Thinking of Preventing the Invasion of Pests and Eliminating Them in Time

Sen Wang*, Xianglong Bao

College of Applied Science and Technology, Hainan University, Hainan, China

*1584795623@qq.com

*Corresponding Author

Keywords: Principal component analysis, Post-lasso method, Performance index the investment return indicators, Performance weight variable

Abstract: Discuss and discuss whether the spread of this pest over time can be predicted and how accurate. According to reports, most witnesses mistakenly thought it was a bumblebee. Only use the provided data set files and (possibly) use the provided image files to create, analyze and discuss models that predict the likelihood of misclassification. Use this model to discuss how classification analysis leads to the priority of reported investigations that are most likely to be positive.

1. Introduction

First, for the bumblebee, we use grey prediction and sequence prediction. Predictions of phenomena changing over time are defined as serial predictions. For example, to predict the consumer price index, we need to determine two variables, one is the level of the consumer price index. Another is the time at which this level occurs. Disaster prediction. Secondly, for the bumblebee propagation region, we use genetic algorithm. In evolution, fitness refers to an individual's ability to adapt to the environment and reproduce. Evaluate against the objective function of the problem. In the process of searching for evolution, genetic algorithms generally do not need other external information, but only use the evaluation function to evaluate the individual or solution, which can serve as the basis for future genetic operations. In the genetic algorithm, the fitting function should be compared and sorted, and on this basis, the selection probability is calculated. Therefore, the value of the fitting function should be positive. It can be seen that in many cases it is necessary to map the objective function to a fitting function with maximum and non-negative values. Finally, sensitivity analysis was carried out. For linear programming problems, Max is the maximum S.t. Is the constraint value, X is the objective function, and XJ is the decision variable. For example, when dealing with linear programming problems with product collocations, Cj in the objective function is usually related to market conditions and other factors.

1.1 Statement of the Problem

Discuss and discuss whether the spread of this pest over time can be predicted, and what level of accuracy. According to reports, most witnesses mistook other bumblebees for bumblebees. Use only the dataset files provided and (possibly) the image files provided to create, analyze and discuss models that predict the likelihood of misclassification. Use the model to discuss how categorical analysis leads to prioritization of reported surveys that are most likely to be positive

findings. How to update the model to get more new reports over time, and how often the update should take place. Using your model, what constitutes evidence that pests have been found in Washington state? Finally, your report should include a two page memo summarizing your results to the Washington State Department of agriculture. Your PDF solution. Develop a model to measure the impact of bumblebees on the country and on agriculture. Our model shows you how to predict the spread of bumblebees and the authenticity of people’s sightings of bumblebees. Distribution and presence in Washington.

1.2 Baseline Model

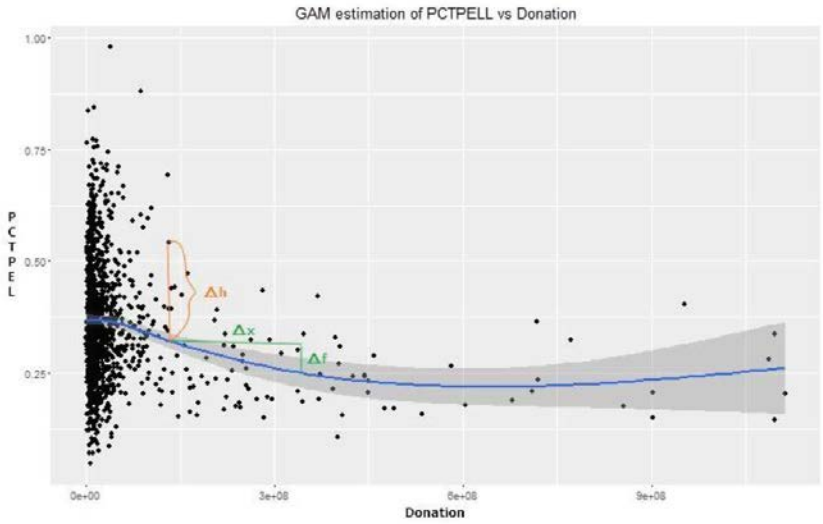
  DOI: 10.25236/iceesr.2021.064

Our definition of ROI is similar to its usual meaning, which is the increase in students' educational performance over the amount Goodgrant Foundation donates.

First we cope with data missingness. Then, to quantify students' educational performance, we develop an index called performance index, which is a linear composition of commonly used performance indicators. Our major task is to build a model to predict the change of this index given a distribution of Goodgrant Foundation $100 m donation. However, donation does not directly affect the performance index and we would encounter endogeneity problem or neglect effects of other variables if we solely focus on the relation between performance index and donation amount. Instead, we select several variables that are pivotal in predicting the performance index from many potential candidates, and determine their coefficientseffects on the performance index. We call these variables performance contributing variables. Due to absence of time-series data, it becomes difficult to figure out how performance contributing variables are affected by donation amount for each institution respectively. Instead, we fit the relation between performance contributing variables and donation amount across all institutions and get a fitted function from donation amount to values of performance contributing variables. Then we divide the impact of donation amount into 2 parts: homogenous and heterogenous one. The homogenous influence is modeled as the change in fitted values of performance contributing variables over increase in donation amount. The heterogenous one is modeled as a tuning parameter, which adjusts the homogenous influence based on deviation from the fitted function. And their product is the institution-specific increase in true values of performance contributing variables over increase in donation amount. The next step is to calculate the ROI of the performance index by adding the

products of ROIs of performance contributing variables and their coefficients on the performance index. This ROI is institution-specific and dependent on increase in donation amount. By adopting a two-step ROI maximization algorithm, we determine the optimal investment strategy.

2. Model of Fitted Rois of Performance Contributing Variables f Roi_i



Again, we modeled the blue fitted curve to represent the homogeneous relation between percentage of data who influence factor. Recall fitted ROI of percentage of data who influence factor f ROI is change in fitted values (Δf)

overThe calculation of fitted ROIs of performance contributing variables is similar.

Increase in donation amount (ΔX). So we get formula (1): $\mathbf{f}ROI_1 = \frac{\Delta f}{\Delta x}$ (1)

2.1 Model of the Tuning Parameter P_i

The first step is to generate a new solution in the solution space from the current solution by a generating function. In order to facilitate the subsequent calculation and acceptance, and reduce the time-consuming of the algorithm, we usually choose the method that the new solution can be

generated by simple transformation, such as the replacement and exchange of all or part of the elements constituting the new solution. It is noted that the transformation method of generating the new solution determines the efficiency of the current new solution Neighborhood structure has a certain influence on the selection of cooling schedule. The second step is to calculate the objective function difference corresponding to the new solution. Because the objective function difference is only generated by the transformation part, it is best to calculate the objective function difference by increment. The fact shows that for most applications, this is the fastest way to calculate the difference of objective function. The third step is to judge whether the new solution is accepted or not. The judgment is based on an acceptance criterion. The most commonly used acceptance criterion is Metropolis criterion: if e_{ϵ} d' T < 0, accept s' as the new currentsolution s; otherwise, accept s' as the new current solution s with probability exp(- e_{ϵ} d' T / T).

The fourth step is to replace the current solution with the new solution when the new solution is determined to be accepted. This only needs to realize the transformation part of the current solution corresponding to the new solution and at the same time, correct the value of the objective function. At this time, the current solution realizes an iteration. On this basis, the next round of test can be started. When the new solution is determined to be abandoned, the next round of test will be continued on the basis of the original current solution. The simulated annealing algorithm has nothing to do with the initial value, and the solution obtained by the algorithm has nothing to do with the initial solution state s (which is the starting point of the algorithm iteration); the simulated annealing algorithm has asymptotic convergence, which has been proved to be a global optimization algorithm converging to the global optimal solution with probability L in theory;the simulated annealing algorithm has parallelism.We then argue that Pi can be summarized by a function of deviation from the fitted curve (Δh), and the function has the shape shown in Figure 2.

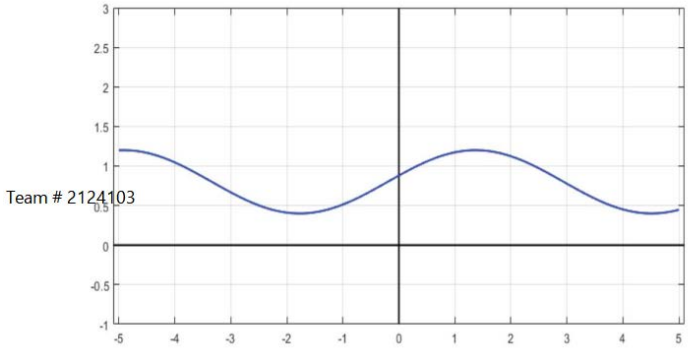


Fig.2 Function from Deviation to P_i

3. School Selection & Investment Strategy

The application of simulated annealing algorithm in VLSI design using simulated annealing algorithm to optimize VLSI design is one of the most successful application examples of simulated annealing algorithm. Almost all optimized VLSI designs can be completed with simulated annealing algorithm. Such as global routing, layout, layout and logic minimization. The simulated annealing algorithm in the neural network computer has the ability to jump out of the local optimal trap. In Boltzmann machine, even if the system falls into the trap of local optimum, it can jump out again after a period of time, and then the system will eventually converge to the global optimum. Simulated annealing algorithm in image processing, simulated annealing algorithm can be used for image restoration and other work, that is, to restore a polluted image to a clear original image, and filter out the distorted part. Therefore, it has a broad application prospect in image processing. In addition to the above applications, simulated annealing algorithm is also applied to other combinatorial optimization problems, such as TSP and knapsack problems. A large number of simulation experiments show that the simulated annealing algorithm can produce satisfactory approximate optimal solutions when solving these problems, and the time is not very long. shown in Figure 3.

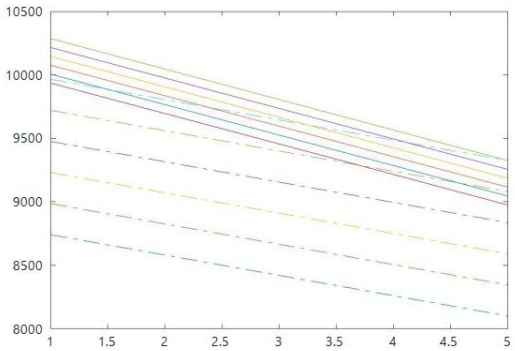


Fig.3 Trend of Weight of Selected Influencing Factors

3.1 Extended Model

Currently, we have obtained a candidate list of institution with priority and appropriate amount of money for the donation to each institution in total. In this section, we incorporate other crucial elements into the baseline model.

3.2 Time Duration

The idea of applying AHP to solve problems is as follows: first of all, the problems to be solved are hierarchically serialized, that is, the problems are decomposed into different components according to the mutual influence and subordination between the factors, and the hierarchical clustering combination is formed to form a hierarchical and orderly hierarchical structure model; then, the relative importance of each level factor in the model is analyzed according to people's

understanding of the objective display The judgment is expressed quantitatively and then the weight of the relative importance order of all factors at each level is determined by mathematical method; finally, the bottom value is obtained by comprehensively calculating the weight of the relative importance of factors at each level, which is used as the basis for evaluating and selecting schemes. AHP method makes people's thinking process and subjective judgment mathematical.It not only simplifies the system analysis and calculation, but also helps decisionmakers to keep the consistency of their thinking process and decision-making process. Therefore, it can get better results for some complex problems. AHP method can often be combined with other models.shown in Figure 4.

Fig.4 Geographical Distribution of Selected Institutions

It has been proposed previously that a set of free weights should be selected arbitrarily, and the weights to be solved can be obtained by establishing a system of linear equations for the transfer function. On this basis, the given target output is directly used as the algebraic sum of linear equations to establish linear equations, and the net output of neurons is no longer calculated by the inversion of the transfer function, which simplifies the operation steps. There is no error feedback principle, so the neural network trained by this method is equivaleare applied to the neural network

to establish the linear equations, and the Gausse limination method is used to solve the linear equations to obtain the unknown weights, instead of the traditional BP network idea of nonlinear function error feedback optimization.

4. Geographical Distribution

Another element that can be incorporated into the baseline model is the geographical distribution of donations. It matters in two ways. First, regional equality often raises heated debate among citizens and demands appropriate treatment. Consequently, charitable organizations are supposed to avoid displaying clear pattern of regional disparity on donations. Second, according to decreasing marginal utility theory, ita¸r´s reasonable to diversify investment with respect to regions. Assuming graduates are more likely to getemployed where their colleges are, the marginal utility of corresponding social benefits, such as more taxpayers, smaller crime rate, and increase in GDP, would decline as donations are centralized.

5. Conclusions and Discussion

Compared with other optimization algorithms, ant colony algorithm has the following characteristics: it uses positive feedback mechanism to make the search process converge and finally approach the optimal solution. Each individual can change the surrounding environment by releasing pheromones, and each individual can sense the real-time changes of the surrounding environment, and communicate indirectly between individuals through the environment. Distributed computing method is used in the search process, and multiple individuals perform parallel computing at the same time, which greatly improves the computing power and efficiency of the algorithm. The heuristic probability search method is not easy to fall into the local optimum, and is easy to find the global optimalsolution.

6. Conclusions

We formulate a performance index for each institution with principal component analysis and develop an appropriate concept for return of investment (ROI) for the charitable foundations like Goodgrant Foundation. We identify three main performance contributing variables that generate a strong impact on the performance index with post-LASSO procedure: percentage of students who re- ceive a Pell grant amount, the students that are part time and the student-to-faculty ratio. We derive the relation between the performance contributing variables and donation amount from a GAM fitting model to predict ROI of performance contributing variables. The final list of selected institutions and appropriate amount of donation is determined by a two-step selection algorithm.

References

[1] Schifrin, M., Chen L. (2015). To p 50 ROI Colleges: 2015 Grateful Grads Index. http://www.forbes.com/sites/schifrin/2015/07/29/top 50 roicolleges 2015 grateful gradsindex.

[2] Burke, J. C. (2002). Funding public colleges and universities for performance. SUNY Press.

[3] Cave, M. (1997). The use of performance indicators in higher education: The challenge of the quality movement. Jessica Kingsley Publishers.

[4] Serban, A. M., & Burke, J. C. (1998). Meeting the performance funding challenge: A nine state comparative analysis. Public Productivity & Management Review, 157-176.

[5] Banta, T. W. , Rudolph, L. B., Va n Dyke, J.,& Fisher, H. S. (1996). Performance funding comes of age in Tennessee. The Journal of Higher Education, 23-45.

[6] Little, R. J., & Rubin, D. B. (2014). Statistical analysis with missing data. John Wiley & Sons.

[7] Ehrenberg, R. G. (2004). Econometric studies of higher education. Journal of econometrics,

121(1), 19-37.

[8] Rogg, K. L., Schmidt, D. B., Shull, C., & Schmitt, N. (2001). Human resource practices, organizationalclimate, and customersatisfaction. Journal ofmanagement, 27(4), 431-449.

[9] Tibshirani, R. (1996). Regression shrinkage and selection via the lasso. Jour-nal of the Royal Statistical Society. Series B (Methodological), 267-288.

[10] Usai, M. G., Goddard, M. E., & Hayes, B. J. (2009). LASSO with crossvalidation for genomic selection. Genetics research, 91(06), 427-436.