GE-103

THE SECRETARY PROBLEM

Harshvardhan Singh, Gursimer Singh, Bhuvan Nawaria, Vasavi Srija Mitta

2021MEB1287, 2021meb1287@iitrpr.ac.in

2021MEB1285, 2021meb1285@iitrpr.ac.in

2021MEB1276, 2021meb1276@iitrpr.ac.in

2021MEB1297, 2021meb1297@iitrpr.ac.in

I. INTRODUCTION

The title of the project is “The Secretary Problem”. It is also known as marriage problem, fussy suiter problem and the best choice problem. It demonstrates a scenario involving optimal stopping theory that is studied exclusively in the fields of applied probability, statistics, and decision theory.

II. LITERATURE REVIEW

The secretary problem was apparently introduced in 1949 by Merrill M. Flood, who called it the fiancée problem in a lecture he gave that year. He referred to it several times during the 1950s, for example, in a conference talk at Purdue on 9 May 1958, and it eventually became widely known in the folklore although nothing was published at the time. In 1958 he sent a letter to Leonard Gillman, with copies to a dozen friends including Samuel Karlin and J. Robbins, outlining a proof of the optimum strategy, with an appendix by R. Palermo who proved that all strategies are dominated by a strategy of the form "reject the first p unconditionally, then accept the next candidate who is better". (See Flood (1958).)

The first publication was apparently by Martin Gardner in Scientific American, February 1960. He had heard about it from John H. Fox Jr., and L. Gerald Marnie, who had independently come up with an equivalent problem in 1958; they called it the "game of googol". Fox and Marnie did not know the optimum solution; Gardner asked for advice from Leo Moser, who (together with J. R. Pounder) provided a correct analysis for publication in the magazine. Soon afterwards, several mathematicians wrote to Gardner to tell him about the equivalent problem they had heard via the grapevine, all of which can most likely be traced to Flood's original work.

The 1/e-law of best choice is due to F. Thomas Bruss (1984).

Ferguson (1989) has an extensive bibliography and points out that a similar (but different) problem had been considered by Arthur Cayley in 1875 and even by Johannes Kepler long before that.

III. OBJECTIVE

The basic form of the problem is the following:

Imagine an administrator who wants to hire the best secretary out of n applicants for the position. The applicants are interviewed one by one in random order. A decision about each particular applicant is to be made immediately after the interview. Once rejected, an applicant cannot be recalled. During the interview, the administrator gains information sufficient to rank the applicant among all applicants interviewed so far, but is unaware of the quality of yet unseen applicants. The question is about the optimal strategy (stopping rule) to maximize the

probability of selecting the best applicant. If the decision was to be made at the end, selecting the best secretary won't be a problem. But here, the decision should be made immediately. From this project we can maximize the probability of making the best choice.

IV. CONCLUSION

This project concludes with a way to make the best choice. Here, The optimal stopping theory selects the single best candidate about 37% of the time, irrespective of whether there are 100 or 100 million applicants.

ACKNOWLEDGEMENT

We would like to thank our group Teaching Assistant, Miss. Nivedita Sethiya for guiding and helping us through our project. Our special thanks to Prof. Sudarshan Iyengar who gave us this precious opportunity to do this project through which we learnt to make the best choice using python.

REFERENCES

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