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How Recommendation Systems can be used in Educational Institutions (Part 1)

When making a decision on which job, undergraduate or graduate program is the best to pursue, people are often very conflicted. We doubt our decision based on financial feasibility, cost of living and more generally, if the decision we're making is the absolute best given our personal values. I was recently involved in a process where I had to research and rank a list of schools for an International Exchange Program at my university. This was an overwhelming process because there were MANY factors to take into consideration- the location, means of transport, financial feasibility and many more. Besides selecting a school to enroll, other crucial decisions students often make are, for example, which course would be the ideal elective course based on a one's interests? Or if a student's plans to pursue a certain career, which courses are recommended to them? With the advancements in Machine Learning and AI, there are opportunities for schools to gather key characteristics of students to accurately predict the most appropriate learning institution or course. Although these recommendation systems are not used in schools today, I thought it would be an interesting task to research how the connections can be made. But *how* would this work?

This article will provide how Recommendation Systems, a type of ML Algorithm are used to cope with this type of information overloading and providing accurate predictions. Part 1 of this article will consist of understanding how a recommendation system works and using Netflix as an example to illustrate the purpose of such a model.

What is a Recommendation System

- Very broadly, recommendation systems identify which products should be presented to the user, in which the user will have time to analyse and select the desired product. It is composed of **three** parts:

Before I explain how data is used to make decisions for the recommendation system, let's walk through a brief outline on Netflix's recommendation system. The decisions you make on what to watch on Netflix determine what type of content is presented to you.

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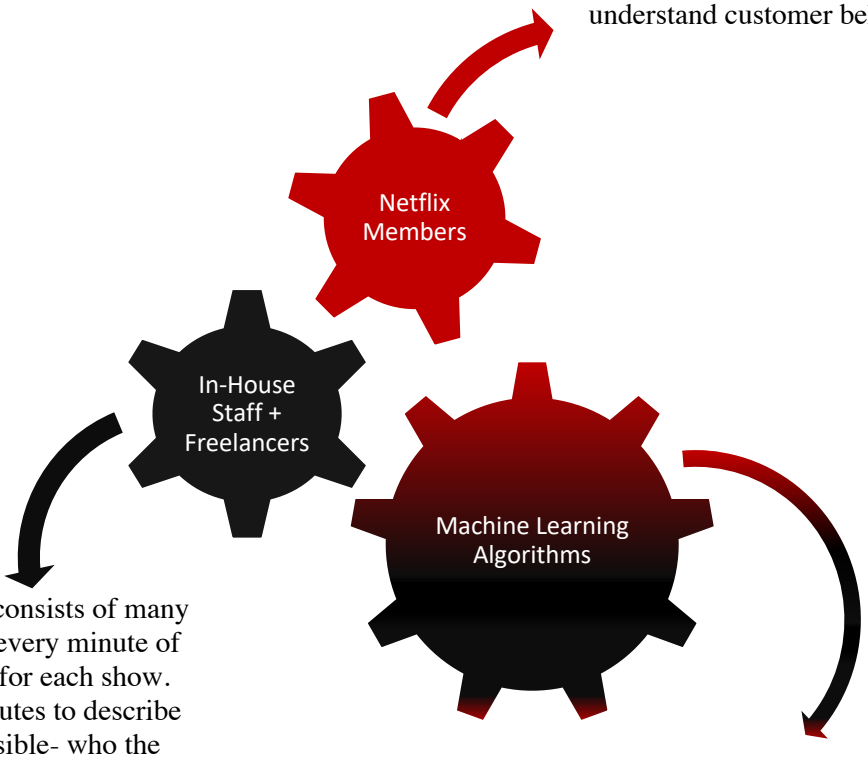
To start off, let's try to understand the three parts to how Netflix recommends content.

1. Through the 250 million users, each user has a profile with attributes that describe them. From the members' data, we see are which genres of shows or movies they watch, what they watch after a particular genre, what time of day they watched a movie and many more. By gathering this data, Netflix is able to find patterns during the process of when a customer logs into their account all the way until they closing the page. This allows Netflix to understand customer behaviours and find patterns.



2. The second component consists of many staff members who watch every minute of the show to generate tags for each show. These tags consist of attributes to describe the show as much as possible- who the characters were, where the setting is and the genre.

3. The user behaviour data from "Netflix Members" and tags from "In-house Staff" are then combined to generate machine learning algorithms that answer critical questions. The overarching question here is "how much should each component of the data be weighed in terms of importance?". For example, how much should it matter that a user watched a horror movie a year ago and never watched another horror movie?

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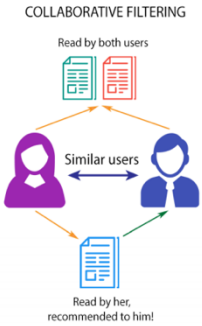

These questions allow Netflix to group users with similarities and differences. The communities that are formed among users is what determines how content is recommended to users. The idea is that the recommendations are based on people who watch the same kind of content that you watch. This is known as **Collaborative Filtering**; where another users ratings or preferences are used to predict and recommend rather than attribute data.

Behind the Scenes of a Recommendation System at Netflix

I will now outline 2 ways Netflix uses these systems:

1. **A/B Tests:** These tests present users with 2 different experiences and captures the users reaction for each experience. This includes how long each user looks at the interface or which interface results in the user watching more movies.
2. **Landing Cards:** Landing cards are the thumbnails you see for each movie or TV show. They personalized based on the interests the user has. For example, if the user enjoys romantic movies, the thumbnail of any movie will change to the romantic scenes of the movie (if the movie contains romantic content in it). Otherwise the landing card will change multiple times to find the more popular one.

In this article, we went through a very brief overview of the core functions of a recommendation system and how it is being implemented in large companies. In my next article, I will expand on this further and discuss how these systems can be used in educational institutions.