

Process description for the creation of Unipath, a website for Ontario high school students going through the university admissions system

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1 Introduction

This year, I took the AP Statistics exam. Even though I studied for months, I could only come out with a 3, equivalent to 70 percent and ineligible for university credit. Although I could not come away with any tangible results, the knowledge I gained from studying for this exam allowed me to build Unipath.

I had an idea a week before writing this (about the second week of July). University admissions in Canada are extremely stressful for students and the extremely confusing system makes it difficult for students to understand how they compare to the competition. I noticed that unlike in the United States, there are no tools for Ontario high school students to help them with the university admissions process, which is why I decided to build Unipath – to help students like myself better understand the university admissions system.

I wanted Unipath to have three main features, each of which will be described and outlined in their own sections:

- Admissions chancing – Using a student’s credentials and comparing them to those of accepted and rejected students to produce a chance of acceptance
- Generating alternative options – Using a student’s credentials and their personal preferences for location, student population size, et cetera to suggest alternative universities and programs
- Help with supplemental applications – Competitive programs such as Business Administration at the University of Western Ontario and Engineering at the University of Waterloo use supplemental applications to get a better sense of their applicants, often serving as a tiebreaker between students with similar academic achievements

This document will outline the entirety of the process of creating Unipath from start to finish. For an overview of statistical concepts used in this project,

see Introductory Statistics 2e. by Barbara Illowsky, Susan Dean, et al. and published by Openstax.

2 Features

2.1 Admissions chancing

2.1.1 Feature description

This is meant to be the main feature of Unipath. The user would input their coursework as well as any test scores and extracurricular activities for supplemental application purposes.

2.1.2 Process

Using data collected from applicants using polling and data released by universities themselves, I aimed to produce a normal distribution of acceptance averages for as many programs as possible considering the conditions for normal distribution. Originally, I attempted to do this by estimating changes in admissions odds in tandem with changes in grade-point average (GPA). I attempted to do this using CollegeVine, a service generating odds of admission to American universities. Using the odds of admission in comparison to GPA, I was able to model admission chance as a function of GPA¹ for a number of sample schools, almost always being modeled as a cubic function. One example of those functions, modelling GPA vs admission probability for Boston College, was:

$$p_{admit}(x) = 0.0005(9(x - 0.8))^3 + 5.2 + 1.2x$$

Using these functions, I was able to estimate the change in change in admission probability. For admission to Boston College, this function was:

$$p'_{admit}(x) = 1.0935(x - 0.8)^2 + 1.2$$

Ultimately, I decided that this method was both ineffective and that it could prove to be extremely inaccurate as CollegeVine considers many other factors in calculating admission probability due to the holistic nature of American university admissions. As a result, I decided to use existing data from Ontario universities and applicants to create chancing models. The majority of the data used for this was taken from the Common University Data Ontario system and a poll of admissions outcomes for applicants during the 2023-24 academic year.

Final method

My final plan was to use admissions data from CUDO to create normal distributions of grades. This would serve as exact data showing applicant's grades and using the provided applicant and acceptance counts, I can estimate median accepted averages. With that, I would be able to estimate grade ranges for acceptance.

Program	95+	90-95	85-90	80-85	75-80	70-75	Applicants	Standard Dev.	Me
Soc. Sci.	28.70%	45.80%	20.30%	5.00%	0.30%	0%	7420	4.65	91.8
Phys/Math Sci.	41.90%	44.10%	12.90%	1.10%	0%	0%	5211	4.112	93.9
Humanities	27.70%	42.90%	21.60%	6.50%	1.10%	0.20%	3567	5.1	91.8
Life Sciences	50.80%	39.60%	8.60%	0.70%	0.30%	0%	9892	4.08	94.7
Rotman Comm.	64.40%	34.30%	1.20%	0%	0%	0%	6734	3.248	95.2
Comp. Sci.	87.10%	12.90%	0%	0%	0%	0%	6204	3.05	96.9

Example Data - University of Toronto - St. George - Faculty of Arts and Science

When the user inputs their top 6 average, the program would generate a z-score considering their average and the mean and standard deviation for the chosen university program, and use that z-score to calculate a probability of admission.