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A Short Summary of Performance Evaluation for Employees from A Local Call Center

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1 INTRODUCTION

1.1 CASE SETTING

“Workers” are taking “calls” from “customers” regarding their issues about certain medical device product. All the workers are divided into 5 groups, each of which are dealing with different issues. On average each worker takes 40-45 calls per day and 200 calls per week. All the calls are monitored and a few are sampled to evaluate the performance of the “worker”.

So for each single call, the information diagram is constructed in figure 1.1.

Figure 1.1: Information Diagram



From the diagram we can see that the information can be divided into three categories.

“Customer” information :

- basic profile (age, gender, ...)
- important record (if s/he is identified as “claimer” who repeats fake claim, ...)
- other information

“Call” information :

- basic profile (time of call, duration, ...)
- issue (what issue the call is about)
- content
- other information

“Worker” information :

- basic profile (age, gender, education, ...)
- speciality (what kind of issue s/he is trained to take care of)
- experience (how long s/he has been doing the job)
- past performance (her/his historical evaluation result)
- workload, working schedule
- other information

1.2 THE GOALS

For each recorded call, is listened by an inspector and the conversation is graded based on a 30-point checklist. A worker’s performance is determined based on the evaluation result of some selected calls that he or she has completed. The difficulty here is: how many calls should be sampled and how to sample for each employee?

In the information diagram, the cost of collecting information of “call” content is *high* because it needs an inspector to listen the whole recorded call. In the meanwhile, other information, such as basic profile of “call”, basic profile of “worker” and other information of “worker”, are relatively *cheap* because they are recorded by computer and easy to access. Thus, the “cheap” information should be utilized as much as possible and the “high cost” information can only be collected under the permission of budgets.

2 METHODOLOGY

2.1 A WORKER’S WEEK-LONG PERFORMANCE

Let N denote the number of calls the worker takes in certain week and the value of all the calls are v_1, \dots, v_N . If v_1, \dots, v_N are all known, then the performance of the worker in that week can be easily determined under certain criterion, for example the mean \bar{v} and variance σ^2 of v_1, \dots, v_N .

However, v_1, \dots, v_N are unknown and we need to select a sample of size n with the hope that the sample, say v_1^s, \dots, v_n^s , has the same characteristic of v_1, \dots, v_N (for example the sample mean and variance are close to \bar{v} and σ^2). How to choose these n calls?

Assuming the value of the calls follows certain unknown distribution, the selected samples should follow that distribution as close as possible. In this case that n is a small number, we should choose samples such that v_i^s is close to \bar{v} . To achieve this goal, the distribution of v_i needs to be studied by using historical data as well as the factors that have influence on it before designing the sampling strategy.

2.2 OTHER INFORMATION'S INFLUENCE

The major factors that have impact on v_i are discussed below.

1. The influence of “call” information

Three factors play important roles: Time of the call, Call duration, and Calling issue.

For each v_i there is an associated time of when the call is made. For example, the calls for v_1, \dots, v_{40} happens on Monday; the calls for v_{41}, \dots, v_{80} happens on Tuesday; ...

The the distribution of v_i for Monday may be different from v_i for Tuesday. And if we know that mean of v_i are high on Monday and low on Thursday and Friday, we should not take sample only on Monday or without on Monday.

How do we know the distribution of v_i on everyday? 1) Historical data: pull out the result of historical evaluation and study how they distribute regarding to time of the call; 2) Design a sampling process for a short time to collect the information.

Similarly, we may also consider the influence of morning call and afternoon call.

Same logic and methods can be applied on the other factors.

2. The influence of “worker” information

- Basic profile

The distribution of v_i for female is different from male. Such information can be studied from historical evaluation result.

- Experience

Junior workers have larger variability on ν_i than senior workers. As a result, they usually need larger sample size to estimate the performance.

Same expectation applies to worker's speciality.

- Workload and working schedule
- Past performance

It can be considered as prior information to help design sampling strategy. For example, if the evaluation result for the worker is very inconsistent in the past few weeks, we may consider the probability that the sampling strategy for that worker didn't work well unless there exists reason for the inconsistency.

With the evaluation results collected from historical data for ν_i and "cheap" information, statistical tools of classification and cluster analysis can be employed to characterize the calls and the workers and study the distribution of relative ν_i 's. Then with these knowledge, the sampling strategy can be designed efficiently and sample size can be chosen according to desired power.

2.3 ADJUSTMENT AND STANDARDIZATION

After the samples are determined and evaluated for all the workers, it is usually necessary to adjust or standardize the values of evaluation before using them for calculating the workers' performance. The adjustment or standardization can be conducted based on all the results in different aspects, such as the factors of influence mentioned above.

2.4 SIMULATION STUDY

With the conclusions from historical data and other information, simulation which is usually low cost can be conducted to enhance the understanding. Based on simulation results, the design of sampling strategy can be efficiently improved.