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# Analysis of the Application of Probability in Real Life

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## Abstract

In all fields, no matter whether people's daily life or scientific development, random phenomena have always existed. After more than three hundred years of development, probability statistics have been widely applied in various fields. In this paper, we first introduce the overview of probability and the application significance of probability, and then analyze it from three aspects: entertainment problem, queuing problem and job search problem, which provides reference value for people to understand probability statistics.

## Keywords

Probability; real life; application; entertainment problem; queuing problem; genetic disease problem.

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## 1. Introduction

As a branch of mathematics, probability theory has a history of more than three hundred years, and it has a close relationship with people's lives. Probability is the most widely used statistical method in real life, involving many fields, such as weather forecast, earthquake forecast, statistical infectious disease probability, and statistical birth rate. By mastering probability theory, people can develop the habit of random thinking. Therefore, if people use the probabilistic method reasonably, it can help people to fully understand the essential phenomenon of the event. The probability theory becomes a powerful tool for people to deal with random events.

## 2. Overview of probability and application significance

Probability refers to people's judgment on the probability of an event occurring and the conclusion of the probability of its occurrence. For example, if the northeast is bound to snow in the winter, the probability of this happening is almost 100%. This is inevitable. But the future life is full of uncertainty, such as which stage of the winter will be the first snow, the amount of snowfall, how long it will start melting. Although the uncertainty of time is inconvenient for people's judgment, sometimes it can be a good way to solve the problem.

In daily life, people often have to deal with probability statistics, such as calculating the possible rate of return on investment stocks and the winning rate of lottery tickets. However, some people lack rationality when judging problems, which means that there is no probability of probability and statistics, and they will make choices that adversely affect themselves. Many merchants use the consumer's awareness of probability and statistics plus the chance to get more profit from it. Therefore, according to the problems in actual life, combined with the knowledge of probability and statistics, people can avoid the consequences of making choices under impulse, and can also help people improve their ability to judge events that are full of uncertainty.

### 3. Probability in real life applications

#### 3.1 The application of probability in entertainment problems

On weekends, many people like to choose to play online games to pass the time, especially shooting games. Shooting games have a certain degree of difficulty, but they are still popular with people. This article analyzes this, can people play shooting can reach hundreds of hundred? This article solves the probability of hitting the target.

Suppose someone has a chance to hit a target by hitting a shot.  $P = 0.004$ , according to the known conditions, get:

$$\begin{aligned} P(A) &= P\left(\bigcup_{i=1}^n A\right) = 1 - P\left(\overline{\bigcup_{i=1}^n A}\right) = 1 - P\left(\bigcap_{i=1}^n \overline{A}_i\right) \\ &= 1 - P(\overline{A}_1)P(\overline{A}_2)\dots P(\overline{A}_n) \\ &= 1 - (1 - \rho)^n = 1 - 0.996^n \end{aligned}$$

When  $n=500$ ,  $P(A)=0.865$

It can be seen that the probability of small probability experiments made in this paper is not very likely, but with the increase of the number of times, this paper concludes that the probability of occurrence of events will tend to happen. Many people are willing to continue playing the shooting game for a long time because they believe that the number of times they play will increase the number of times they hit the target. This is what everyone says is persistence is victory.

#### 3.2 The application of probability in queuing problems

People always encounter queues in their daily lives, such as buying tickets at the window, buying food at the cafeteria, and taking children to the playground. Especially in the window for recharge business, at the end of the month, the hall will be in a crowded state. The theory of queuing phenomenon was born in the early 20th century. The earliest proponent was the Danish mathematician Erlang. After years of development, the theory of queuing phenomenon has been continuously improved. Here is an example to illustrate this problem:

Suppose the customer waits for service in a business hall in minutes. According to the exponential distribution, the probability formula is obtained:  $f_x(x) = \frac{1}{5}e^{-x/5} (x > 0)$ ,  $f_x(x) = 0 (x \leq 0)$

The customer waits for more than ten minutes to leave the window of the business hall. According to the customer, go to the business hall five times a month, and solve according to this condition.  $P\{Y \geq 1\}$ . According to the probability that the customer leaves the window without waiting for the service, you can get:  $P\{Y - 1\} = 1 - P\{Y = 0\} = 1 - (1 - e^{-2})^5 = 0.5167$

It can be seen that the service companies such as the business hall responsible for providing services to customers need to make appropriate adjustments according to business needs and the number of customers, such as personnel transfer, increase of personnel, etc., so as to reduce the average waiting time of customers.

#### 3.3 The application of probability in job search

Probability statistics also apply to job search issues. University graduates and professionals in the workplace will experience various twists and turns in the process of seeking suitable positions. Few people can successfully get the ideal offer when they apply for a job. Sometimes they need to interview many times to succeed. .

Suppose that a person's chance of success in each job search is 0.4. How many times does the job need to solve a person's job search to increase the success rate to 0.9?

According to the geometric distribution and event incompatibility, you can get:

$$P(x \leq 5) = P(X = 1 \cup X = 2 \cup X = 3 \cup X = 4 \cup X = 5) \\ = \sum_{k=1}^5 P(X = K) = \sum_{k=1}^5 0.6^{k-1} 0.4 = 0.9$$

It can be seen that the person needs to go through five job searches to get a job opportunity with 0.9.

#### 4. Conclusion

From these three aspects of analysis, life is inseparable from probability statistics, which means that probability statistics are used to solve problems in real life, which has a significant effect. If people use the probability and statistics reasonably and do the theory and practice, they can help them improve their judgment, logical thinking and innovation ability.

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