

MARINE ANTIOXIDANTS

PREPARATIONS, SYNTHESSES, AND APPLICATIONS

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Academic Press is an imprint of Elsevier
125 London Wall, London EC2Y 5AS, United Kingdom
525 B Street, Suite 1650, San Diego, CA 92101, United States
50 Hampshire Street, 5th Floor, Cambridge, MA 02139, United States
The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, United Kingdom

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ISBN: 978-0-323-95086-2

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Publisher: Nikki P. Levy
Acquisitions Editor: Simonetta Harrison
Editorial Project Manager: Clark M. Espinosa
Production Project Manager: Omer Mukhtar
Cover Designer: Mark Rogers

Typeset by MPS Limited, Chennai, India



CHAPTER 38

Boundary Exon Prediction in Human Sequences Using External Information Sources (Pages: 815-834)

Neelam Goel, Shailendra Singh, Trilok Chand Aseri

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Blood Glucose Prediction Using Machine Learning on Jetson Nanoplatfrom (Pages: 835-848)

Jivan Parab, M. Sequeira, M. Lanjewar, C. Pinto, G.M. Naik

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GIS-Based Geospatial Assessment of Novel Corona Virus (COVID-19) in One of the Promising Industrial States of India—A Case of Gujarat (Pages: 849-868)

Azazkhan I. Pathan, Pankaj J. Gandhi, P.G. Agnihotri, Dhruvesh Patel

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Blood Glucose Prediction Using Machine Learning on Jetson Nanoplatfrom

Jivan Parab ✉, M. Sequeira, M. Lanjewar, C. Pinto, G.M. Naik

Book Editor(s): Mukhdeep Singh Manshahia, Valeriy Kharchenko, Elias Munapo, J. Joshua Thomas, Pandian Vasant

First published: 11 February 2022 | <https://doi.org/10.1002/9781119792642.ch39> | Citations: 2

Summary

Monitoring blood glucose non-invasively is utmost important with good accuracy. Here, we developed a blood glucose monitoring system with 5-fixed LED wavelengths in Near-Infrared (NIR) region at 2.12, 2.24, 2.27, 2.31, and 2.33 μm as source of excitation. The Jetson Nano board having ARM Cortex A57 is used to control these LED sources. We have recorded 57 spectra on laboratory samples prepared which resembles the blood, having the proportion as per the major constituents (Glucose, Ascorbate, Urea, Lactate, and Alanine) present in the blood. Out of 57 spectra, 53 were used for calibration set and 4 were used for the validating the model. The Partial Least Square Regression (PLSR) prediction algorithms are developed in python and run on Jetson Nano board. With PLSR, the result of glucose prediction gave a Root Mean Square Error (RMSE) of 12.01 mg/dL, determination coefficient $R^2 = 0.97$, and accuracy of 90.14%. Since we require high accuracy, Backpropagation Artificial Neural Network (BP-ANN) model is developed on Jetson Nano board, which is specially designed standalone platform for Machine Learning (ML). This BP-ANN model is used to train the same 53 sample data sets and 4 for validating the model. Surprisingly, the results were so astonishing that it gave RMSE of 2.06 mg/dL, $R^2 = 0.99$, and accuracy of 98.65%. The system is validated with Clarke Error Grid Analysis (CEGA) and BlandAltman analysis.