclosure	A document prepared during the design phase of any project	1	5,000
9	Display Interface (if applicable)	Is used to transmit video, Potentially also audio and other technologies between the signal source (typically a computer, Mobile etc.)	1	2,500
10	Multimeter	To Measure Voltage and current	1	4,000
11	Thermometer	Temperature measurement range 32-43 C(minimum guaranteed)	1	4,000
12	Miscellaneous and Contingency	Relation between environment, behavior and consequences.	1	10,000
13	Arduino	Arduino is an open-source electronics platform based on easy-to-use hardware and software.	1	3,000

14	Servo Motors	electronic devices and rotary or linear actuators that rotate and push parts of a machine with precision.	4	10,000
15	Motion sensor	detect nearby people or objects.	2	4,000
16	Arduino Omega	to create complex projects due to its structure	1	5,000

Total Budget	90,000

The budget breakdown provided is approximate and subject to variations due to factors such as currency exchange rates, brand preferences, component availability, and unexpected project challenges. Additionally, it does not include supplementary costs for documentation, presentation materials, or potential software licensing fees for proprietary tools. The project team will strive for responsible financial management and cost-effective solutions to stay within the allocated budget while delivering an innovative IoT Shower Valve prototype.

7 Project Implementation Schedule

Please provide a detailed outline of the project milestones along with their corresponding time schedule. A sample is shown below.

Activities	September-October 2023	November-December 2023	January-February-March 2024	April-May 2024
Collection of Literature				
Study of Literature				
Analysis of Proposed Scheme				
Preparation of Schemes / Model				
Implementation of Schemes/Model				
Analysis & Simulation, Hardware Testing				
Result Formulation				
Final Write-up & FYDP Report Submission				

The comprehensive project implementation schedule delineates the crucial milestones and tasks that are to be accomplished for a duration of two semesters, spanning a period of one year, for the project titled "Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve."

8 Utilization of Project Results

The potential impacts of the Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve project are expected to be significant across multiple industries, as it tackles practical difficulties and contributes to improving user experiences and resource efficiency. The project exhibits potential applications and benefits that transcend the boundaries of academics, resonating with industrial design, sustainability initiatives, and the broader public. The application of project outcomes can be conceptualized in various significant domains:

1. **Residential and Commercial Spaces:** The integration of voice commands, body detection, and automatic temperature adjustment in the IoT Shower Valve has significant possibilities for both home and business environments. The integration of this technology into contemporary residential spaces, hospitality establishments, wellness facilities, and fitness establishments enables the conversion of ordinary showering activities into intelligent, customized, and streamlined interactions. The outcomes of the study have the potential to make valuable contributions to the advancement of smart home ecosystems, hence improving levels of comfort and convenience.
2. **Hospitality Industry:** Within the realm of the hospitality industry, the results of the project possess the potential to significantly transform and enhance the overall experiences of guests. Hotels and resorts have the capability to provide their guests with a refined and sanitary bathing system that can be customised to meet individual tastes, resulting in reduced water use and increased customer contentment. The implementation of an automated temperature adjustment method guarantees a consistent level of comfort, hence enhancing the overall quality of service.
3. **Water and Energy Conservation:** The project's emphasis on water efficiency is in line with international endeavors to tackle water scarcity and advance sustainable methodologies. The IoT Shower Valve is a great tool in countries experiencing water shortage as it effectively reduces wasting through the automation of temperature adjustments and control of water flow. The outcomes of the project can be seen as evidence of the effective utilization of technology in addressing urgent environmental issues..

4. **Hygiene and Health Safety:** The implementation of touch less operation through the utilization of speech recognition and body detection technologies effectively mitigates hygiene problems, which are of paramount importance in both residential and public environments. The outcomes of the study make a significant contribution to the preservation of cleanliness and the promotion of health safety, particularly in communal areas that are utilized by several individuals.
5. **Technological Innovation and Education:** The success of the initiative highlights the potential of Internet of Things (IoT) technology to revolutionise commonplace tasks. This particular example can be utilised as a case study inside educational institutions, serving as a source of inspiration for students to engage in interdisciplinary projects that integrate electronics, software development, and user-centric design. The outcomes have the potential to stimulate creativity and motivate future cohorts of engineers and designers.
6. **Customization and Personalization:** The IoT Shower Valve possesses a distinctive competitive advantage through its capacity to save and retrieve personalized customer preferences. The concept of customization aligns with the growing need for personalised experiences and is especially attractive to technologically proficient individuals who are seeking intelligent solutions that are in line with their way of life.

   In summary, the results of the research exhibit significant potential in addressing practical challenges within the field of industrial design through the integration of technical advancements and user-centric considerations. The integration of voice commands, body detection, and automatic temperature adjustment in the IoT Shower Valve serves as a prime example of how technology can be utilized to augment daily experiences, foster sustainability, and tackle urgent issues. The potential of this innovation to revolutionize the manner in which individuals engage with shower systems extends well beyond the confines of academia, thereby offering significant contributions to both the industrial sector and society as a whole.

9 References

[1] Delta Faucet T27967 Ara Angular Modern Monitor 17 Series Valve Trim with 6-Setting Integrated Diverter, [Online]. Available: https://www.efaucets.com/detail.asp?product_id=T27967, accessed on 2018.

[2] Thermostatic vs Pressure Balance Shower Valves: What's the Difference?, [Online]. Available: https://www.yliving.com/blog/thermostatic-vs-pressure-balance-shower-valves, accessed on 2018.

[3] E. Chobot, D. Newby, R. Chandler, N. A. Mulaweh, C. Chen, and C. P. Ráez, "Design and implementation of a wireless sensor and actuator network for energy measurement and control at home" International Journal of Embedded Systems and Applications (IJESA), vol. 3, no. 1, pp. 1 – 15, accessed on 2013.

[4] Iswanto and H.. Muhammad, "Weather monitoring station with remote radio frequency wireless communications," *International Journal of Embedded Systems and Applications (IJESA)*, vol. 2, no. 3, pp. 99 – 106, accessed on 2012.

[5] C. Kavitha, A. V. Ramana, and S. S. Raj, "Embedded management system for out patient department," *International Journal of Embedded Systems and Applications (IJESA)*, vol. 2, no. 3, pp. 47 – 56, accessed on 2012.

[6] M. Ma, B. Hotrabhavananda, J. Hall and M. Skubic, "Assistive Adjustable Smart Shower System," *IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE)*, Philadelphia, PA, accessed on 2017, pp. 253-254.

[7] D. De Freitas Melo, E. De Souza Lage, A. V. Rocha and B. De Jesus Cardoso, "Improving the consumption and water heating efficiency in smart buildings," *13th International Conference and Expo on Emerging Technologies for a Smarter World (CEWIT)*, Stony Brook, NY, accessed on 2017, pp. 1-6.

[8] Y. Gao, D. Hou and S. Banerjee, "Fixture identification from aggregated hot water consumption data," *2016 IEEE International Smart Cities Conference (ISC2)*, Trento, accessed on 2016, pp. 1-6.

[9] Hydrao Smart Shower, [Online]. Available: https://www.hydrao.com/en/products/hydrao-shower-aloe, accessed on 2018.

[10] DreamSpa® AquaFan 12-inch All-chrome Rainfall Shower Head with Color-Changing LED/LCD Temperature Display, [Online]. Available: http://www.ipshowers.com/dreamspa-aquafan-12-inch-all-chrome-rainfall-shower-head-with-color-changing-led-lcd-temperature-display, accessed on 2018.

[11] WaterHawk 6" Smart Rain Shower Head with Water Usage and Temperature LED Display, [Online]. Available: https://www.newegg.com/Product/Product.aspx?Item=0N3-00CA-00001, accessed on 2018.

[12] Amphiro a1 basic, [Online]. Available: https://www.amphiro.com/en/produkt/amphiro-a1-basic, accessed on 2018.

[13] YOO.MEE LED Thermometer Handheld Shower Heads, [Online]. Available: https://www.amazon.com/YOO-MEE-Temperature-Designed-Lifetime-Accessories/dp/B015MM9RIG, accessed on 2018.

[14] EvaDrop, [Online]. Available: http://evadrop.com, accessed on 2018.

[15] Moen U Shower Smart Home Connected Bathroom Controller, [Online]. Available: https://www.amazon.com/Moen-Connected-Bathroom-Controller-TS3302TB/dp/B01MY07CZG, accessed on 2018.

10 FYDP to CEP Mapping

The alignment of the Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve project with the characteristics outlined in the Continuous Engineering Problems (CEP) mapping is as follows:

S#	Attribute	Complex Problem	Targeted	Justification
1	Preamble	Yes		The project addresses complex engineering challenges related to automation, IoT integration, and user-centered design.
2	Range of conflicting requirements	Yes		The project involves integrating conflicting requirements such as personalized comfort and resource conservation.
3	Depth of Analysis required	Yes		The project requires abstract thinking to combine voice recognition, sensors, actuators, and IoT connectivity effectively.
4	Depth of Knowledge required	Yes		The project necessitates research-based knowledge in IoT, automation, sensor integration, and energy-efficient algorithms.

S#	Attribute	Complex Problem	Targeted	Justification
5	Familiarity of issues	Yes		The project tackles infrequently addressed challenges related to integrating voice control and body detection in shower systems.
6	Extent of application codes	Yes		The project extends beyond standard codes of practice as it incorporates novel elements like voice-activated controls.
7	Extent of stake-holder involvement	Yes		The project involves diverse stakeholders including users, engineers, designers, and potentially commercial partners.
8	Consequences	Yes		The project's outcomes hold significant consequences in terms of enhancing user experiences and contributing to water and energy conservation efforts.
9	Interdependence	Yes		The project integrates numerous component parts, including sensors, actuators, microcontrollers, algorithms, and communication modules, for a cohesive solution.

The Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve project aligns closely with the attributes of complex engineering problems outlined in the CEP mapping. It addresses multifaceted challenges that demand interdisciplinary expertise, original thinking, and a holistic approach to problem-solving. The project's potential impact extends to various stakeholders and societal aspects, making it a prime example of a continuous engineering problem with far-reaching implications.

11 FYDP to SDGs Mapping

The Voice-Activated, Body Detecting, and Auto Temperature Adjusting IoT Shower Valve project aligns with several Sustainable Development Goals (SDGs) due to its potential contributions to various aspects of sustainable development:

Goal#	Description	Justification
3	GOOD HEALTH & WELL-BEING	By providing a comfortable and hygienic showering experience, the project promotes well-being.
6	CLEAN WATER AND SANITATION	The project's water-efficient design supports sustainable water usage, contributing to this goal.

Goal#	Description	Justification
7	AFFORDABLE AND CLEAN ENERGY	The project's focus on energy-efficient algorithms aligns with the goal of sustainable energy access.
9	INDUSTRY, INNOVATION, AND INFRASTRUCTURE	The integration of innovative IoT technology showcases the potential of technology in infrastructure.
12	RESPONSIBLE CONSUMPTION AND PRODUCTION	The project's emphasis on water and energy conservation supports sustainable consumption patterns.
13	CLIMATE ACTION	The project's resource-efficient design and automation contribute to reducing carbon footprint.

While the project's primary focus is not directly linked to poverty alleviation, gender equality, or other specific goals, its contributions to water and energy efficiency, well-being, and innovative technology highlight its alignment with various SDGs. By promoting sustainable water and energy usage, enhancing user experiences, and

showcasing technological innovation, the project indirectly supports the broader agenda of sustainable development. Figure 1: The proposed smart showering system.

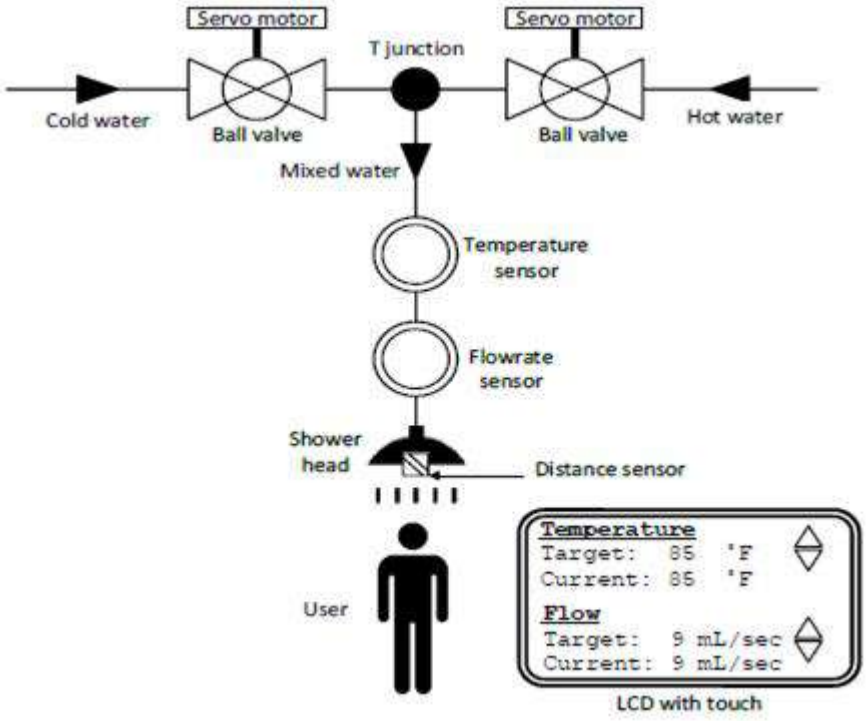

Figure 1. The proposed smart showering system.

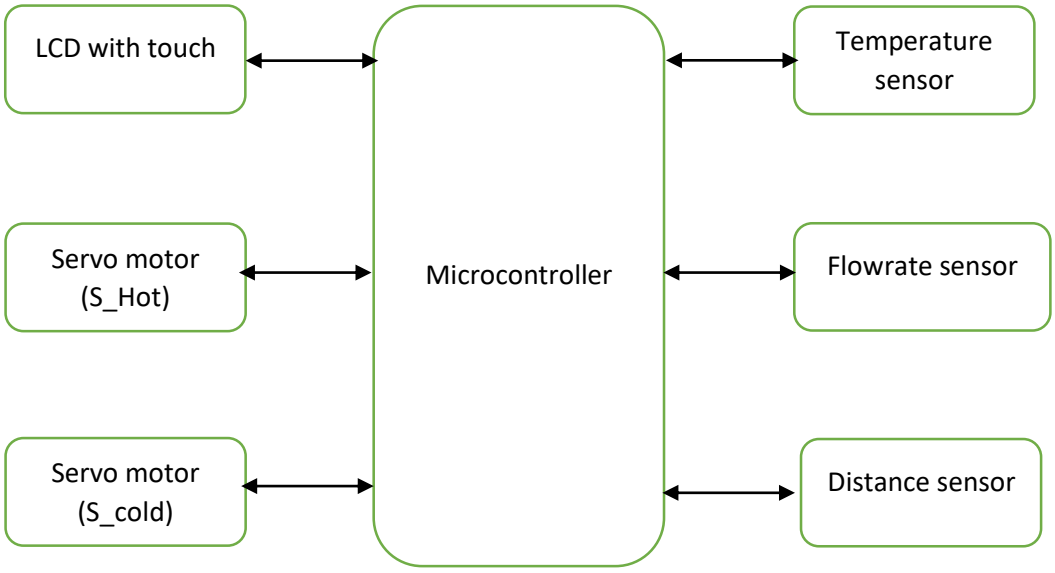

Figure:2 Block diagram of the hardware unit.

Annexure-i: Undertaking

This is to certify that to the best of my knowledge; the content of this project proposal is my own work. This proposal has not been submitted for any degree or other purposes. I certify that the intellectual content of this project is the product of my own work and that all the assistance received in preparing this proposal and sources have been acknowledged.

Signature of Student:- _____

Name of Students: - M.Ibrahim shah

Registration Numbers: - 20MDELE193

Signature of Student: - _____

Name of Students: - M.Sohaib

Registration Numbers: - 20MDELE155

Signature of Student: - _____

Name of Students: - Kamran khan

Registration Numbers: - 20MDELE124

Annexure-ii: Proposed Supervisor's Comments

Take recommendation of your supervisor for your project work here.

Please note the proposed supervisor may be changed on the recommendation of FYDP Committee and final approval of Chairman.

Signature of Supervisor_____.

Name of Supervisor_____.

Designation of Supervisor_____.

Annexure-iii: Comments of FYDP Coordinator

Comments of FYDP Coordinator in accordance with recommendations of FYDP Committee.

Signature of FYDP Coordinator: _____ Dated: _____

Annexure-iv: Approval by the Chairman of Department

Signature: _____ Dated: _____