BOOK OF ABSTRACTS

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Professor Asima Chatterjee Foundation Kolkata (PACFK),
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Asima Chatterjee

ICCHD-2025

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OP-14

Deep Learning and Nanotechnology: A Promising Avenue for the Human Lung Carcinoma Cells Classification and Diagnosis

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Abstract:

To diagnose lung cancer in its early stages and to track the disease while it is being treated, medical imaging technologies are crucial. Numerous medical imaging modalities have been thoroughly investigated for the detection of lung cancer, including molecular imaging approaches, chest X-rays, magnetic resonance imaging, positron emission tomography, and computed tomography. Among the drawbacks of these methods is their inability to automatically classify cancer images, making them inappropriate for patients with other diseases. The development of an accurate and sensitive method for the early detection of lung cancer is critically needed. With quickly developing applications across medical image-based and textural data modalities, deep learning is one of the medical imaging fields with the quickest rate of growth. Clinical professionals may identify and categorize lung nodules more rapidly and precisely with the use of deep learning-based medical imaging technologies. This study proposes a deep learning method for lung carcinoma cells [1a] detection that uses transfer learning-based snapshot ensemble technique. Therefore, the primary goal of this study was to validate and identify the best model for determining the prevalence of lung cancer disease using DL techniques and classification models. In this research, we used the LC25000 [1b] and Chest CT-scan images datasets [1c] along with some transfer-learning-based models incorporating the CBAM attention mechanism and used Snapshot Ensemble based Deep Learning Neural Network. After the successful classification of human lung carcinoma cells, we have also tried to develop a nontoxic nanocarrier for the successful delivery of a novel drug with enhanced efficacy against human lung carcinoma cells. A magnetic spinel ferrite nanocarrier has been developed and conjugated with the drug Ketoconazole (an antifungal drug) and the drug conjugated nanoparticles have been applied against the growth of the lung carcinoma cells. The drug shows a significantly enhanced anticancer activity after its conjugation with the nanocarrier. This study shows a new perspective in biomedical research for both the detection and treatment of lung cancer disease with enhanced efficacy and minimum side effects.

References

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OP-15

Different device applications based on PDI acceptors

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Abstract:

Perylenediimide based materials generally are soluble and air stable materials that can be tuned to get semiconducting property. A new material ANTPABA-PDI has been synthesized and utilized as an non fullerene acceptor in fabrication of inverted organic solar cells. In that fabrication P3HT has been used as donor material along with ANTPABA-PDI acceptor to deposit bulk heterojunction active layer. The power conversion efficiency of the as fabricated inverted structured solar cell is 1.7%. The fabrication and characterization process has been performed in open atmosphere. By increasing the conjugation in PDI moiety another symmetric PDI based compound has been designed and synthesized. This PDI based organic nanomaterial has been used as an acceptor material along with P3HT as donor to check its photoactivity and it has come out to be a suitable acceptor material for fabricating organic photodiode. The device structure of this photodetector is also inverted with ZnO as buffer layer. For both cases, the inverted structure reduces the recombination rate. In case of this photodiode, a very small amount of current (~nm) flows when the device is illuminated under solar simulator.

References

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