

CYBERGENAI'26 CONFERENCE PROCEEDINGS

CHENNAI RAMAPURAM



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4th INTERNATIONAL CONFERENCE

on

**CYBER SECURITY & GENERATIVE
ARTIFICIAL INTELLIGENCE
(CyberGenAI'26)**

IN ASSOCIATION WITH



MULTIMEDIA UNIVERSITY, MALAYSIA

&



MAJAN UNIVERSITY COLLEGE, OMAN

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OMAN**

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SRM Institute of Science and Technology-Ramapuram Campus

Bharathi Salai, Ramapuram,

Chennai – 600 089.

Website: <https://sites.google.com/view/srmist-rmp-mca/conference>

Mail-Id: coordinator.csa@fsh.srmrmp.edu.in



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EMAIL SPAM DETECTION USING SUPPORT VECTOR MACHINES AND NATURAL LANGUAGE PROCESSING

B .Kamatchy¹

Assistant Professor,
Department of Advanced Computing and Analytics,
Vels Institute of Science, Technology & Advanced Studies (VISTAS)
Email: kamatchi6282@gmail.com

N. Kalaichelvi²

Assistant Professor,
Department of Advanced Computing and Analytics,
Vels Institute of Science, Technology & Advanced Studies (VISTAS)
Email: dr.kalaichelvinagarajan@gmail.com

S. Muthukumaran³

Assistant Professor,
Department of Advanced Computing and Analytics,
Vels Institute of Science, Technology & Advanced studies (VISTAS)
Email: muthumphil11@gmail.com

ABSTRACT

The growing use of email communication has led to the massive influx of unwanted and viral communications otherwise known as spam. Spamming must be detected effectively to make sure that an email is not lost and that the email is secure. In this paper, an automated email spam solution has been introduced and it is based on Natural Language Processing (NLP) and a Multi- Kernel Support Vector Model (MK-SVM) model. Term Frequency Inverse Document Frequency (TF-IDF) technique is used to convert email text into numerical features and Support Vector Machines with Linear, Radial Basis Function (RBF), Polynomial, and Sigmoid kernels are used to do the classification. Each of the kernels is tested based on several metrics which include accuracy, precision, recall, specificity and errors rate. The experimental results indicate that the Linear and Sigmoid kernel SVMs are the most accurate in classification with a minimum error of 0.011, as compared to RBF and Polynomial kernels. These results show that the simplicity of kernel functions is better applied to large textual data of high dimensions and it would be the most appropriate to email spam filters based on NLP.

Keyword: *Email spam detection, natural language processing, support vector machine, TF-IDF, kernel functions.*