

**A Mini-Project report on,**

**“NextGen Cart – Shopping made smart and simple”**

**Automation and Robotics Department 2023-24**

**CERTIFICATE**



**This is to certify that Shrinidhi Mudhole - 01FE22BAR015, Nandeesh Tuppad - 01FE22BAR020, Vijay Totakar - 01FE22BAR023, Shwetha Halepujari - 01FE22BAR042 & Koushik Kamble - 01FE23BAR413 have successfully submitted the project titled “NextGen Cart – Shopping made smart and simple” as the part Mini Project course for the academic year 2024-25 Odd.**

**Guide, Head of the Department**

**Dr.Vinodkumar Meti Prof. Sachin Karadgi**

**Examiners Signature: 1.**

**2.**

**Automation and Robotics Department**

**2023-24**

**Student Declaration**

We the students of Automation and Robotics, 5TH semester declare that all the sheets, CAD, report files and images submitted to department as a part of Mini Project are solemnly modelled, captured and generated by us.

We hereby declare that we have not copied any files or reused the existing ones submitted at any level of course or competitions. The course in-charge, department and University can use the report, models & files for any academic purpose and issues rising out of any copy-right infringement will be liable to us.

Team Number: 10

|  |  |  |
| --- | --- | --- |
| **Student Name** | **SRN** | **Signature** |
| Shrinidhi Mudhole | 01FE22BAR015 |  |
| Nandeesh Tuppad | 01FE22BAR020 |  |
| Vijay Totakar | 01FE22BAR023 |  |
| Shwetha Halepujari | 01FE22BAR042 |  |
| Koushik Kamble | 01FE23BAR413 |  |

**Acknowledgment**

We would like to thank the KLE Technological University for providing an opportunity and pedagogical improvement which helped us to get a hands-on experience in the 5th semester level.

We would thank our HOD, Prof. Sachin Karadgi for the competitive changes in curriculum and keeping the course content updated as per the industry requirement and standards.

We would thank our guide Dr. Vinodkumar Meti for his involvement and guidance throughout the course.

We would provide our heartly thanks to the faculty in-charge, Mr. Girish Karikatti, & Mr. Prashant Udapudi for their continuous involvement, assigning challenging tasks and quite an ease of delivery of content. The examples taken up in- session were easy to understand and practice, demonstrated all the tools required for the project fulfillment.

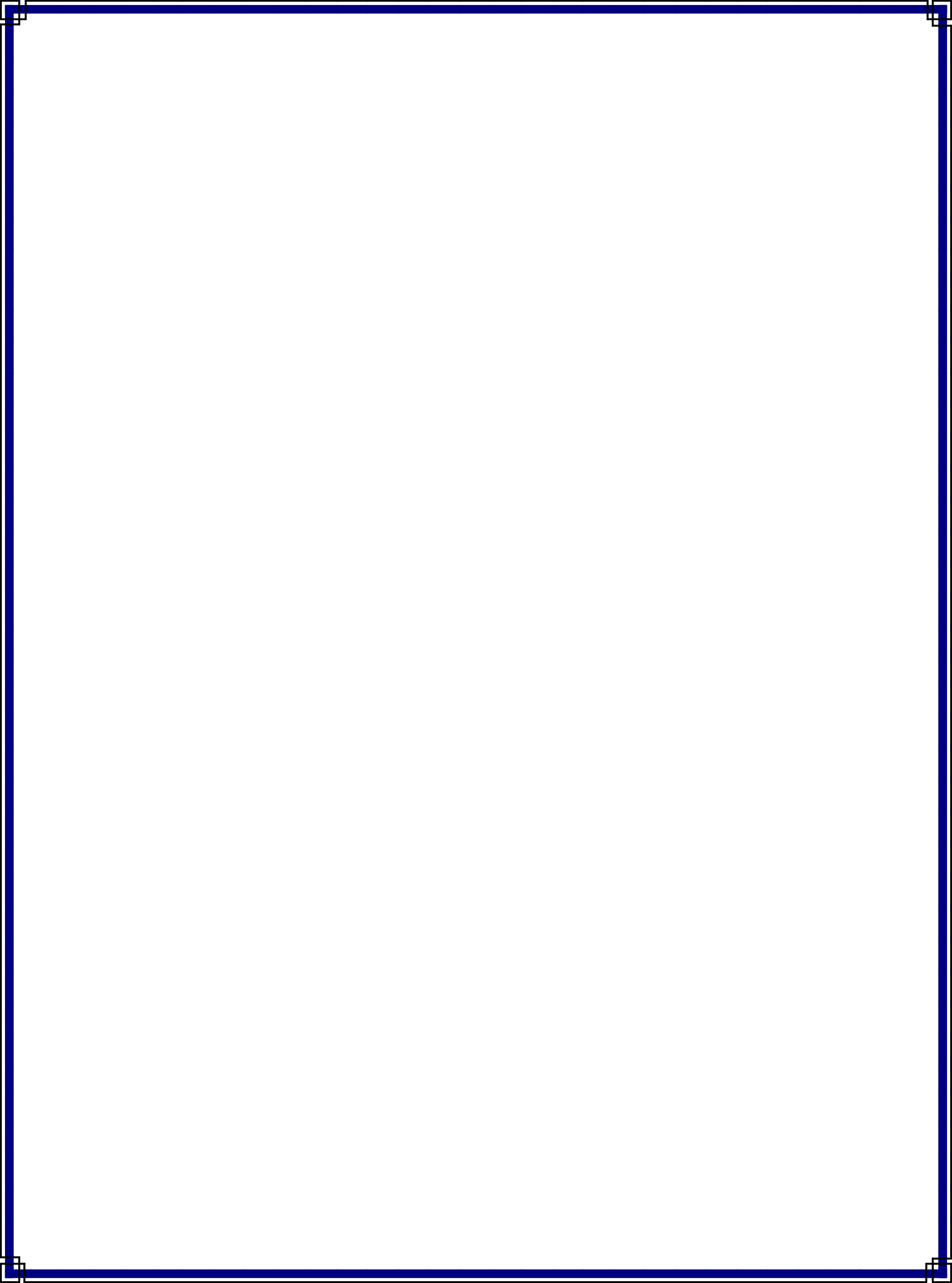
We thank all the staff members of A&R, our parents and teammates for the support and blissful guidance.

Shrinidhi Mudhole- Nandeesh Tuppad- Vijay Totakar- Shwetha Halepujari- Koushik Kamble-

**INDEX**

|  |  |  |
| --- | --- | --- |
| **SL. No.** | **Content** | **Page No.** |
| 1 | Theme | 1 |
| 2 | Problem Identification | 2 |
| 3 | Introduction to Design Thinking | 3 |
| 3.1 | Stakeholder Map | 3-4 |
| 3.2 | Stakeholder Persona’s | 4-7 |
| 3.3 | Empathy Map | 8-9 |
| 3.4 | User need statements | 10-11 |
| 3.5 | Generating requirements | 12-13 |
| 3.6 | Demands and Wishes | 13-15 |
| 3.7 | Prioritizing requirements | 16 |
| 4 | Mechatronics System Design | 17 |
| 4.1 | MATLAB requirement toolbox | 17 |
| 4.2 | MATLAB Architecture | 18 |
| 4.3 | Morphological chart | 19-20 |
| 4.4 | Conceptual Designs | 20-22 |
| 4.5 | Concept Evaluation | 22 |
| 4.5a | Concept Screening | 22 |

|  |  |  |
| --- | --- | --- |
| 4.5b | Concept Scoring | 23 |
| 4.5c | Finalized concept | 23-28 |
| 4.6 | Flow chart | 28 |
| 4.7 | Bill of Materials(BOM) | 29 |
| 4.8 | Circuit design | 29 |
| 5 | Prototyping | 30-33 |
| 6 | Testing | 33-34 |
| 7 | Conclusion | 34 |
| 8 | Team Details | 35 |
| 9 | Portfolio | 36 |



**List of Figures**

|  |  |  |
| --- | --- | --- |
| **Figure Number** | **Figure Name** | **Page No.** |
| 3.1 | Stakeholder Map | 3 |
| 3.2a | Primary Stakeholder-1 | 4 |
| 3.2b | Primary Stakeholder-2 | 5 |
| 3.2c | Primary Stakeholder-3 | 5 |
| 3.2d | Secondary Stakeholder-1 | 6 |
| 3.2e | Secondary Stakeholder-2 | 6 |
| 3.2f | Tertiary Stakeholder-1 | 7 |
| 3.2g | Tertiary Stakeholder-2 | 7 |
| 3.3a | Primary Stakeholder Empathy Map | 8 |
| 3.3b | Secondary Stakeholder Empathy Map | 8 |
| 3.3c | Tertiary Stakeholder Empathy Map | 9 |
| 3.7 | Prioritizing requirements(MOSCOW Prioritization) | 16 |
| 4.2a | Logical Architecture | 18 |
| 4.2b | Functional Architecture | 18 |
| 4.4a | Conceptual Design 1 | 20 |

|  |  |  |
| --- | --- | --- |
| 4.4b | Conceptual Design 2 | 20 |
| 4.4c | Conceptual Design 3 | 21 |
| 4.4d | Conceptual Design 4 | 21 |
| 4.4e | Conceptual Design 5 | 22 |
| 4.5c(i) | Detailed design | 23 |
| 4.5d(i) | Base frame | 24 |
| 4.5d(ii) | Basket | 24 |
| 4.5d(iii) | Buzzer | 25 |
| 4.5d(iv) | Display support | 25 |
| 4.5d(v) | Geared motor | 26 |
| 4.5d(vi) | LCD display | 26 |
| 4.5d(vii) | Side frame | 27 |
| 4.5d(viii) | Top frame | 27 |
| 4.5d(ix) | Ultrasonic sensor | 28 |
| 4.6 | Flow chart | 28 |
| 4.8 | Circuit Diagram | 29 |
| 5.1 | Images of prototype | 30-31 |
| 5.2 | Images in operating condition with user | 31-33 |

|  |  |  |
| --- | --- | --- |
| 8 | Team Photo | 35 |

**List of Tables**

|  |  |  |
| --- | --- | --- |
| **Table Number** | **Table Name** | **Page No.** |
| 3.4 | User need statements | 10-11 |
| 3.5 | Generating Requirements | 12-13 |
| 3.6 | Demands and Wishes | 13-15 |
| 4.1 | MATLAB requirement toolbox | 17 |
| 4.3 | Morphological chart | 19-20 |
| 4.5a | Concept screening | 22 |
| 4.5b | Concept Scoring | 23 |
| 4.7 | Bill of Materials(BOM) | 29 |
| 8 | Team details | 35 |

**KLE Technological University, Hubballi-580031**

Department of Automation & Robotics Page **1** of **77**