

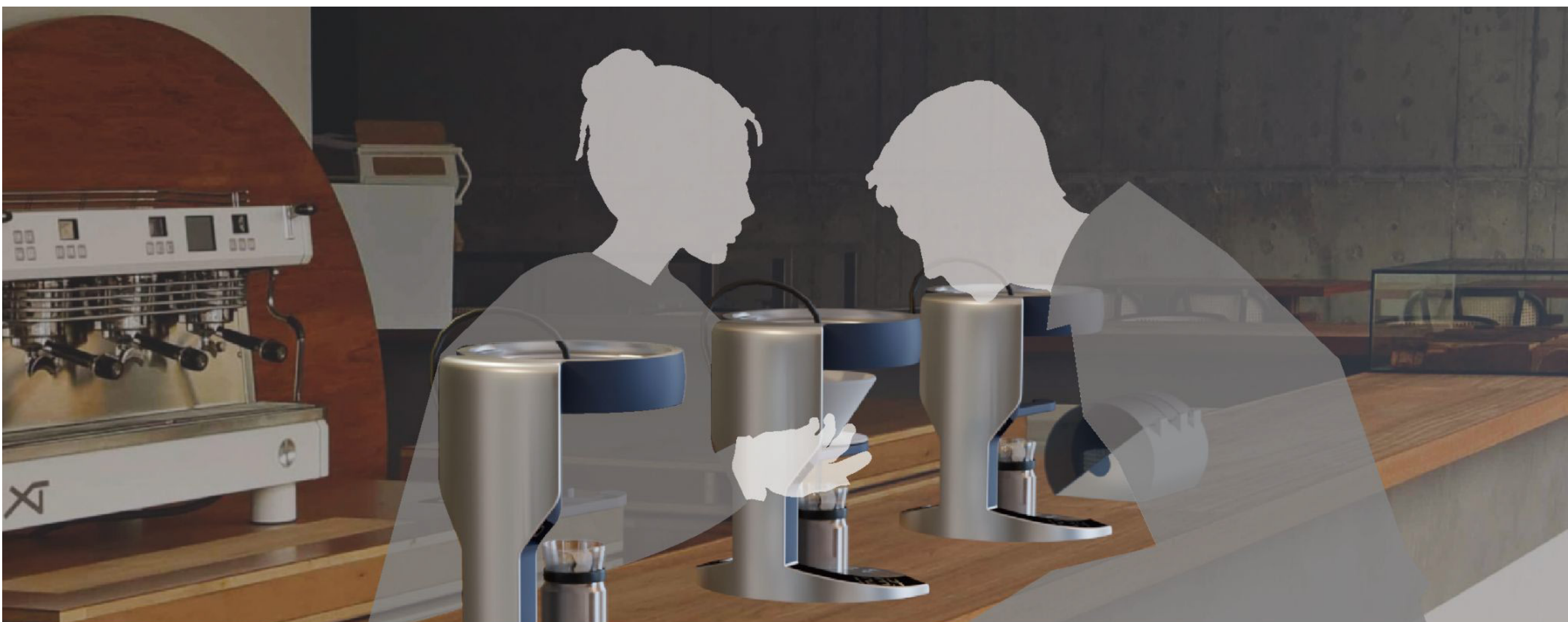
Automatic Pour-over Coffee Machine

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1.Research Background

A 3D printer-like machine is being developed to **improve communication between baristas and customers**, replicating the water-pouring trajectory of human hands. This technology meets professional standards for hand-brewed coffee and different types of coffee beans. However, rising operating costs, high turnover rates, and varied training expectations for new cafes make it challenging to maintain consistent quality. Automatic pour-over coffee machines currently lack **the ability to engage with customers and create sensory experiences**. This is particularly problematic for coffee businesses, where one barista typically instructs multiple learners during pour-over coffee classes.



2.Objectives

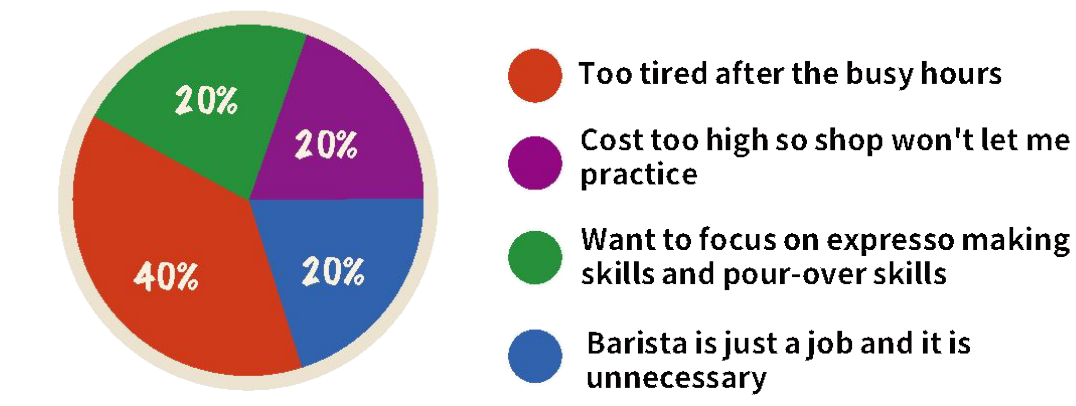
- To reduce the operating costs of coffee shops
- To maintain the consistent quality of hand-brewed coffee across different coffee shops
- To enable one-to-many pour-over coffee courses
- To attract people to share their pour-over coffee experiences on social media
- To promote the pour-over coffee culture experience



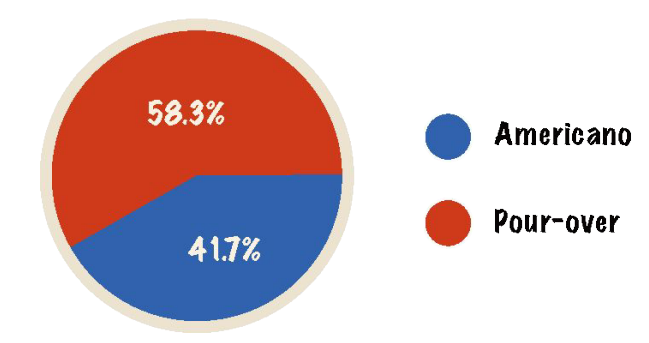
3.Methodology

I conducted a survey of baristas in the coffee industry and found that over 70% of them had worked in multiple cafés. The majority worked at café restaurants and nearby chains. They had experience working during peak hours, aiding the study. I also interviewed two coffee managers from two different well-known coffee brands and one highly experienced small local coffee shop owner. The survey aims to understand the factors affecting pour-over coffee quality, customer communication, and training costs for professional baristas. Additionally, a 3D printing prototype was completed in the last 12 months. I have also **finished a prototype using 3D printing technology and tested the model's dimensions, the functionality of the dripper stand, and water pouring trajectory, and connected the water injection pipe.**

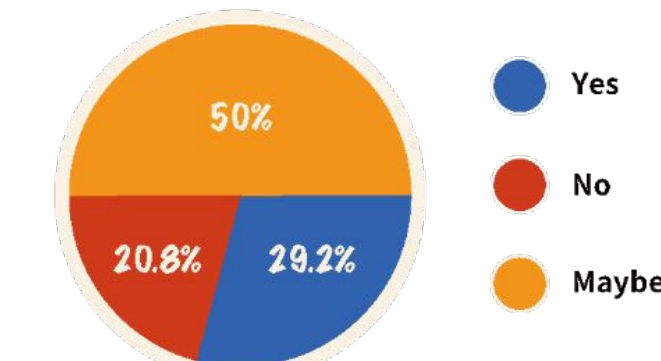
What would be the most likely reason that stopped you from practising other coffee brewing methods?



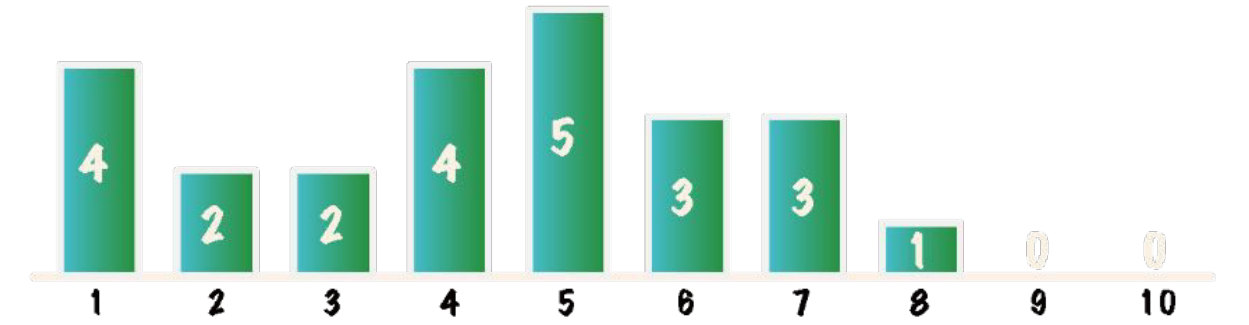
Which do you think the customer would pick if the price and wait time of an Americano and a pour-over coffee are the same?



Have you ever brewed pour-over coffee during peak hours, which might cause you to be distracted and affect the quality of your pour-over coffee?



If the answer is yes or maybe, How frequently do you believe the above situations happen?



4.Results and Discussion

I discovered that the main reason most baristas do not practise pour-over techniques in their free time is **tiredness** after work. Additionally, it would contribute to the uneven quality of the pour-over coffee during peak hours. Furthermore, my survey indicates that when the cost and wait time were the same, customers **prefer pour-over coffee to Americano.**

An automatic pour-over coffee maker can lower the cost of pour-over coffee in Hong Kong as well as the training expenses for junior baristas. It would also improve customer-barista communication, creating more shareable moments on social media. Thus, Hong Kong could learn from markets like Tokyo and Taiwan to develop its potential pour-over coffee market.



5.Usage

First of all, Customers can **first select the coffee bean** they wish to try. The barista can recommend a coffee bean based on its popularity and roast date if customers are having trouble choosing one.

Moreover , the baristas can **adjust the pour-over method according to the roast date**, which the coffee roaster has already programmed according to different bean characteristics . Most coffee beans begin to lose their distinctive qualities every other month, so there will be three different coffee recipes available every 30 days. Therefore, if a chain of coffee shops uses this coffee machine, all branches will serve the same taste of drip coffee , and the flavors of the pour-over coffee will remain consistent under the three-month tasting period . The barista just needs to **place the filter paper and coffee powder in the dripper** and **hit the start button** after selecting the coffee machine that isn't in use. The bottom part of the coffee machine has an electronic scale next to the start button. Customers can check the portion size of the coffee and the time.

Automatically, the coffee machine will set the height of the dripper stand and begin to pour water.