

Hidden Markov Model(HMM) Application in Career Recommendation System

My mission is to bridge the gap between education and career development by leveraging AI-driven insights and web-based solutions to empower Rwandan students in navigating their career journeys. The goal is to provide them with the tools, platforms and resources needed to make informed career decisions.

A Hidden Markov Model can be applied to uncover student career paths and provide personalized recommendations based on their academic performance and behavioral history.

Measurable data that could be used

The model would use observable features that reflect a student's profile and behavior over time which include:

- Academic performance in various subjects to determine subject strengths
- Interests which can be collected through surveys
- Extracurricular activities

Type of HMM Problem

This is an unsupervised HMM problem since career inclination for every student is not directly observable and is therefore a hidden state. Our aim would be to infer the hidden career states from sequences of observed features.

Training Algorithm

Known values at the start:

- Sequences of observations: academic scores, interest data, extracurricular activity logs
- The number of possible hidden career states which include target careers like healthcare, business, arts

Unknown values at the start:

- Transition probabilities between hidden career states
- Emission probabilities of observed behaviors
- The most likely sequence of hidden career states for each student.

Parameter Updates

- Initial probabilities: Likelihood of a student starting in a specific career state
- Emission matrix: Probability of observed data given a hidden career state
- Transition matrix: Probability of switching from one hidden career state to another over time