M-CAFE: Managing MOOC Student Feedback with Collaborative Filtering

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Introduction

The MOOC Collaborative Assessment and Feedback Engine (**M-CAFE**) allows students to numerically assess the course, their own performance, provide textual suggestions about how the course can be improved and rate others' suggestions on a **weekly basis**. It implements statistical methods and **Collaborative Filtering (CF)** to **scalably identify valuable suggestions**.

Motivation

Student engagement and **feedback** are important in effective teaching. However, the massive class size of MOOCs impede instructors from obtaining valuable information effectively. New tools must be developed that allow instructors to efficiently collect and analyze data.

In this work-in-progress report, we present a new platform, the M-CAFE, which encourages ongoing feedback from students and provides **weekly reports** to the instructors.

As a pilot study, we evaluate M-CAFE with 2 EdX MOOCs, CS 169.1x and CS 169.2x, by testing the following hypotheses:

1. **CF can sort textual suggestions close to expert human performance.**
2. **The quantitative feedback trends agree with events in the course.**

Data

560 Students provided a total of **83** suggestions for CS 169.1x and **132** suggestions for CS 169.2x. We also observe a total of **1,691** and **3,564** peer-to-peer ratings on the textual suggestions for the two courses respectively.

Current Implementation

We are currently utilizing M-CAFE in a regular university class, IEOR 170 at UC-Berkeley, in the hope of compare M-CAFE performance in various setting. In addition, we would expect M-CAFE to improve the regular end-of-semester evaluation scores. In the past weeks, M-CAFE has demonstrated to be extremely helpful and fun to use. The students think it is an engaging feedback tool.

Preliminary Results

Quantitative

We explore relative relationship of the Quantitative Analysis Topics (QATs) between weeks throughout each course and attempt to link the quantitative observations to the qualitative feedback to ensure the **validity of quantitative trends**. Below is a plot of the QAT values for CS 169.2X. Note that the unusual behavior between week 3 and 4 is primarily due to **the increasing difficulty of homework**, which was among the top-rated suggestions.
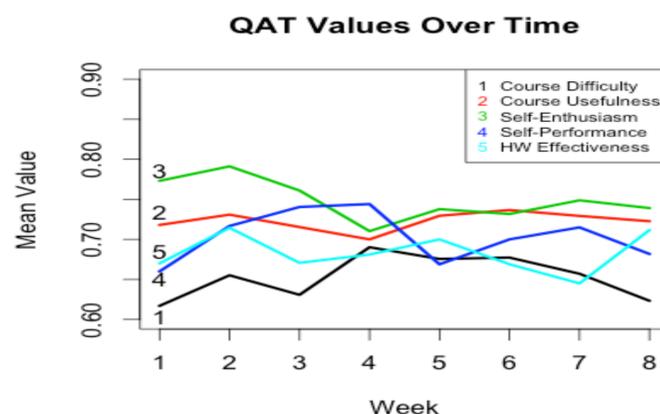

Figure 1. Weekly mean for the five quantitative analysis topic values for CS 169.2X.

Qualitative

The textual suggestions aim to answer the question "In what specific way could this course be enhanced to make it more valuable for you?". They were then sorted using **Wilson score** based on peer to peer CF. By evaluating the top-rated comments on novelty, topics covered and quality, we will demonstrate that CF is capable of identifying valuable suggestions, addressing the scale issue of qualitative feedback. Examples of CF identified top-rated comment and lowest-rated comment in CS 169.2X:

Top-rated: More examples of well-written Rspec and cucumber tests or some recommended answers to the homework from the tutors.

Lowest-rated: Changing grading policy to let late submission for all HW assignments as in Part1 of the course.
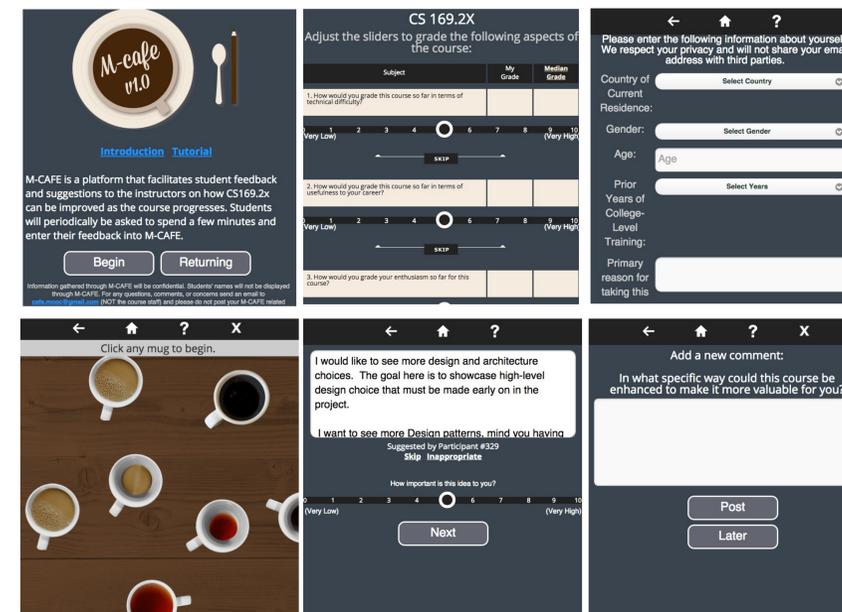

Figure 2. Interface of M-CAFE: Upon entering M-CAFE, students are required to register by email and are given the option to provide their age, gender, home country, years of college-level education, and the primary reason why they are taking the course. Then they rate 5 quantitative assessment topics (QAT) on a scale of 1-10. After that, students click on mugs to view the textual suggestions of their peers, evaluate how valuable the suggestions are and provide their own suggestions.

Future Development

Currently weekly M-CAFE reports are generated manually. Future versions of M-CAFE may seamlessly integrate into MOOC software to better ensure feedback can be quickly analyzed and utilized by the instructor. The demographics information and the QATs can also be customized to individual courses. New features for students to track their rating history and compare to the class average will also be added to facilitate student engagement.

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