Summer Undergraduate Research Programme 2025

The Summer Undergraduate Research Programme (SURP) is part of the CREATE-DkIT project, which is co-funded by the Government of Ireland and the European Union through the ERDF Southern, Eastern & Midland Regional Programme 2021-27.

Project ID	SURP2506
Project Name	Analysing the Utility of Synthetic Data in Lung Cancer Detection
Applicant	Any Higher Education Intuition in the Republic of Ireland

Research Project's Aim and Objectives

This project aims to analyze the utility of synthetic data in lung cancer detection. Lung cancer is one of the leading causes of death worldwide. It is often diagnosed at later stages, where only limited treatment options are available. Artificial Intelligence (AI) models can help early detection by automating the screening phase for high-risk individuals. To train AI models, a large dataset is needed to represent diverse communities. These datasets are not readily available to the scientific community because of medical data privacy concerns. After the evolution of Generative AI, the focus is now on the application of synthetic data in medical system development. Therefore, this project focuses on analyzing the utility of synthetic data for lung cancer detection. In this project, some real-world lung cancer image datasets will be used to generate synthetic images, and then different AI models will be trained on both the real and artificial datasets to assess and compare their performance.

The intended objectives of the project are as follows:
1. Explore different image generation techniques (Generative AI algorithms) to generate a synthetic lung cancer detection image dataset.
2. Train different Machine learning (ML) and Deep learning (DL) models on both the synthetically generated datasets and real-world datasets to assess and compare the performance to draw feasible insights and conclusions.
3. This project will provide hands-on experience in AI image generation and model development, particularly using the Python programming language, which includes working with libraries such as TensorFlow, Keras, PyTorch, and CV, etc.
4. The selected candidate will also write technical documents reporting the overall results and findings adequately to the research community.
5. The candidate will also present the work to the RSRC group at the end of the internship. Also, a potential poster presentation at a good conference venue will provide an opportunity to collaborate with other researchers.

Profile of Student Needed

The candidate must meet the following requirements:
Mandatory:
Good computing skills
Intermediate coding skills in Python
Basic understanding of machine learning/ deep learning models
Basic understanding of image processing
Knowledge about Python Integrated Development Environment (IDE)

Other Desirable requirements:

Report writing skills.
Proficiency in MS Word, Latex/overleaf
Knowledge about image generation models

Location

On campus, Dundalk Institute of Technology

Informal Project Contact

If you have any questions about the project itself, please contact Dr Abhishek Kaushik: abhishek.kaushik@dkit.ie or Asifa Mehmood: asifa.mehmood@dkit.ie

Conditions

Conditions of the programme:
- To be eligible, students must be starting their 3rd or 4th year of an undergraduate programme in Semester 1 of 2025/2026
- This project is open to students registered at any Higher Education Institution in the Republic of Ireland
- Successful students will receive a weekly scholarship of €200
- Awarded students must attend virtual and in-person training held over the 8-week period, including an in-person induction on July 1st
- Awarded students must present a poster at a research dissemination event in October 2025

How to Apply

Using the Project ID in the subject line, please email your current CV, along with a cover letter, to Elaine O'Neill, Research Support Officer at elaine.oneill@dkit.ie by **12pm, Monday May 12th 2025**.

Interviews will take place in the week of May 19th.