KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

Indian Institute of Science campus, Bengaluru

Telephone: 080 – 23341652, 23348848 || Email: spp@kscst.org.in
Website: www.kscst.org.in/spp.html or https://kscst.karnataka.gov.in/en

FORMAT FOR STUDENT PROJECT PROPOSAL FOR THE 49th SERIES OF STUDENT PROJECT PROGRAMME

(Handwritten proposals will not be accepted, pleasefill 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/iXiR81MyoLWn871x7

1.	**Name of the College:** **Hirasugar Institute of Technology, Nidasoshi.**
2.	**Project Title:** **Lung Cancer Detection using CT(Computer Tomography) Image Processing and Machine Learning**
3.	**Branch:** **Computer Science and Engineering**
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)** **Data Science, Cyber Security, Computing, Pattern Recognition and Image Processing, Signal Processing.**
5.	**Name of project guide:** **1. Name: Prof. M. G. Ganachari** **Email id: mgganachari.cse@hsit.ac.in** **Contact No.: +91 8904879471**
6.	**Name of Team Members (Strictly not more than four students in a batch):** **Name: AFTAB IRSHAD YARAGATTI** **USN No.: 2HN22CS005** **Email id: aftabyaragatti80@gmail.com** **Mobile No.: +91 6362099891** 

Name: LAXMI ASHOK BILUR
USN No.: 2HN22CS026
Email id: laxmibilur16@gmail.com
Mobile No.: +91 8310848293

Name: BHAGYASHREE SHARANAPPA POOJARI
USN No.: 2HN22CS013
Email id: bhagyapoojari1918@gmail.com
Mobile No.: +91 7204073517

Name: KAVITA KALAGOUDA DODAGOUDANAVAR
USN No.: 2HN22CS024
Email id: kavitadodagoudanavar74@gmail.com
Mobile No.: +91 6362388965

7. Team Leader of the Project:

Name: AFTAB IRSHAD YARAGATTI
USN No.: 2HN22CS005
Email id: aftabyaragatti80@gmail.com
Mobile No.: +91 6362099891

8. Processing Fee Details (Through Online Payment only):

(processing fee of Rs. 1180/-)

Please furnish the payment details in the format provided in the last page of the proposal.

9. Date of commencement of the Project:

04th August 2025

10. Probable date of completion of the project:

04th December 2025

11. Timeline Structure

Task	Start Date	End Date	Duration	Milestone achievable
Project Initiation	04/08/2025	10/08/2025	1 Week	Understood the problem of lung cancer and its medical importance and Identified key features of CT scan images for cancer detection.

					Conducted requirement gathering (software, dataset, libraries). Prepared initial project plan and workflow.
	Research Phase	11/08/2025	18/08/2025	1 Week	Reviewed research papers on lung cancer detection. Studied different ML/DL models: CNN, ResNet, Naïve Bayes. Understood CT scan image patterns (nodules, lesions, abnormal tissues).
	Development Phase	21/08/2025	20/09/2025	1 Month	Preprocessed CT images (resize, normalize, augmentation). Implemented CNN model for prediction. Implemented ResNet-based transfer learning model. Trained and validated models using dataset. Developed backend API using Python (Flask/FastAPI). Developed frontend using Node.js/HTML/CSS. Integrated prediction API with the frontend UI.
	Testing Phase	22/09/2025	06/10/2025	2 Weeks	Performed model testing using test dataset. Evaluated model accuracy, precision, recall, F1-score. Tested

						frontend–backend integration. Checked correct display of cancer prediction results. Fixed UI issues and API errors.
		Submission of PPT and Abstract to KSCST for conducting mid-term evaluation (Upload to Google Form)	Middle of March – 2nd Week of April 2026			
		Final Review	24/11/2025	25/11/2025	2 Days	Completed full implementation of Lung Cancer Detection system. Verified model performance (accuracy, precision, recall, F1-score). Ensured the CNN, ResNet, and NB models work as expected. Integrated frontend (Node.js) with backend (Python API) successfully. Improved UI/UX for clear display of prediction output. Performed end-to-end testing on sample CT scan images. Fixed bugs and optimized model prediction response time.
		Project Submission	27/11/2025	01/12/2025	5 Days	Prepared complete project documentation (report, abstract, methodology). Finalized project presentation slides for viva and demonstration. Conducted internal review

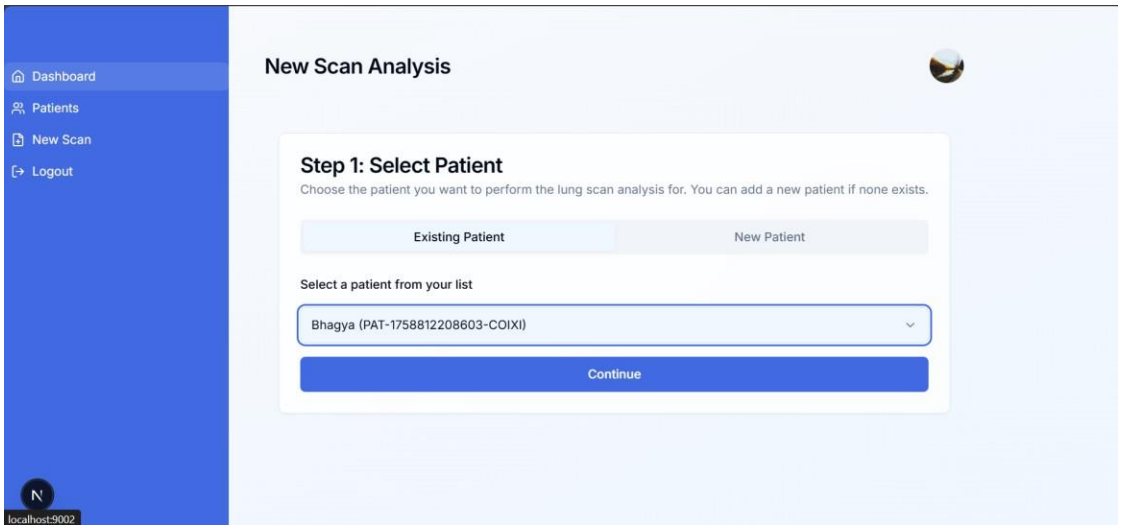
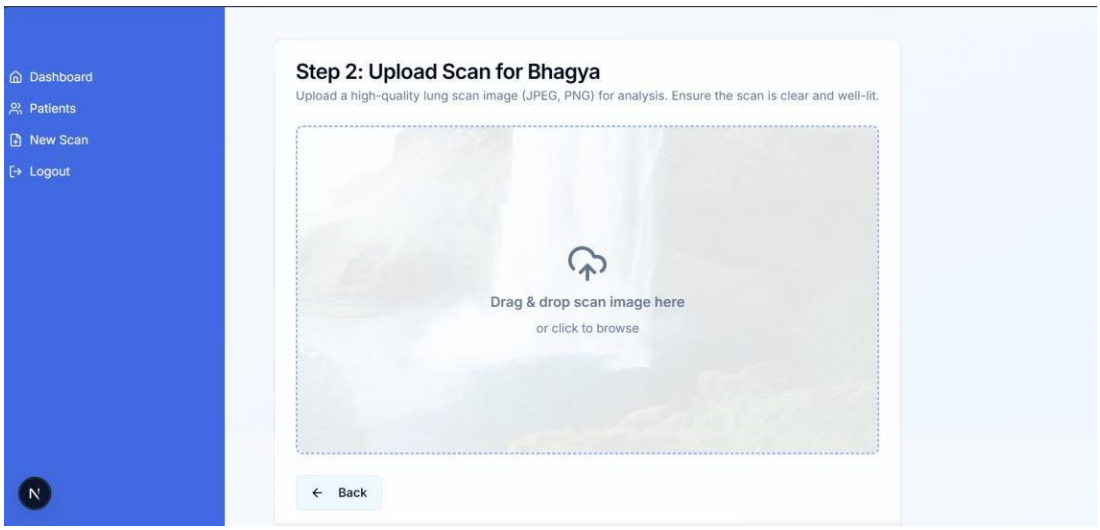
						with project guide and made corrections. Generated final results: "Potential cancer detected – 98% confidence". Submitted final code, report, PPT, and project files. Completed final project demo and viva successfully
		Submission of Project Completion Report to KSCST (Upload to Google Form)	April / May 2026			

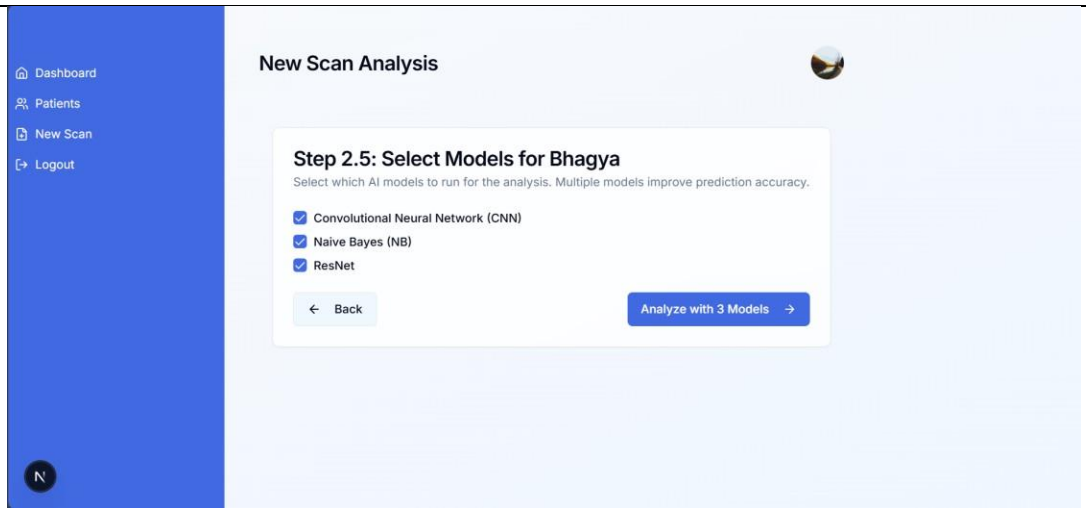
12. **Scope / Objectives of the project:**

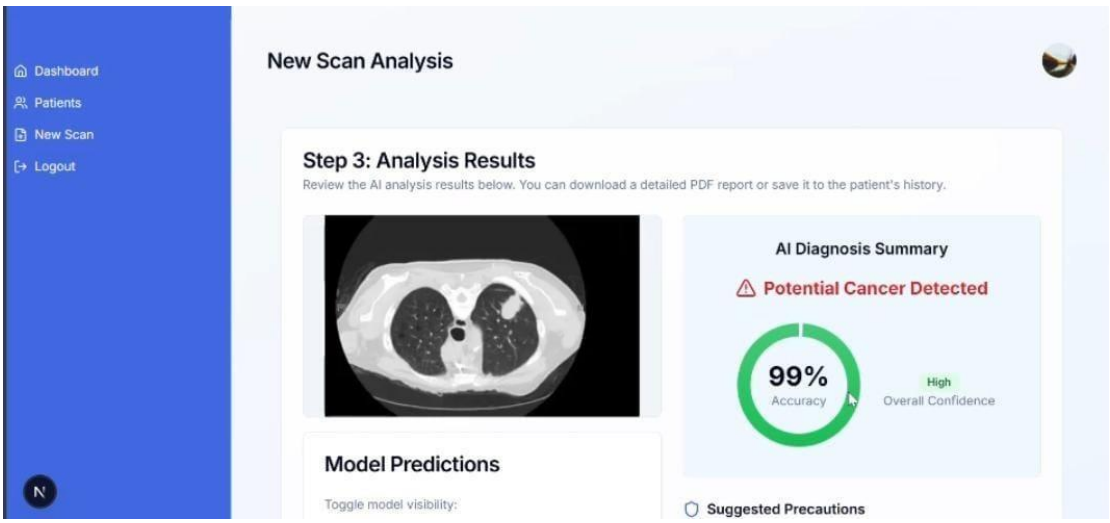
The project focuses on developing an intelligent lung cancer detection system using CT scan images by applying advanced Machine Learning and Deep Learning algorithms. The primary scope of the work is to create an automated and reliable prediction model that assists in the early identification of lung cancer, thereby supporting radiologists in decision - making. The system utilizes three approaches—Convolutional Neural Network (CNN), ResNet-based Transfer Learning, and Naïve Bayes—to analyze CT images and classify them based on potential cancerous patterns. The project involves collecting and preprocessing CT image datasets, training and evaluating multiple models, and selecting the most accurate one based on performance metrics such as accuracy, sensitivity, and specificity. A Python-based backend is developed to handle prediction requests, while a simple user interface enables users to upload CT images and receive a confidence-based output such as "Potential Lung Cancer Detected – 98% Confidence." The main objective is to design a scalable and efficient system that can process medical images with high precision, reduce manual errors, and support early detection. Although the system does not perform medical diagnosis, it serves as an assistive tool to enhance clinical workflows and contribute to improved healthcare outcomes.

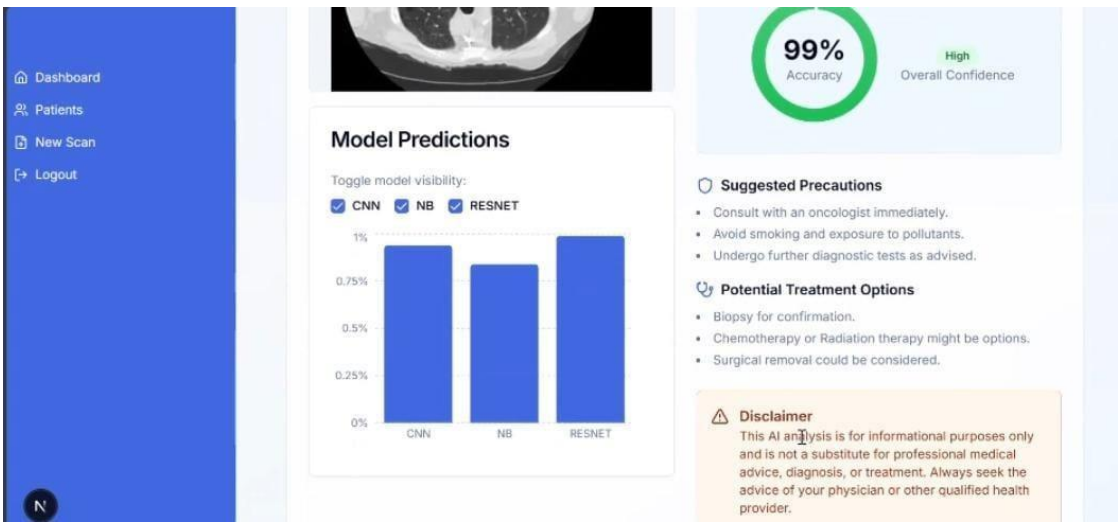
13. **Methodology:**

The methodology for the Lung Cancer Detection system using CT scan images is designed as a structured, multi-phase process that ensures accuracy, reliability, and scientific rigor. The project begins with the collection of CT scan images from publicly available medical datasets, followed by extensive preprocessing that includes resizing, normalization, noise reduction, and contrast enhancement to improve the clarity of lung structures. Once the data is prepared, three machine learning models—CNN, ResNet (Transfer Learning), and Naïve Bayes—are implemented. The CNN

	model is trained from scratch to learn spatial features, whereas the ResNet model leverages pre-trained deep learning layers to extract high-level image features, and the Naïve Bayes classifier is applied for baseline comparison. The models are trained, validated, and tested using a split dataset, and evaluation metrics such as accuracy, precision, recall, F1-score, and sensitivity are computed to determine their effectiveness. A Python -based backend is developed to integrate the selected model, allowing real-time prediction through an API. The frontend interface, built using Node.js/HTML, enables users to upload CT images and view model outputs with confidence scores. Finally, the complete system undergoes testing, refinement, and performance optimization before deployment, ensuring that the prediction results are clear, consistent, and clinically meaningful. Although the system does not replace medical diagnosis, the methodology ensures that it functions as an efficient assistive tool for early detection of lung cancer.
14.	**Expected Outcome of the project:**  







15.	**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: **Yes, the proposed project "Lung Cancer Detection Using CT Scan Images Using Machine Learning" is highly relevant to the healthcare industry, society, and academic institutions. Lung cancer is one of the leading causes of mortality worldwide, and early detection significantly improves survival rates. This project provides an automated, AI-based assistive tool that supports radiologists and hospitals by analyzing CT scan images and identifying potential cancerous patterns with high accuracy. The system reduces diagnostic workload, enables faster decision-making, and enhances healthcare delivery. It is also highly relevant to educational institutions as it demonstrates practical implementation of Machine Learning, Deep Learning, medical imaging processing, and full-stack development.** **Industry / Institution Supporting the Project (Academic Support):** **Department of Computer Science & Engineering** **Hirasugar Institute of Technology, Nidasoshi** **Hukkeri, Belagavi, Karnataka.** **Type of Support Provided:** **Technical guidance in machine learning and medical imaging** **Access to computing resources for model training** **Academic support for project design, development, and evaluation** **Mentorship for implementation and testing.**
16.	**Can the product or process to be developed in the project be taken up for filing a Patent?** **Yes / No: Yes** **The proposed system for Lung Cancer Detection Using CT Scan Images with Machine Learning Models (CNN, ResNet, NB) has potential for patent filing because it integrates a unique combination of deep learning–based image processing, multi-model analytical comparison, and real-time prediction delivery through an automated interface. If the final solution demonstrates a novel workflow, distinct feature extraction method, unique model integration, or innovative preprocessing pipeline, it can be considered patentable. Before filing, the novelty and originality of the approach must be verified through a prior-art search, and the institution can assist in the patent evaluation process. However, the system must not replicate existing patented technologies and should provide measurable technical improvement or uniqueness.**

Prior Art search done?

Yes/No: Yes

The proposed project, "Lung Cancer Detection Using CT Scan Images with Machine Learning," is highly relevant to the healthcare industry, medical imaging sector, and societal healthcare needs. Early detection of lung cancer significantly improves patient survival rates, and automated detection systems support radiologists by reducing manual errors and diagnostic time. The project aligns with institutional goals of promoting research in AI, healthcare innovation, and digital diagnostics.

17. 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)	4000.00
b) Labor (Describe)	1000.00
c) Travel (Describe)	3500.00
e) Miscellaneous (Please specify)	1500.00
Total	**10000.**00

18. Any other technical details (Please specify):

The Lung Cancer Detection system using CT scan images is designed as an end-to-end automated solution leveraging advanced Machine Learning and Deep Learning techniques. The project begins with the collection of CT scan images from publicly available medical datasets, followed by extensive preprocessing that includes resizing all images to a standard 224×224 resolution, normalization of pixel values, noise removal using Gaussian or median filters, and data augmentation techniques such as rotation, flipping, zooming, and shifting to enhance dataset diversity and prevent overfitting. Optional lung segmentation can be applied to focus the model on relevant regions. The system employs three machine learning models: a custom-built Convolutional Neural Network (CNN) trained from scratch to extract spatial features, a ResNet-based transfer learning model leveraging pre-trained weights for high-level feature extraction, and a Naïve Bayes classifier used as a baseline model. Hyperparameters such as learning rate, batch size, optimizer selection (Adam), and epochs are carefully tuned, and model performance is evaluated using metrics including accuracy, precision, recall, F1-score, sensitivity, specificity, and ROC-AUC. k-fold cross-validation and confusion matrices are used to ensure robustness and analyze false positives/negatives. The backend, developed using Python Flask/FastAPI, handles image input, preprocessing, model inference, and prediction output, while the frontend, implemented using Node.js/HTML/CSS, allows users to

	upload CT scan images and receive results with confidence scores, such as "Potential Lung Cancer Detected – 98% Confidence." The system architecture is scalable and can be retrained with additional datasets, and is designed to integrate with hospital PACS systems or telemedicine platforms in the future. Security and privacy are maintained by temporary storage of patient images, optional encryption for datasets, and compliance with standard data privacy guidelines. The deployment can be cloud-based for real-time usage, with regular updates and maintenance planned to ensure model accuracy, usability, and reliability. Overall, this technically comprehensive system provides an assistive tool for early lung cancer detection, reducing manual errors and supporting clinicians in decision-making.
19.	**SPP Coordinator (Identified by the college):** **Name: Prof. Mohan. S. Futane** **Email id: mohanfutane.mech@hsit.ac.in** **Contact No.: +91 9164105035**

(Name & Signature of
SPP Coordinator with Seal)
Email id: mohanfutane.mech@hsit.ac.in
Contact No.: +91 9164105035

(Name and signature of the
Project Guide with Seal)
Email id: mgganachari.cse@hsit.ac.in
Contact No.: +91 8904879471

DECLARATION

(From Project Students)

We, the project team hereby declare that the details enclosed in the project proposal (Title of the Project: **LUNG CANCER DETECTION USING CT(COMPUTER TOMOGRAPHY) IMAGE PROCESSING AND MACHINE LEARNING,** Branch: **COMPUTER SCIENCE & ENGINEERING,** College: **HIRASUGAR INSTITUTE OF TECHNOLOGY, NIDASOSHI BELGAUM**) are true and correct to the best of our knowledge and belief. We undertake to inform the Karnataka State Council for Science and Technology (KSCST) of any changes to the project title or team members' names immediately through our project guide or the SPP Coordinator of our institution.

Additionally, we declare that the project work is original and not a result of copying or purchasing. We are committed to completing the project independently, with support from our faculty and project guide, while utilizing the facilities provided by the college. We will not engage in plagiarism and pledge to be sincere and dedicated in executing and completing the project as proposed.

We understand that if any of the above information is found to be false, untrue, or misleading, we may be held liable. We authorize the sharing of the project information contained in this proposal with KSCST, Bengaluru.

We acknowledge that the project team must exhibit and demonstrate the project, participate in the mid-term evaluation of sanctioned projects, and engage with experts. Additionally, we must exhibit the project at the Annual State-Level Poster Presentation and Exhibition, if selected. Should our team fail to participate in the mid-term evaluation or the Annual Exhibition (if selected), we understand that the supported project funds will be returned to KSCST.

We also enclose the endorsement form for KSCST, Bengaluru.

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

1. AFTAB I YARAGATTI - 2HN22CS005
2. LAXMI A BILUR - 2HN22CS026
3. BHAGYASHREE S POOJARI - 2HN22CS013
4. KAVITA K DODAGOUDANAVAR - 2HN22CS024

(Name & Signature of SPP Coordinator with Seal)
Email id: mohanfutane.mech@hsit.ac.in
Contact No.: +91 9164105035

(Name and signature of the Project Guide with Seal)
Email id: mgganachari.cse@hsit.ac.in
Contact No.: +91 8904879471

ENDORSEMENT

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

This is to certify that 1) **Mr. AFTAB IRSHAD YARAGATTI,** 2) **Ms. LAXMI ASHOK BILUR,** 3) **Ms. BHAGYASHREE SHARANAPPA POOJARI,** 4) **Ms. KAVITA KALAGOUDA DODAGOUDANAVAR,** are bonafide students of Department of **COMPUTER SCIENCE & ENGINEERING,** in the degree program of our institution. If the project proposal submitted by these students under the 49th 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 mid-term evaluation of project and in the Annual State-Level Poster Presentation and Exhibition (if selected). If the student team fails to send the completed project report or fails to attend the evaluation in mid-term evaluation of sanctioned projects or fails to attend the Annual State-Level Poster Presentation and Exhibition (if selected), the supported project amount will be returned to KSCST.

(Name & Signature of Project Guide with Seal)	**(Name & Signature of SPP Coordinator with Seal)**	**(Signature of HoD with Seal)**
Email-id: **mgganachari.cse@hsit.ac.in**	**Email-id:** **mohanfutane.mech@hsit.ac.in**	**Email-id:** **svmanjaragi.cse@hsit.ac.in**
Contact No.: +91 8904879471	**Contact No.: +91 9164105035**	**Contact No.: +91 9986658309**

(Signature of the Principal with Seal)

Email-id:
kamateksk@rediffmail.com

Contact No.: +91 9535666217

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).

For finance related queries, please contact KSCST accounts section: 080 – 23341652, 23348848, email: finance@kscst.org.in

1. TITLE OF THE PROJECT	:	Lung Cancer Detection using CT(Computer Tomography) Image Processing and Machine Learning.
2. NAME OF THE TEAM LEADER	:	AFTAB IRSHAD YARAGATTI
3. EMAIL ID	:	aftabyaragatti80@gmail.com
4. CONTACT MOBILE NO.	:	+91 6362099891

PAYMENT MADE DETAILS

5. BANK REF. NO. / UTR NO. / UPI No. (12 digits)	:	346189913204
6. TRANSACTION ID	:	T251129190508349870 4159
7. NAME OF THE SENDER / ACCOUNT HOLDER and CONTACT NUMBER	:	Aftab Irshad Yaragatti +91 6362099891
8. NAME OF THE BANK	:	Union Bank of India
9. PROCESSING FEES	:	Rs. 1,180/- (Inclusive of 18% GST)
10. DATE OF PAYMENT MADE	:	29/11/2025
11. TIME	:	07:05 pm
12. MODE OF PAYMENT MADE (NEFT / UPI, PLEASE SPECIFY)	:	UPI - PhonePay

(Name & Signature of the team leader)

(Name & Signature of Project Guide / SPP Co-ordinator / HOD with Seal)