KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY
Indian Institute of Science campus, Bengaluru
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Website: www.kscst.org.in/spp.html or https://kscst.karnataka.gov.in/en

FORMAT FOR STUDENT PROJECT PROPOSAL FOR THE 47thSERIES OF STUDENT PROJECT PROGRAMME

(Handwritten proposals will not be accepted, please fill all the details in this MS word file, insert images / diagrams wherever necessary. Convert to pdf file, get it approved from the project guide / head of the department and principal of your institution.Keep ready the scanned pdf file of 1) Declaration and Endorsement 2) details of processing fees made and fill-up the Google Form.

https://forms.gle/mE8Q4pM2nwZQuHbi9

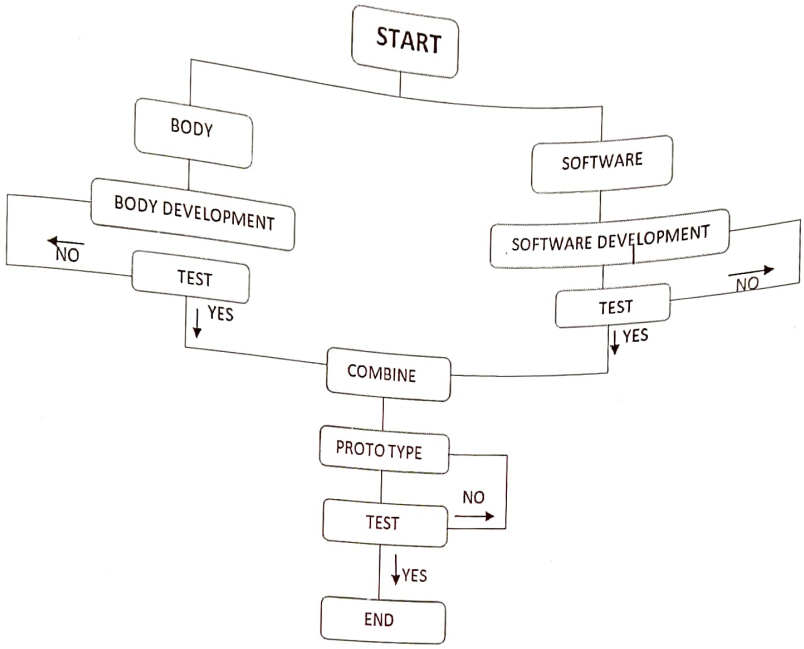
1.	**Name of the College: Visvesvaraya Technological University**
2.	**Project Title: "Design and Development of a versatile Humanoid Service Robot."**
3.	**Branch: Robotics and Automation**
4.	**Theme (as per KSCST poster):** **(The project proposals shall mandatorily be from one of the broad themes / areas. Visit website www.kscst.org.in/spp.html)** **Robotics**
5.	**Name(s) of project guide(s):** **1. Name: Dr. Anil Pol** **Email id: anilpol@vtu.ac.in** **Contact No.: 9738480136**

6.	**Name of Team Members (Strictly not more than four students in a batch):** *(Type names in Capital Letters as provided in your college)* (Please paste the latest passport size photograph adjacent to your respective names) 1. Name: **Chinmayagouda Nagangouda Patil**  USN No.: **2XV20RA004** Email id:**chinmayp907@gmail.com** Mobile No:**6363402489** 2. Name: **Sumant S Malaji**  USN No.:**2VX21RA408** Email id:**sumantmalaji35@gmail.com** Mobile No.: **6360454423** 3. Name: **Yogesh Sham Badiger**  USN No.: **2VX20RA012** Email id: **yogeshbadiger255@gmail.com** Mobile No.:**8277710177** 4. Name: **Divya L Hegde**  USN No.: **2VX20RA005** Email id: **hegdedivya408@gmail.com** Mobile No.: **9113674594**
7.	**Team Leader of the Project:** **Name:** Chinmayagouda Naganagouda Patil  **USN No.:** 2XV20RA004 **Email id:** chinmayp907@gmail.com **Mobile No:** 6363402489
8.	**Processing Fee Details (Through Online Payment only):** **(processing fee of Rs. 1000/-)** **Please furnish the payment details in the format provided in the last page of the proposal.**
9.	**Date of commencement of the Project:** 20 November 2023
10.	**Probable date of completion of the project:** 25 April 2024

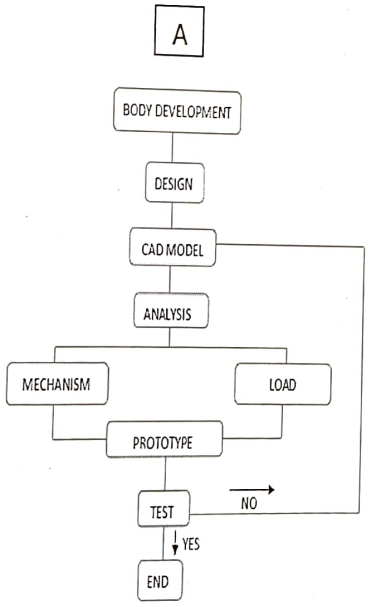
11.

Methodology:

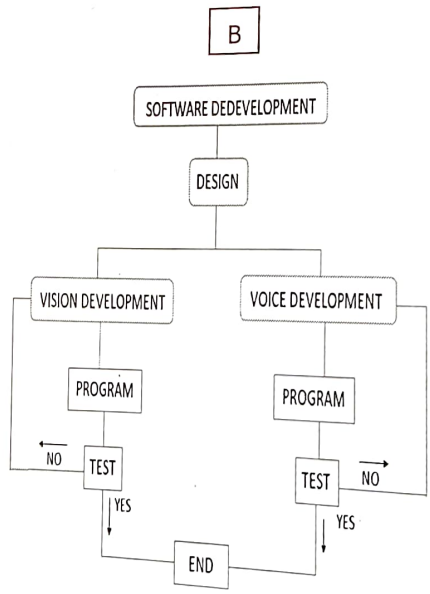
Robot Working methodology:



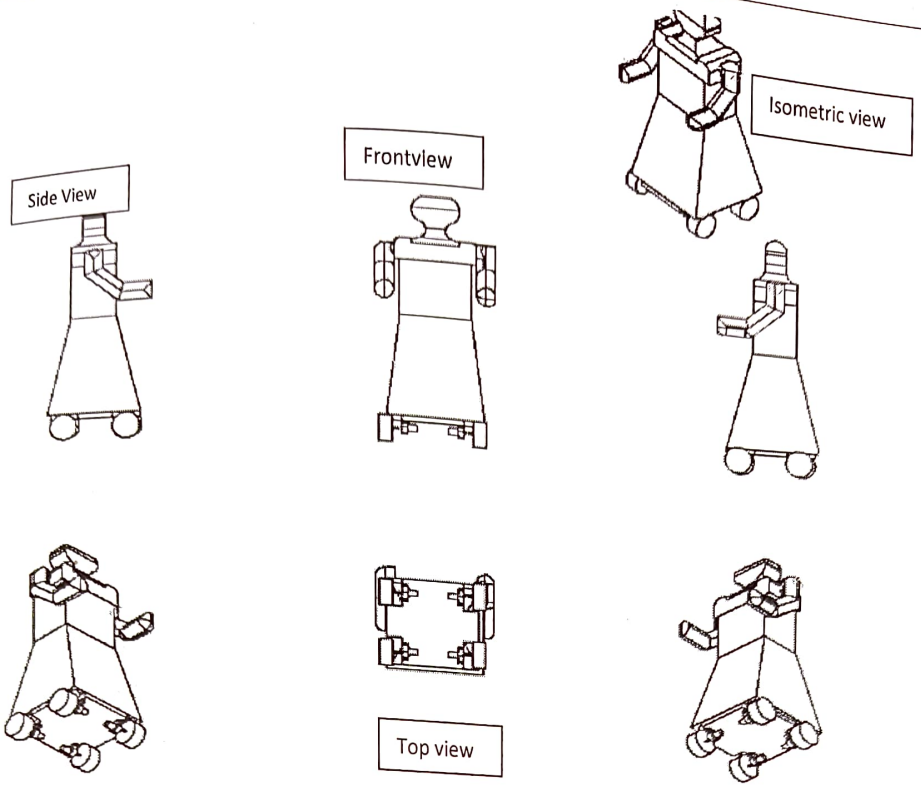
Fig(1.1). block diagram for overall manufacturing



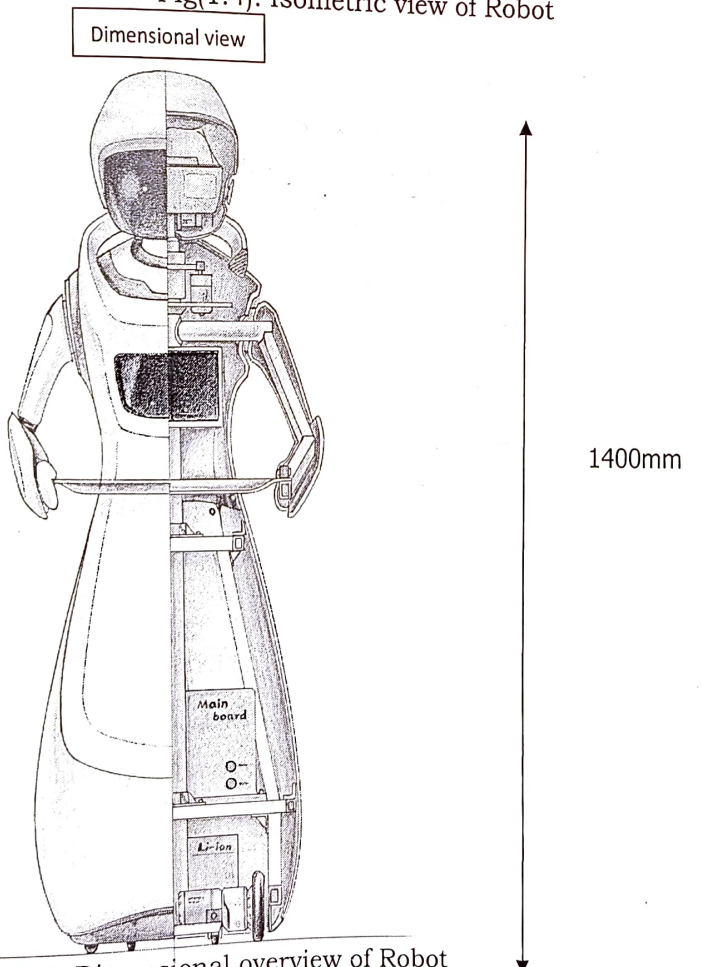
Fig(1.2). Block diagram for body development



Fig(1.3). Block diagram for software development



Fig(1.4). Isometric view of Robot



Fig(1.5). Dimensional overview of Robot

12. **Expected Outcome of the project:**

- Users will experience a personalized and engaging interaction with the humanoid service robot, as it recognizes faces, detects emotions, and communicates through text-to-speech (Voice assistance).

- The robot's Omni-directional movement, line follower, and obstacle detection ensure it navigates easily, follows specified paths with line detection, enhancing its usability in extreme environments.

- The humanoid service robot can provide practical assistance by recognizing faces, responding to emotions, and using text-to-speech, making it a responsive and helpful assistant in users' daily routines.

- The robot's flexibility, with navigation, face recognition, and emotion detection capabilities, opens opportunities for applications in healthcare, hospitality, and customer service, demonstrating adaptability for varied tasks in different industries.

13. **Is the project proposed relevant to the Industry / Society or Institution?**
Yes / No: Yes

If Yes, please provide details of the Industry / institution and contact details:

1. Healthcare Industry:

- The robot could assist healthcare professionals by providing information, delivering messages, and offering companionship to patients. Emotion detection may be valuable in assessing patient's well being

2. Hospitality:

- In hotels or service-oriented businesses, the robot could guide guests, provide information, and even offer room service. Face recognition enhances personalized interactions, contributing to a positive customer experience.

3. Customer service:

- The robot's ability to recognize and respond to emotions, coupled with its text-to-speech capability, could be utilized in customer service settings, improving the quality of interactions and addressing user inquiries.

4. **Can the product or process developed in the project be taken up for filing a Patent?**

Yes / No:Yes

As the product which is going to build by the us is cost effective and the product can be assisted to all the need of humanity by doing little customization in the product. This can be support for the economically backward peoples and who need the assistant with the cheapest possible ways.

Prior Art search done?

Yes/No:No

Note: If your answer is "Yes", you may contact Patent Information Centre of KSCST. For more details, email: pic@kscst.org.in

15. **Budget details (break-up details should be given):**

Note:KSCST will provide nominal grant support for carrying out the project by students if selected by the project selection committee.

Budget	
a) Materials / Consumables	**Amount (Rs)**
1. Raspberry pi	8000/-
2. Esp32(2)	800/-
3. PI camera	1000/-
4. Servo motor(18)	10000/-
5. Speaker	1000/-
6. Microphone	1000/-
7. 3d printing	8000/-
8. Chassis	12000/-
9. Electronics(motors, motor driver, sensors, connectors, PCB, Servo pulse generator, buck convertor, cooling fan etc.)	15000/-
10. Battery (LIPO)	5000/-
b) Labor	2000-3000/-
c) Travel	1500-2000/-
e)Miscellaneous(nuts/bolts, adhesive, welding, soldering materials, miscellaneous)	3000-4000/-
Total (Rs)	70000-71000

Note : Above mentioned rate are as per market it may be going to change

16. **Any other technical details (Please specify):**

- The robot is equipped with a camera for facial recognition, Analog IR sensors for line following capability, ultrasonic sensor for obstacle detection, Bluetooth for serial communication wirelessly, a speaker for text-to-speech and a microphone for speech to text.
- It is equipped with a speaker to translate any text based output to us
- For facial recognition we have used a raspberry pi and a camera module as hardware and have coded in OpenCV using python language in Thonny software.
- It recognizes the face and takes his/her name if the face data is available in the memory
- For any obstacle coming in front of it we have placed ultrasonic sensor to detect it. If any obstacle is found then the robot either

changes its direction or stops until the obstacle moves

- For line following we have place 5 channel IR sensor array for easy detection and following and have used PID for coding and error correction
- For movement of the robot, we have used two powerful motors with an rpm of not more than 80rpm for smooth motion of the robot and also for improved torque. The powerful motors allow it to carry load and move freely without affecting its trajectory
- Whenever the robot is not following a line, it can be controlled via Bluetooth control via an app developed by us
- The app can be used to control every motion in the robot right from the eye movement to motor control
- The robot is equipped with emergency stop switch on the exterior for any emergency situations as a precaution
- It has supporter for it to balance the weight and to increase the payload capacity of the robot.
- The robot dimension is subjected to testing during the fabrication; however, we have assumed the dimension as 1400mm in height and a maximum of 20kg in weight with a payload capacity of minimum 10kg

17. **SPP Coordinator (Identified by the college):**

Note: To be identified by the principal of the institution. The project proposals must be submitted to KSCST through SPP coordinator designated by the principal.

Name: Prof. / Dr. / ~~Mr. / Mrs.~~ Anil Pol

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Contact No.: 9738480136

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Name of the Chairperson: **Dr. R.R Malagi**
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Contact No.:**94489078847**