

## USING SALIENT FEATURES TO REINFORCE GA-SVM FOR BUSINESS CRISIS DIAGNOSES

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**ABSTRACT.** *This research considers the benefits of integrating a real-valued genetic algorithm and saliency analysis into an SVM for the determination of parameter values and the selection of salient features to carry out the diagnosis of a business crisis. Two phases, corresponding to the financial and intellectual capital indices used in real businesses, are adopted to determine the salient features. Eight salient features, including six financial indices and two intellectual capital ones, are used for the diagnosis. These features are common and easily accessible from publicly available information, making the proposed method very practical for business managers who wish to conduct a real-time investigation of the potential for a business crisis. A series of learning and testing processes with real business data show that the diagnosis model has a crisis prediction accuracy of up to 96.11%, demonstrating the applicability of the proposed method.*

**Keywords:** SVM, Business crisis, GA, Saliency analysis

**1. Introduction.** The alert mechanisms for business crisis have recently attracted the attention of researchers and business managers. According to statistical data issued by the Ministry of Economic Affairs, Taiwan, from 1990 to 2000, over 280,000 firms went bankrupt. This has significant adverse effects on individuals and households, and consequently on the national and social economy. The avoidance of such crises, and thus the stable growth of businesses, can enhance the relationship between society and individuals, leading to greater general prosperity.

In many situations, by the time that a business recognizes that it has a problem, it is already in a state of acute financial crisis, and is thus likely to be forced to restructure, liquidate, or declare bankruptcy. However, certain signs may appear before a business crisis actually occurs. It is thus the responsibility of business managers to identify and monitor critical indicators to ensure that their firms can continue to develop. Moreover, early awareness of potential problems may allow managers to turn potential problems into opportunities by changing certain aspects of the business. This issue has motivated the development of a business crisis diagnostic system to aid business managers in monitoring business performance.

In general, to make a diagnosis system efficient and effective, the critical features of the concerned problem should be determined beforehand [4,29]. For applications in businesses, selecting the optimal set of salient features for monitoring business performance is particularly important since efficiency and effectiveness are of great concern for a business