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(54) Title of the invention : Risk Assessment Method Using Multivariate Optimization Mathematics

(51) International classification	:G06Q 10/06, G06Q 40/00, G05B 23/02, G05B 13/04, G06Q 10/00	(71)**Name of Applicant :** **1)Dr. Brajesh Kumar Singh** Address of Applicant :Professor, Department of Mathematics, School of Sciences, IFTM University, Moradabad, Uttar Pradesh - 244102 Uttar Pradesh India **2)Dr. Balaji N** **3)Dr. Pooja Singh** **4)Mrs. Kumari Deepika P** **5)Mrs. Bharathi S** **6)Mr. Thavaseelan J**
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(57) Abstract :
The present invention provides a risk assessment method based on multivariate optimization mathematics designed to accurately evaluate, predict, and mitigate risks across diverse application domains. The method utilizes a combination of multidimensional data acquisition, statistical modeling, and optimization algorithms to analyze multiple risk factors simultaneously. By applying advanced mathematical techniques such as multivariate regression, weighted factor analysis, and nonlinear optimization, the system computes a Composite Risk Score (CRS) that reflects the true risk level of a process, system, or environment. The invention enables dynamic, real-time assessment by continuously updating the risk model through iterative optimization, thereby improving prediction accuracy as new data becomes available. It effectively handles correlated variables, uncertainty, and complex interactions that traditional linear risk assessment methods often fail to capture. The method further identifies the most influential parameters contributing to risk, enabling targeted preventive actions and efficient resource allocation. Through its computational efficiency, scalability, and robustness, the invention enhances decision-making processes in critical sectors such as industry, healthcare, finance, infrastructure, and cybersecurity. This multivariate optimization–based risk assessment approach represents a significant advancement over conventional techniques, offering improved reliability, early detection of potential failures, and reduced operational costs. (Accompanied Figure No. 1)

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