

**KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY**

*Indian Institute of Science campus, Bengaluru*

Telephone: 080 -23600978, 23341652 || Email: spp@kscst.org.in

Website: www.kscst.iisc.ernet.in/spp.html or www.kscst.org.in/spp.html

**FORMAT FOR STUDENT PROJECT PROPOSAL FOR THE**

**45th SERIES 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. Send the softcopy of the project proposal including the three scanned pages and send the proposal (All information in one pdf file) by email to spp@kscst.org.in

https://forms.gle/9wriMyaKhBaGaWpw7

|  | **Name of the College: BMS Institute of Technology** |
| --- | --- |
|  | **Project Title: Pressure Ulcer Prediction and Prevention** |
|  | **Branch: Computer Science and Engineering** |
|  | **Theme (as per KSCST poster): Technologies relevant in the aftermath of Covid-19 (The project proposals shall mandatorily be from one of the broad themes/areas. Visit website www.kscst.org.in/spp.html)** |
|  | **Name(s) of project guide(s):**   1. **Name: Prof. Mrs. Durga Bhavani A**   **Email id: durga842004@bmsit.in**  **Contact No.: 89514 40755** |
|  | **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)    **Name: A Nitya Dyuthi  USN No.: 1BY18CS001**  **Email id:** [**nityaa55@gmail.com**](mailto:nityaa55@gmail.com)  **Mobile No:9353704080**    **Name: Khushwinder Singh**  **USN No.: 1BY18CS0074**  **Email id: khushwinder99@gmail.com**  **Mobile No.: 9354247571**    **Name: Likith S**  **USN No.: 1BY18CS081**  **Email id: likithsrinath2000@gmail.com**  **Mobile No.: 8310887310**    **Name: Prakhyat**  **USN No.: 1BY18CS108**  **Email id: prakhyat13@gmail.com**  **Mobile No.: 9632440294** |
|  | **Team Leader of the Project:**  **Name: A Nitya Dyuthi**  **USN No.: 1BY18CS001**  **Email id: nityaa55@gmail.com**  **Mobile No.: 9353704080** |
|  | **Processing Fee Details (Through Online Payment only):  (processing fee of Rs. 1000/-)**  **Please furnish the payment made details provided in the last page of this proposal.**  **Note:** (The student team shall furnish the details in the Google Form. It is informed to the students to 1) keep ready the project proposal and 2) make the payment made details for processing fees and 3) Enter the details in the Google Form on the same day of payment made to KSCST by NEFT / UPI payment). |
|  | **Date of commencement of the Project: 01-11-2021** |
|  | **Probable date of completion of the project: 01-06-2022** |
|  | **Scope / Objectives of the project:**  Due to the advent of COVID-19, the number of bedridden patients have soared. The lack of mobility and other important factors cause bedridden subjects to develop decubitus ulcers.  Decubitus Ulcers (DU) are dangerous and can have severe consequences, leading to long-term hospitalization. At more severe stages, bedsores become very painful, and the patient is at risk of surgery and even death. The goal of this project is to predict and prevent the formation of bedsores without human intervention. Prevention techniques in hospitals and retirement homes today are still traditional, where the healthcare personnel/caretaker spends a considerable amount of time regularly checking the status of their patients and their changes in body position and other body parameters. In the proposed system, data is gathered from an array of ambient pressure sensors to evaluate the vulnerable areas depending on the total time of impact and other factors.  The goals that we aim to achieve in the project are:   * Predict the occurrence of bedsores * Prevent the occurrence of bedsores * Eliminate the need for manual intervention in the prediction and prevention of bedsores |
|  | **Methodology:**  The proposed solution is divided into two parts: prediction and prevention. The prediction involves two factors: pressure and moisture. We propose monitoring the pressure values from Interlink Electronics FSRTM 400 (pressure sensor) in real-time and comparing it against a set threshold value. If the threshold (400mm Hg) is crossed for a duration of time (4 to 6 hours), we take action that will be explained. For the moisture component, we measure the value via the moisture sensor and using the data and the trained model, we predict the formation of a DU.  The main goal in prevention is to reduce pressure and that can be done either by increasing the area of contact or decreasing the force on the body part. Moisture increases as the area of contact increases and so, the chances of a DU increase. We must consider moisture and pressure in preventing a DU.  **Note:** In case of fabrication work in the project, an engineering drawing with dimensions / detailed design should be attached to the proposal. |
|  | **Expected Outcome of the project:**  The problem can be solved by using an IoT-based approach utilizing an array of pressure and moisture sensors for prediction and prevention. It uses a notification service to alert caretakers/healthcare personnel to take appropriate steps. The project also aims to minimize human intervention in monitoring and controlling decubitus ulcers using intelligent cushions that can be altered automatically based on the real-time pressure and moisture sensor values. Predicting the pressure ulcers will enable providing a good practice on bed condition for rehabilitation and accelerate safe and smooth support in bed-to-ambulation movement. This low-cost approach reduces costs and is better not just economically but also relieves the physical and psychological burden of caregivers. |
|  | **Is the project proposed relevant to the Industry / Society or Institution?**  **Yes / No:** Yes, as the project helps people with lesser mobility to not contract pressure ulcers.  **If Yes, please provide details of the Industry / institution and contact details:**  The project will help hospitals by reducing overheads caused by pressure ulcers and help patients by reducing the number of ailments to recover from.  It will help healthcare workers and caretakers to focus on the patient's recovery rather than on treating bedsores. The precious time that could be spent on treating the actual condition rather than bedsores. The data that we require for conducting this project is collected via our contact at Gandhi Medical College, Bhopal. (Dr. Ravpreet Kaur, +91 9379509282)  (**Note:** Preference will be given to those projects relevant to the industry/institution. Hence be specific in giving detailed information). Is the industry extending support - technology/funds / use the final product, please specify. |
|  | **Can the product or process developed in the project be taken up for filing a Patent?**  **Yes / No: Yes**    **Prior Art search done?**  **Yes/No: Yes**  **Note:** If your answer is “Yes”, you may contact the Patent Information Centre of KSCST. For more details, email: pic@kscst.org.in |
|  | **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** | **Amount** | | --- | --- | | a) Materials / Consumables (Please specify) | 47,000.00 | | b) Labor (Describe) | 20,000.00 | | c) Travel (Describe) | 10,000.00 | | e) Miscellaneous (Please specify) | 20,000.00 | | **Total** | 97,000.00 |  * **Labor:** The labor cost includes the cost that will be required to fabricate the mattress according to the project’s requirement and to get a bed that is according to the patient's need. * **Travel:** The travel cost includes the cost of going to the hospitals to get the data and test the final product from the subjects in hospitals and various old age homes where patients are bed ridden. It also includes the various travel charges incurred by the team members during the course of the project i.e. to various conferences, competitions, etc. * **Miscellaneous:** It includes various miscellaneous items like stationary, publication cost, small gift as a token of thank you to the subjects who provide us the data, etc. * **Materials Split up**  | **Name of Component** | **Number** | **Cost of item** | **Total Amount** | | --- | --- | --- | --- | | Arduino Uno R3 | 1 | 1400 | 1400 | | Interlink Electronics FSRTM 500 (pressure sensor) | 10 | 450 | 4500 | | SEN-13322 (moisture sensor) | 4 | 150 | 600 | | NodeMCU ESP8266 | 3 | 400 | 1200 | | NW miniature air pump 5V-6VDC 400KPa 370 | 2 | 5000 | 10000 | | DHT 11 Temperature and Moisture Sensor | 4 | 100 | 400 | | CJMCU-4051 74HC4051 8 Channel Analog Multiplexer/Demultiplexer Breakout Board for Arduino | 2 | 400 | 800 | | 24V DC Mini Solenoid Valve | 12 | 400 | 4800 | | Wires | Many | 300 | 300 | | Pipes and Blower | Few | 3000 | 3000 | | Bed Fabrication Materials | 1 | 20000 | 20000 | | **Total** |  |  | 47,000 | |
|  | **Any other technical details (Please specify):**    Fig. Architecture Diagram  The architecture of the system is   * Bed: a bed equipped with sensors and fabricated with air pockets. The bed is specially fabricated with air pockets situated evenly across and is equipped with sensors that monitor the various parameters mentioned in the previous sections. The pressure in the air pockets will be regulated based on real-time sensor readings * The sensor to monitor and measure pressure is Interlink Electronics FSRTM 400, a force-sensing resistor. To measure the skin moisture levels, we use the SEN-13322 moisture sensor and the DHT 11 for ambient moisture and temperature. NodeMCU ESP8266 is the microcontroller component to transmit data to the server and control the sensors via instruction. The 24V DC Solenoid Valve is used to inflate or deflate the air pockets to redistribute pressure. * The microcontroller is used to monitor the sensor readings and control the various components connected to it. The solenoid valve will also be controlled based on real-time sensor values. This will alter the pressure in the air pockets. The microcontroller also sends the sensor data to the server for analysis. The instructions are sent to the valves from the microcontroller * The server is used to host the web interface and also to perform analysis on the sensor data. The analysis outputs are sent over to the microcontroller to manipulate the valve movement. The server also enables connection to other nodes (devices) from where the bed sensor data can be accessed * The communication from the server to the nodes will be done exclusively via APIs that are secured with a user authentication layer |
|  | **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.**  **Email id:**  **Contact No.:** |

| **Name of the Project Guide:**  **Prof. Mrs. Durga Bhavani A** | **Name of the HOD:**  **Dr. Bhuvaneshwari C M** |
| --- | --- |
| **Email id: durga842004@bmsit.in** | **Email id:bcm@bmsit.in** |
| **Contact No.: 89514 40755** | **Contact No.: 9449811522** |

**DECLARATION**

**(From Project Students)**

(To scan this page and enclose in the project proposal)

We, the project team hereby declare that the details enclosed in the project proposal (Title of the Project: **Pressure Ulcer Prediction and Prevention**, Branch: **Computer Science and Engineering**, College: **BMS Institute of Technology and Management**) are true and correct to the best of our knowledge and belief and we undertake to inform KSCST of any changes therein in the project title, students name will be intimated immediately through project guide. In case any of the above information is found to be false or untrue or misleading, we are aware that we may be held liable for it. We hereby authorize sharing of the project information with this project proposal with the Karnataka State Council for Science and Technology, Bengaluru.

We are aware that the project team must exhibit / demonstrate the project in the nodal centre and interact regarding the project with the experts and to exhibit the project in the State Level Seminar and Exhibition (if selected). If the student team fails to attend the evaluation in the nodal centre or fails to attend the State Level Seminar and Exhibition, the supported project amount will be returned to KSCST.

We also hereby enclose the endorsement form to KSCST, Bengaluru.

**Name of the students with USN No. Signature with date**

1. A Nitya Dyuthi 1BY18CS001
2. Khushwinder Singh 1BY18CS074
3. Likith S 1BY18CS081
4. Prakhyat 1BY18CS108

| **(Name & Signature of Project Guide with Seal)** | **(Name & Signature of HOD with Seal)** |
| --- | --- |
| **Email id: durga842004@bmsit.in** | **Email id: bcm@bmsit.in** |
| **Contact No.: 89514 40755** | **Contact No.: 9449811522** |

**ENDORSEMENT**

**(From College, endorsement to be taken in the institution / Department Letter head)**

(To scan this page and enclose in the project proposal)

This is to certify that **1) Ms. A Nitya Dyuthi, 2) Mr. Khushwinder Singh 3) Mr. Likith S, 4) Mr. Prakhyat**, are bonafide student(s) of the Department of **Computer Science and Engineering**, in the degree program of our institution. If the project proposal submitted by these students under the 45th series of Student Project Programme is selected by KSCST, we will provide the requisite laboratory / Computer / infrastructure support in our college / Institution. Further we also take necessary steps to see that the project team will exhibit / demonstrate their project in the nodal centre and in the State Level Seminar and Exhibition (if selected). If the student team fails to send the completed project report or fails to attend the evaluation in nodal centre or fails to attend the State Level Seminar and Exhibition, the supported project amount will be returned to KSCST.

| **(Name & Signature of  Project Guide with Seal)** | **(Signature of HOD with Seal)** | **(Signature of the Principal with Seal)** |
| --- | --- | --- |
| **Email id: durga842004@bmsit.in** | **Email id: bcm@bmsit.in** | **Email id: principal@bmsit.in** |
| **Contact No.: 89514 40755** | **Contact No.: 9449811522** | **Contact No.:** |

**DETAILS OF PROCESSING FEES MADE THROUGH   
NEFT / UPI PAYMENT**

(**Note:** Include this page in the softcopy of the student project proposal. The student team shall furnish the details in the Google Form. It is informed to the students to 1) keep ready the softcopy of the project proposal and other documents and 2) Furnish the payment made details as processing fees and 3) update the details in the Google Form on the same day of payment made to KSCST by NEFT / UPI payment).

| 1. TITLE OF THE PROJECT | : | **Pressure Ulcer Prediction and Prevention** |
| --- | --- | --- |
| 1. NAME OF THE TEAM LEADER | : |  |
| 1. EMAIL ID | : |  |
| 1. CONTACT MOBILE NO. | : |  |

**PAYMENT MADE DETAILS**

| 1. BANK REF. NO. / UTR NO. / UPI No. (12 digits) | : |  |
| --- | --- | --- |
| 1. TRANSACTION ID | : |  |
| 1. NAME OF THE SENDER / ACCOUNT HOLDER and CONTACT NUMBER | : |  |
| 1. NAME OF THE BANK | : |  |
| 1. PROCESSING FEES | : | Rs. 1000/- |
| 1. DATE OF PAYMENT MADE | : |  |
| 1. TIME | : |  |
| 1. MODE OF PAYMENT MADE (NEFT / UPI, PLEASE SPECIFY) | : |  |

| (Name & Signature of  the team leader) | (Name & Signature of  Project Guide or HOD with Seal) |
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**KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY**

Indian Institute of Science campus, Bengaluru

**45th SERIES OF STUDENT PROJECT PROGRAMME (SPP)**

***(Note: This page is for information about bank details of KSCST to the student team and college / institution and not to include this page in the project proposal softcopy)***

**BANK ACCOUNT DETAILS OF KSCST**

| Name and address of the Institution | Karnataka State Council for Science and Technology, IISc Campus, Bangalore -560012 |
| --- | --- |
| Account holder’s name / Designation | Secretary, Karnataka State Council for Science and Technology |
| Bank Account No. & Name of the bank | Current A/C No. 0683201000024 Canara Bank, IISc Campus Branch, Bangalore-560012 |
| IFSC Code | CNRB0000683 |
| MICR Code | 560015023 |
| Bank Branch Address | Canara Bank, Indian Institute of Science, Bangalore-560012 |

