RANSAC-based Study on Innovative Teaching Plan of the Ideological and Political Course

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Abstract

The RANSAC algorithm is a specificity collection and optimization algorithm of the statistical data sample. Applied to case study of the innovative ideological and political education, it can improve the authenticity and objectiveness of data sample, thus providing referential data for the innovation of ideological and political teaching plan. Hence this study analyzes the theoretic framework of the RANSAC algorithm and proposes the investigation method for feasibility and specialty of the ideological and political teaching plan so as to provide theoretic reference for relevant research and support the development of the ideological and political teaching.

Keywords: RANSAC Algorithm, Ideological and Political Course, Optimization Model, Teaching Plan.

1. RESEARCH BACKGROUND

1.1 Literature review

RANSAC algorithm, abbreviate for Random Sample Consensus, was proposed by Bolles and Fischler early in 1981. Its theoretic model is an optimization algorithm to settle specificity of the sample data, i.e. to detect the consensus within data sample through sampling survey (Gao et al., 2017). In previous summary and application of social investigation data, the universality, i.e. the similarity between individuals, need be considered as much as possible. But with the continuous deepening of the ideological and political education as well as the innovation of its teaching methods, it has been found that there exists not only generality but also individuality in receiving education for students (Zhang and Wang, 2017). Among sample data individual case itself is the statistical result that is not easy to compromise and whose linear discipline is not easy to summarize. Therefore, the RANSAC algorithm is needed to settle the influence from the outliers in sample data so as to obtain an investigation situation closer to the reality of ideological and political education.

1.2 Research objective

The RANSAC algorithm, adding a group of sample data containing outliers for calculation, distinguishes the outliers from inliers and makes comparison between them through the mathematical model of data function (Xu, 2017). Previously the RANSAC algorithm was widely applied to the research on computer vision, for example, detecting the match value problem of the three-dimensional visual arts through survey data so as to analyze the influence of outliers with the operational mode of basic matrix (Ji, 2017). This study applies the RANSAC algorithm to optimization and innovation of the ideological and political education by deeply digging whether the specific case among the sample data will exert various effects within different intervals or at different time through study on the specificity of the sample data. Through this study, orientated by special demand of students, teaching plan will be much closer to the reality, thus reaching the optimal generality of the ideological and political education.

2. THEORETIC FRAMEWORK OF THE RANSAC ALGORITHM

Computing architecture of the RANSAC algorithm is a four-step process to analyze the specificity of sample data, as shown in Figure 1.
Figure 1. Theoretical framework of the RANSAC algorithm

Firstly, it need to analyze model feature of the minimum sample set \( n \) which originates from the sample data in an all-round way and represents the initial effect of the minimum referential scalar during analysis of the random data sample (Cui et al., 2017). Meanwhile, another referential sample set \( P \) need be formed that is the actual reference variable of the survey data. So the condition \( S(p) \leq n \) need be met always to ensure the calculation results are authentic.

Secondly, the operation mode \( M \) of \( S(p) \) need be set to define the original scalar of the model as complementary set:

\[
SC_{[Consensus\ Set]} = P \setminus S.
\]

Thirdly, the error value of the sample set need be calculated within the specific threshold value space \( S \) so as to distinguish the consensus of the inlier set \( S^* \) from that of the threshold value space \( S \). When \( P(S^*) \geq N \), parameters of that data sample can be affirmed of high consensus (Duan, 2017). Then the operation mode of \( S^* \) in sample classification can be used for the sub-set budget case closer to actual results.

Finally, refresh the data information in repeated calculation and select randomly a brand-new data sample set \( S \). when a certain data sample is selected with high consensus, the calculation result can be proved true, and vice versa (Dong and Liu, 2017). Bigger reference value space need be extracted from the data sample as the calculation process to repeat the above operation until the biggest consensus set is obtained to judge whether the inliers and outliers can meet the initialization conditions, where the RANSAC algorithm is finished.

3. SURVEY METHOD FOR FEASIBILITY AND SPECIFICITY OF THE IDEOLOGICAL AND POLITICAL TEACHING PLAN

3.1 Comparing the actual teaching plans and analyzing the specific variable

The ideological and political course has been opened many years in China and the teaching paradigm is relatively complete from the primary school to the senior high school education. However, with the standardization of education, individuality loss is a problem that can’t be avoided. This practice variable of individual teaching is an analysis variant originating from reference to students’ individual character (Jin, 2016). In previous teaching, as the education system emphasized the positiveness of students’ ideological thinking, the teaching plan as well as style was very rigid. Such teaching method centering on standard answer restrained students’ dialectic analysis capability. And when students knew about the discipline of things, they always took the view of point and theoretic knowledge from their teachers as analysis guideline and lost their own self judgement. As the new ear is coming, it is urgent to reform the ideological and political education system in an all-round way in China. Imparting students’ standard answers is far less effective than helping form their subjective consciousness by leading them to summarize objective law of various things (Wei, 2015). In order to remove such error zone and formalism in traditional education, we must establish conditions and methods to inspect students’ individuality. Meanwhile, as the data sample of universal survey mainly targets at summarizing the common problems of all students, it is unable to analyze the specificity problems of students. Therefore, it is necessary to describe the different results of specificity parameter using the RANSAC algorithm so as to compare the feasibility of actual teaching plans. \( S(p) \) sub-set can be formed among the sample data for comparison of its result with the original data so as to analyze the specificity problem under that type of data, thus avoiding blurry definition caused by too vague data.
information. By this way can be verified the actual results from student individuality orientation, thus supporting innovation and development of the ideological and political education.

3.2 Analyzing teaching method and collecting feedback from students

Teaching feedback is an important method to know about feasibility of teaching plans. Previously the innovation and development of the teaching plan was innovative thinking based upon students’ feedback. Such analysis itself does not conflict with the actual application, but in actual survey sample the statistical data avoids deliberately the data with specificity, thus leading to a result different from the real data to a certain extent (Zhao, 2015). Therefore, survey results of traditional statistics sampling data cannot ensure that the data sample fully conform to the reality. At the same time of collecting basic data sample with the RANSAC algorithm, student feedback also need be collected for the ideological and political education so as to summarize the shortage of current teaching method. But different from previous survey result, the major analysis subject should be the special demand of students, or even the specific case of marginalization in the ideological and political teaching. So the RANSAC algorithm is not to analyze the universality of the general survey data, but to dig deeply for the specificity of teaching. To settle the specificity is the final appeal to avoid blank area in ideological and political education so as to improve feasibility of teaching plans. In RANSAC algorithm $P(S^*) \geq N$ can be used to compare the feasibility dimension of reference variables in different threshold value space between various data types so as to recognize the blank field in ideological and political teaching and innovate the optimization plan of ideological and political education under data support.

4. FEASIBILITY AND SPECIFICITY ANALYSIS OF THE IDEOLOGICAL AND POLITICAL TEACHING PLAN BASED ON STATISTIC RESULTS

After specificity variable analysis and student feedback collection, operation mode of the complementary set from $SC_{\text{Consenus Set}} = p \setminus S$ can be used to summarize the specificity and feasibility of existing teaching methods (Yu, 2015). But such specificity need be analyzed dialectically instead of being applied directly to universal survey as valid data. What need be analyzed is authenticity of the survey data sample obtained from the statistical data and of the specificity displayed by the data sample.

4.1 Authenticity of the specific data sample

Authenticity of specific sampled-data can form various specificity set according to different learning scores, capabilities, status as well consciousness of students. In study on innovative ideological and political education, the degree of innovation is not measured by the optimized teaching effect on a part of students, but on the true feedback obtained about innovative practice during the general teaching process. So a uniform teaching output mode need be designed considering individual differences of students (Zhou, 2013). In this process the specificity survey sample, based on the quantification standard of the sub-set budget case $M^*$, is of high authenticity in specific expression. Therefore, its result can be taken for comparison with the general data and combined totally into the $SC_{\text{Consenus Set}} = p \setminus S$ consensus operation mode so as to judge students at various levels, thus verifying the application space of the innovative ideological and political teaching plan.

4.2 Authenticity of the survey data sample

Authenticity of the survey data sample is the statistic item that the general social survey must endeavor to judge. If the data sample itself is not fully authentic, its result will also deviate from reality, then the obtained sampled-data is not of referential value. This problem mainly results from three conditions, teacher interference, student disturbance and the environment of questionnaire survey. Firstly, the survey should avoid participation by teachers so as to ensure authenticity of the survey data sample. Secondly, in previous data sample collection, there existed severe disturbance between students. So this survey was arranged in the form of single on-spot questionnaire survey to prevent students from being influenced by thinking guidance or disturbance from other students. Finally, as the survey environment will take students into a specific thinking environment during the survey and there may exist a certain mental suggestion for the students, the individual point of view output may hence be hindered to a great extent about ideological and political education. So this survey, instead of arranged inside the campus, was arranged outside the campus so as to make sure that the students’ thinking pattern would not be influenced by the environment too much.
5. SUGGESTION ABOUT THE INNOVATIVE IDEOLOGICAL AND POLITICAL TEACHING PLAN BASED ON THE SURVEY RESULTS OF THE SAMPLED-DATA WITH THE RANSAC ALGORITHM

5.1 Procedure of the sample data survey with the RANSAC algorithm

This study uses the RANSAC algorithm for systematic analysis of the general data sample in ideological and political education in universities and colleges. The sample data, covering 5000 students from 27 specialties of 6 universities or colleges, issued 5000 questionnaires and withdrew 3659 pieces with 2752 effective ones after removing those with unfavorable factors such as teacher interference, students’ disturbance or questionnaire survey environment. Though the withdrawal rate was only 55.04% this time, the authenticity and subjectivity of the data can be guaranteed for sure. Among the sample data, there were 1377 boys, 50.44% of the total and 1375 girls, 49.96% of the whole. Among them there were 1527 freshmen, 57.15% of the total sample, and 1225 sophomores, 44.51% of the all. As the data sample has low difference, it can be taken as the authentic general data for analysis of the ideological and political education.

5.2 Analysis of the data sample survey result with the RANSAC algorithm

In results of this survey three substantive issues have been detected concerned with innovation of the ideological and political teaching plan. Firstly, the teaching is seriously rigid. 56.78% of students thought classroom teaching was too rigid and the theory taught by teachers was unverifiable or short of theoretic research paradigm (Li and Tang, 2012). Hence exploration and innovation in this field is quite necessary. Secondly, the theory is too complex with too few case studies. The shortage of theoretic research paradigm in the first problem can be classified into the specificity sub-set of the second problem to obtain the specificity condition with the RANSAC algorithm so as to propose corresponding solution (Zhang and Zou, 2011). Thirdly, innovative and expansion dimension is lacking in teaching model. Lacking in innovative dimension refers to limitation in teaching method while that in the expansion dimension is caused by the failure to effectively apply modern teaching method. Therefore, the innovative model should be expanded further in ideological and political teaching in universities and colleges and the expansion dimension of teaching need be innovated by use of multimedia, MOOC, microlecture, and web-based teaching platform, etc., thus achieving the expected teaching effects.

6. CONCLUSIONS

In this survey research, the specificity statistical analysis method of RANSAC algorithm has been adopted for inducting the specificity sub-set \( S_{Consensus\ Set} = p\setminus S \) based on collected data sample and feedback on ideological and political teaching has been obtained that conforms to the reality basically. But according to the summarized data information, the current ideological and political teaching model can not effectively expand the knowledge content or apply various innovative methods in modern teaching. So the innovation and reform in ideological and political teaching in universities and colleges should be oriented by the statistical analysis results of the RANSAC algorithm with more practical cases added into teaching for guiding students to establish their own practical application system based on ideological and political theories. Meanwhile, modern teaching model need be expanded to create for students a learning environment based on the computer network technology so as to provide more individualized teaching plan, thus achieving the effective combination of innovative and application dimension in ideological and political teaching.

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