

waste classification results and recycling information. We achieve power efficiency by integrating solar energy, which supports continuous outdoor deployment. Experimental results show high accuracy in waste classification, effective segregation, and sustainable recycling, reaching up to 80% accuracy in real-time. This work demonstrates the potential of AI-driven waste segregation systems to reduce landfill waste, minimize human intervention, and encourage eco-friendly recycling practices in domestic and urban settings.

77. COMPARATIVE CODON USAGE ANALYSIS BETWEEN VIRULENT AND NON-VIRULENT ESCHERICHIA COLI GENES USING BIOPYTHON

Amirtha Varshini P, Nethraa V S, Ramya Sathiyan, Priyadarshini K, Shantkriti S*

Department of Biotechnology, School of Biosciences and Technology, SRM Institute of Science and Technology (SRMIST), Tiruchirappalli Campus, 621105, Tamil Nadu, India.

The bias in codon usage demonstrates how evolution is able to adapt to genes and their expression. In this study, we investigated the codon usage of three virulence-associated genes (stx2A, eaeA, espA) of pathogenic Escherichia coli (E. coli O157:H7) and three housekeeping genes (recA, rpoB, gapA) present in non-pathogenic E. coli K-12, using Biopython. The GC content and GC3 bias were calculated for all the genes, where the virulence-associated genes had a lower GC3 content compared to housekeeping genes. Furthermore, the virulence genes were shown to influence codon preferences by optimizing for translational efficiency of virulence factors, while the non-pathogenic E. coli genes showed a more uniform codon preference. Importantly, this study highlights how bioinformatics and genomics tools can reveal certain signs of molecular adaptation even in limited comparative inference.

78. CYBERGUARDIAN AI SCAMSHIELD NETWORK

Akshayaa A.C (22617104), Abirutha.S (22617101), Sethu.S ME (Assistant professor)
vels institute of science technology and advanced studies – VISTAS

CyberGuardian AI ScamShield Network is a no-code/low-code project that aims to improve the security awareness and defensive skills of the users of digital transactions in India through the implementation of a multi-modal, interactive, and AI-driven tool for identifying, analyzing, and alerting users about the threats they might encounter. The rapid expansion of the online financial activities ecosystem results in users being exposed to the scam like phishing, identity theft, payment fraud, and incentive-based attacks that exploit the greed. The project mixes a plethora of user-interactive and AI-powered modules to provide the detection, analysis, and user education of the scam threats faced by them in a contextualized manner. One part of the platform is a multilingual chatbot that can grasp the content of suspicious messages in English, Hindi, and Tamil, and do the scam risk quick assessments for the users. A user-interactive scam is one of the simulators that performs numerous scenario-based quizzes on demand so users can understand and comprehend the common digital scam modes as well as practice safe digital usage. The risk predictor for transactions gives a risk rating for the target transaction by comparing historical data and making AI-based predictions. A Bricks-generated dynamic dashboard makes scam trends, risk distributions, and other transaction dataset visualizations in a more accessible and engaging way. Fraud Threat Radar that is made by Claude, NotebookLM, and Perplexity, gives graphics of scam distributions along with the areas where new kinds of threats have arisen. Moreover, by using Google My Maps, users can now seamlessly navigate the high-risk locations to discover any unusual activity, in addition to, local scam patterns. The collaborative hub that is aimed at building community trust, is