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# Development Of a Liquid/Fluid Removing System Module For Medical Hospitals Using IoT

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## Abstract

In this paper, the development of an automatic fluid dispensing module for medical applications in the hospital zones using IoT concepts is presented. This project focuses on developing an automatic fluid dispenser designed to offer a seamless and hands-free fluid supply, eliminating the need for manual intervention. This technology is widely used in diverse environments, including households, offices, public spaces, and industrial settings. The dispenser operates through sensors, valves, and pumps to identify the presence of a container, such as a glass or bottle, and dispenses a pre-set amount of fluid. As technology progresses, automatic fluid dispensers are expected to evolve with advanced features like touchless interfaces, fluid purification systems, and remote connectivity for monitoring and control. Key advantages include hands-free operation, fluid conservation, user-friendliness, and the potential for integration with smart systems. The work carried out is the second semester mini-project by the students of Electronics & Communication Engineering under the guidance of the faculties.

## Introduction

In a fast-paced era marked by technological advancements and a growing emphasis on convenience and sustainability, the emergence of automatic fluid dispensers represents a significant solution catering to specific needs and broader environmental considerations. These devices introduce a substantial advancement in the fluid supply system by eliminating the requirement for manual intervention while promoting efficient fluid usage and reducing plastic waste. The conventional practice of pouring fluid from a tap, while straightforward, often leads to inconvenience and limitations, particularly in settings with high hydration demands, such as households, offices, educational institutions, and public areas.

Automatic fluid dispensers provide a seamless and user-friendly alternative, employing sensor-based mechanisms to detect container presence and dispense the appropriate amount of fluid as needed. This not only simplifies the fluid retrieval process but also enhances hygiene by minimizing contact points. Furthermore, as technology continues to progress, automatic fluid dispensers hold the potential for integration into smart home systems, contributing to the broader landscape of the Internet of Things (IoT).

This project utilizes an ultrasonic sensor in conjunction with an Arduino Nano microcontroller and batteries for power supply. Its primary objective is to offer a hands-free fluid supply experience. When the sensor identifies the presence of a container, the internal pump activates, pumping and delivering fluid through a designated pipe. It's important to note that this is a prototype model comprising essential components.

### Proposed methodology to develop the project

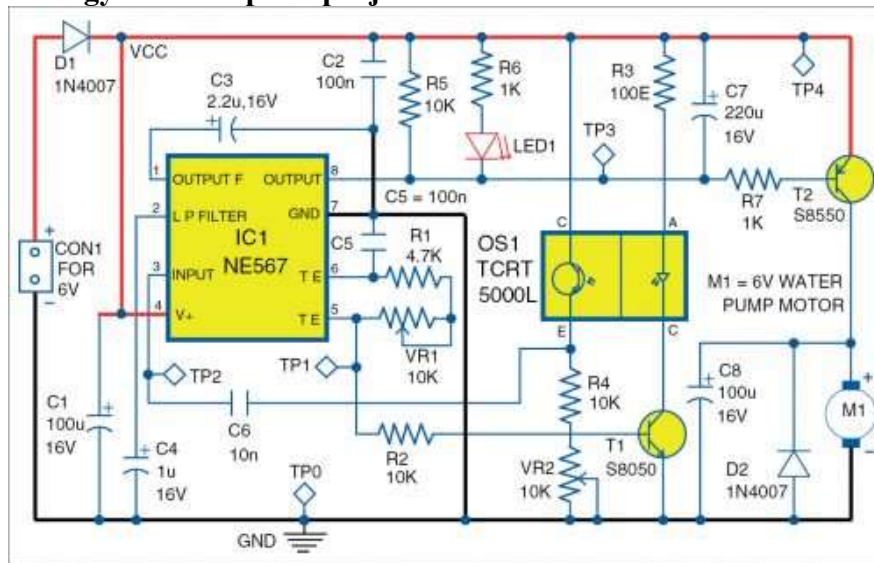


Fig. 1 : Circuit diagram for automatic fluid dispensing unit



Fig. 2 : Automatic liquid dispensing unit

### Conclusions

In conclusion, the development of the (fluid) removing system module for medical hospitals represents a significant advancement in the healthcare infrastructure. This project has successfully addressed the critical need for efficient and reliable fluid removal within medical facilities, offering several key takeaways. Overall, this project signifies a meaningful step toward improving healthcare facilities' operational efficiency, safety, and sustainability, ultimately benefiting both medical staff and patients. The successful development of this module underscores the potential for innovative engineering solutions to address critical challenges in the medical field.

### References

1. Pratik Kumar Singh, Prakhar Tibrewal, P.J. Mohammed Shoab, Naveen, Padmavathi M., Dr. T.C.Manjunath, "A Raspberry Pi-based Private Cloud System for Remote Data Access", International Journal of Innovative Research in Technology, IJIRT, An International Open Access, Peer-reviewed, Refereed Journal, Impact Factor 7.376, UGC approved journal no. 47859, ISSN: 2349-6002, Unique Paper ID: 160208, Volume 9, Issue 12, pp. 1274 – 1280, May 2023.
2. Manoj Kumar J., Arpitha N., Darshan R., Narendra Babu C.B., Dr. Pavithra G., Dr. T.C.Manjunath, "Design & Development of A Multi-Functional Robot (MOB) For Military, Mining Applications And Disaster Rescue Operations In The Country – A Prototype", International Conference on Interdisciplinary Innovative Research and Studies (ICIIRS-2023) Jointly organized

- by JS University, Shikohabad and International Association of Research and Developed Organization with the collaboration of Conference World at International Centre Goa, Dona Paula, Goa, India, Paper Id 62, ISBN 978-93-91535-45-2, pp. 32-48, 1 April 2023.
3. Nandini C.R., Madhu Shree K., , Kumari Ayushi, Arpitha H.K., Jyothi Gutti, Keerthana M., Dr. Pavithra G., Dr. T.C.Manjunath, “A case study on circle detection & edge detection in gray scale images using digital image processing technique”, International Conference on Interdisciplinary Innovative Research and Studies (ICIIRS-2023) Jointly organized by JS University, Shikohabad and International Association of Research and Developed Organization with the collaboration of Conference World at International Centre Goa, Dona Paula, Goa, India, Paper Id 61, ISBN 978-93-91535-45-2, pp. 26-31, 1 April 2023.
  4. Niveditha K.M., Shrushti Pattar, Dr. Sindhushree M., Dr. Pavithra G, Dr. T.C.Manjunath, “Novel sensor based multi-layered mask design for usage by the human beings during the pandemic times”, International Conference on Interdisciplinary Innovative Research and Studies (ICIIRS-2023) Jointly organized by JS University, Shikohabad and International Association of Research and Developed Organization with the collaboration of Conference World at International Centre Goa, Dona Paula, Goa, India, Paper Id 59, ISBN 978-93-91535-45-2, pp. 16-25, 1 April 2023.
  5. Manoj Kumar J., Arpitha N., Darshan R., Narendra Babu C.B., Dr. Pavithra G., Dr. T.C.Manjunath, “Design & Development of A Multi-Functional Robot (MOB) For Military, Mining Applications And Disaster Rescue Operations In The Country – A Prototype”, Journal of Semiconductor Optoelectronics, Scopus Indexed Journal, SCI Q4, Vol. 41, No. 12, ISSN:1001-5868, pp. 1404-1419, Dec. 2022.
  6. Nandini C.R., Madhu Shree K., , Kumari Ayushi, Arpitha H.K., Jyothi Gutti, Keerthana M., Dr. Pavithra G., Dr. T.C.Manjunath, “A case study on circle detection & edge detection in gray scale images using digital image processing technique”, Journal of Semiconductor Optoelectronics, Scopus Indexed Journal, SCI Q4, Vol. 41, No. 12, ISSN:1001-5868, pp. 1398-1403, Dec. 2022.
  7. Niveditha K.M., Shrushti Pattar, Dr. Sindhushree M., Dr. Pavithra G, Dr. T.C.Manjunath, “Novel sensor based multi-layered mask design for usage by the human beings during the pandemic times”, Journal of Semiconductor Optoelectronics, Scopus Indexed Journal, SCI Q4, Vol. 41, No. 12, ISSN:1001-5868, pp. 1388-1397, Dec. 2022.
  8. Pratik Kumar Singh, P.J. Mohammed Shoaib, Prakhar Tibrewal, Naveen, Padmavathy M., Dr. T.C.Manjunath, “Recent advances in the development of data access system using remote means with raspberry pi & cloud computing”, International Conference on Advances in Engineering and Technology (ICAET-2023)”, Organized by RSP Conference Hub, Coimbatore, Tamil Nādu, India, RSP Conference Hub, Coimbatore, Tamil Nādu, India, Paper ID : 2305060, 27-28 May 2023.
  9. Nikhil Bhutra, Gaurav Singh, Madhur Mehta, Ohshin Bhat, Padmavathi M, Dr. T.C.Manjunath, “Establishment of Secure Network using Reinforcement Learning”, International Conference on Advances in Engineering and Technology (ICAET-2023)”, Organized by RSP Conference Hub, Coimbatore, Tamil Nādu, India, RSP Conference Hub, Coimbatore, Tamil Nādu, India, Paper ID : 2305061, 27-28 May 2023.
  10. Pratik Kumar Singh, Prakhar Tibrewal, P.J. Mohammed Shoaib, Naveen, Padmavathi M., Dr. T.C.Manjunath, “A Raspberry Pi-based Private Cloud System for Remote Data Access”, International Journal of Innovative Research in Technology, IJIRT, An International Open Access, Peer-reviewed, Refereed Journal, Impact Factor 7.376, UGC approved journal no. 47859, ISSN: 2349-6002, Unique Paper ID: 160208, Volume 9, Issue 12, pp. 1274 – 1280, May 2023.
  11. Satvik M. Kusagur, Dr. Arun Kumar G., Dr. T.C. Manjunath, “Modelling & Control of Multivariable Smart Structures Using Output Feedback”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13658-13665, 2023, doi: 10.48047/ecb/2023.12.si4.1241
  12. Rajashekher Koyyeda, Dr. T.C. Manjunath, “Designing an efficient standalone hybrid system incorporating PV, wind, and fuel cell technologies while considering partial shading conditions in

- PV and enhancing transient stability”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13647-13657, 2023, doi: 10.48047/ecb/2023.12.si4.1240
13. Dr. Prakash Kuravatti, Dr. Naveen S.M., Dr. P. Aruna, Dr. Archana H.R., Dr. Surendra H.H., Dr. Jyothi A.P., Dr. C.M. Joseph, Dr. Pavithra G., Dr. Sindhu Sree M., “Design & development of a nano antenna using chemical decomposition methods in IoT based nano-technology systems for energy harvesting for telecommunication sectors with AI-ML approach”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13638-13646, 2023
14. Aishwarya A., Avantika P., Indhudhara G.I. Kavya U., Dr. Sindhu Sree M., Dr. Pavithra G., Dr. T.C.Manjunath, “REFES - Robot Engineering Based Fire Evacuation System”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13630-13637, 2023
15. Charan Reddy N., Gopinath C., Jayashree K., Revati Hiremath, Dr. Pavithra G., Dr. Sindhu Sree M., Dr. T.C.Manjunath, “The AQUABOT : human body detection underfluid, fluid quality monitoring & marine boundary surveillance using concepts of artificial intelligence”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13621-13629, 2023
16. Lohit Nimbagal, Rahul M., Sneha N. Teggi, Sushmitha M.R., Dr. Pavithra G., Dr. Sindhu Sree M., Dr. T.C.Manjunath, “Design & development of a lunar rover (chandrayan type) for Indian Space applications”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13614-13620, 2023
17. J. Pavan Raju, Amrutha Bhat, Sindhu S., Sushmitha A.C., Dr. Sindhu Shree M., Dr. Pavithra G., Dr. T.C.Manjunath, “Conceptual development of nano route based synthetic RBC using chemical composition concepts”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13607-13613, 2023
18. Kavyanjali R, Mo Imran, Nalliboyina Yuva Raja Phani Kumar, Maria Dayana L.N., Dr. Pavithra G., Dr. Sindhu Sree M., Dr. T.C.Manjunath, “Design and implementation of smart prosthetic hand using Artificial Intelligence”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13598-13606, 2023
19. Joseph Walter A., Akshay D. Akamanchi, C. Karthik, Mangala Shashank, Dr. Pavithra G., Dr. T.C.Manjunath, “Design and development of terrain globetrotter BoT for different types of engg. Applications”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Vol. 12, Special Issue 4, pp. 13591-13597, 2023
20. Bindu K.R., Ashwini M., Divya K.K., Aishwarya C., Dr. Sindhu Sree M., Dr. Pavithra G., Dr. T.C. Manjunath, “Design & development of intelligent ambulance concept – AI and human interface technology”, Scopus Indexed Journal Article, SCImago Journal & Country Rank - Quartile 3 (Q3), SJR 2022 Rating 0.25, Journal of European Chemical Bulletin, Section A-Research paper, e-ISSN 2063-5346, H-Index 11, Received: 10.05.2023, Revised: 29.05.2023, Accepted: 09.06.2023, Vol. 12, Special Issue 9, pp. 177-188, 2023.