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Automated Student Merit Prediction using Machine Learning

Indrani Sengupta
Dept. of F.M.S.
Dr.B.C.Roy Engineering College
Durgapur, W.B, India
indrani.sengupta@bcrec.ac.in

Chandan Koner
Dept. of C.S.E.
Dr.B.C.Roy Engineering College
Durgapur, W.B, India
chandan.koner@bcrec.ac.in

Niloy kumar Bhattacherjee
Dept. of F.M.S.
Dr.B.C.Roy Engineering College
Durgapur, W.B, India
niloy.bhattacherjee@bcrec.ac.in

Subir Gupta
Dept. of C.S.E.
Dr.B.C.Roy Engineering College
Durgapur, W.B. India
subir2276@gmail.com
ORCID 0000000209410749

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***Abstract*— Imparting higher education to today's generation is gaining in importance. With the National Education Policy 2020 put on the table, there has been a massive transformation in the education system. The Government is already investing a considerable sum in budgetary allocation in quality education. However, the Government's effort in this regard could hardly bear fruit by itself. According to this survey of private engineering institutions under MAKAUT, the performance of the present generation is deteriorating rapidly, which will be a detrimental effect on the long-term viability of these institutions, as placement would be directly affected by this level of performance. The present study addresses the problem from three angles. First, Pearson's correlation coefficient has been used to measure the correlation between the starting and closing ranks across private engineering college departments under the MAKAUT umbrella. Second, a multiple regression has been run to study the impact of the passage of prior periods on the current merit level. Third, a random forest model was fitted to predict the ranks for the 31 college departments in the test datasets based on 600 data points in the training dataset for 2020. Finally, a Chi-square test has been run with the predicted and actual values first and then on the smaller subset of the test data. For this purpose, data on WBJEE ranks of students admitted to private engineering colleges under MAKAUT from 2015 to 2020 have been used. Each of the opening and closing ranks of candidates has been subtracted from the rank 1 lakh to generate the desired set of data values. Analysis based on the Pearson correlation coefficient shows that candidates' opening and closing ranks are correlated, college and department-wise. It perhaps gives evidence that admissions move in homogeneous cohorts of positions. Further, the estimates of the parameters from the multiple regression model suggest that the parameter estimates' coefficients are negative or minimal, indicating negative to no effect of previous years' figures on 2019 values. The predictions by the random forest model are reasonably close to the actual.**

Keywords— College admissions, merit trends, Pearson's rho, O.L.S. regression, Machine Learning, Random Forest.

I. INTRODUCTION

Worldwide, the United States and China have, over the years, dominated higher education. Since independence, India has seen a gradual but steady rise in the availability of high-quality higher education. Recently, however, a need for giving a significant thrust to this sector has been overly felt. Since the eleventh five-year plan sought to increase the literacy rate to 84 percent and minimize the gender gap in literacy to 14 percent, higher vocational education funding to promote this industry has grown. U.G.C. provides general courses and AICTE trials in India. With the aid of the state and universities, AICTE grants institutions autonomy [1]. Education is a self-directed process. India should prioritize research and scholarship to grow into a knowledge hub and develop higher education. India is today undergoing a rapid transformation. Ensuring academic excellence, instructional excellence, and research aptitude is the need of the hour to help develop knowledge-based initiatives—institutional performance, especially in higher education. It is pertinent to note that quality higher education is the crux of sustainable human resource development. With the globalization of the economy, India has witnessed an exodus of good-quality students overseas for technical and higher education. Many of the wide variety of disciplines offered in the west do not have any Indian replacement, which is why bright students of the country are being siphoned out. Despite the Government's efforts to revive higher education in the country, the picture seems not very promising. From a bird's-eye view of Eastern India, it's clear that the quality of students coming into top-recognized private engineering institutes affiliated with MAKAUT University's engineering departments has decreased in recent years. It is easy to assume that greater rank density would suggest better student intake, allowing for the maintenance of high levels of instructional throughput and, eventually, favorable placements. Institutions accept that the better the arrangements, the higher the quality and quantity of student intake. Immediately downstream from the aforementioned logical node is the worry about the long-term viability of these colleges, a concern arising from the observed constant decline in the quality of the students taking admission in these colleges as reflected in the ranks of the students in the WBJEE entrance examination. The primary concerns are exacerbated further by severe shocks such as the pandemic and subsequent lockdowns and long-term tendencies such as

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