

StyleBot: Can AI Give Good Fashion Advice?

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Abstract

When it comes to giving good style pointers, it is expected that humans should be better than machines. But what if a machine can perform as good as (or maybe even better than) a human stylist at providing superb fashion guidance? In this paper, I present StyleBot, an attempt to investigate whether AI algorithms can really give good fashion and style recommendations, and not just generic ones, but advice that can even be perceived as computationally creative, by making use of personalization (giving advice *specifically* tailored to a particular user, based on a combination of their style preferences, body shape, upcoming events, etc). I begin by discussing the basis of my exploration, before explaining the approach I took to implementing StyleBot, which involved leveraging several existing technologies in a bid to produce optimal outputs. Finally, I conduct an evaluation of some of the system's results, including comparing them with simulations of real-world user interactions.

Introduction

In recent years, the use of chatbots has become an emerging trend in almost every

industry, not just fashion, especially with implementations like ChatGPT floating around. Nonetheless, chatbots have particularly seen a major growth in their use in the fashion industry in the last two years.

Complex versions of chatbots like ChatGPT can be viewed as creative systems that produce replies that are human-like. Language inventiveness is a component of their capacity to comprehend and produce text in a conversational style. Chatbots can generate creative, contextually relevant replies by utilizing language models; this can be seen as a form of computational creativity, a mixture of both generative and adaptive creativity as defined by Bown (2012, p. 361).

Similarly, as purchasing fashion items online continues to grow in popularity, the domain of fashion recommendation has received more and more attention (Chen et al., 2019). There is an expanding corpus of research on computer vision that deals with issues like localizing fashion goods, figuring out their category and qualities, or figuring out how similar they are to other products, to mention a few (Deldjoo et al., 2023).

Unlike other industries, consumer choices in the fashion sector are heavily influenced by the way a product looks (Chen et al., 2019). For instance, while shopping online, individuals frequently wait to buy clothes until they have looked at the product's photos. In line with this aspect, there have been several attempts in recent years to make use of product images when producing fashion recommendations (Chen et al., 2019).

In contrast, StyleBot approaches this in a different way. It not only attempts to give recommendations based on details provided by the user in a conversation but also to explain why it has given those suggestions and to visualize them as images, further exploiting the substantial influence that the visual appearance of items can have on the user's decision to follow its advice.

Creating this kind of system is no mean feat, however. Consequently, StyleBot was made by leveraging well-known, tried and tested models such as the GPT-3.5 (for message generation when talking to the user) and also DALL-E 2 (for generating images of recommended fashion items) by OpenAI. In doing so, I try to make a bot that is capable of intentionally producing advice that is valuable (and in some cases, can even be perceived as novel) to the user.

Related Works

There are more works related to chatbots in general, than the niche area StyleBot tries to examine. The list below details a few of them more closely related to StyleBot than others:

- 'Instacart is augmenting the Instacart app to enable customers to ask about food and get inspirational, shoppable answers. This uses ChatGPT alongside Instacart's own AI and product data from their 75,000+ retail partner store locations to help customers discover ideas for open-ended shopping goals, such as "How do I make great fish tacos?" or "What's a healthy lunch for my kids?" Instacart plans to launch "Ask Instacart" later this year' (Brockman et al., 2023).
- 'Shop, Shopify's consumer app, is used by 100 million shoppers to find and engage with the products and brands they love. ChatGPT API is used to power Shop's new shopping assistant. When shoppers search for products, the shopping assistant makes personalized recommendations based on their requests. Shop's new AI-powered shopping assistant will streamline in-app shopping by scanning millions of products to quickly find what buyers are looking for—or help

them discover something new’ (Brockman et al., 2023).

- ‘Snap Inc., the creator of Snapchat, introduced My AI for Snapchat+ this week. The experimental feature is running on ChatGPT API. My AI offers Snapchatters a friendly, customizable chatbot at their fingertips that offers recommendations, and can even write a haiku for friends in seconds. Snapchat, where communication and messaging is a daily behavior, has 750 million monthly Snapchatters’ (Brockman et al., 2023).

Methodology and Design

When designing this bot, I used the ChatGPT API (specifically the GPT-3.5-Turbo model) for developing the conversation part of the software to avoid StyleBot using pre-decided/pre-determined questions as using these does not really show any creativity on the computer’s part (or even prevents it) and also because the case of if a user gives an unexpected answer is more easily and probably better handled by the API than trying to account for it manually in my code. In addition, when prompting the GPT-3.5 model, I tried to write my prompt in such a way that it can serve as a fitness function and the model’s general knowledge as its knowledge base, resulting in the design of the system taking

on a more “Inception”-like structure (Ventura, 2016) and allowing the bot to be intentional in its responses.

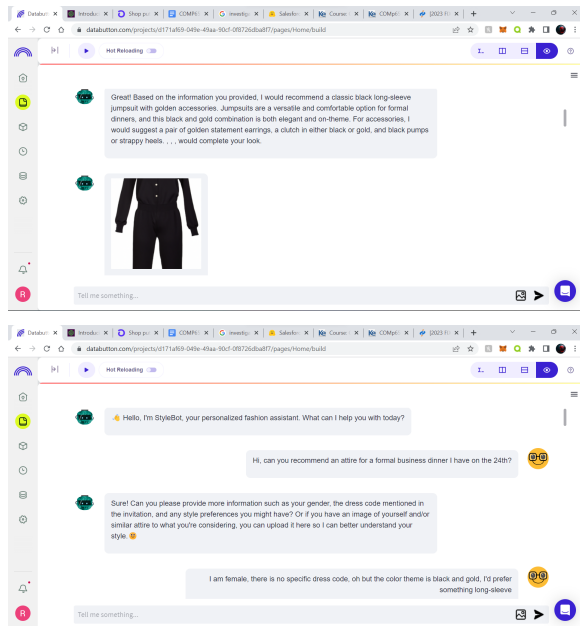
For image generation, I used the DALL-E 2 API. The bot worked by getting information by analysing the user-specific details provided during the conversation and using that to generate recommendations of fashion items and descriptions of those items are then passed to the DALL-E2 model which then generated realistic images of those items based on the descriptions provided.

The user can also upload images of themselves to inform StyleBot’s recommendations. StyleBot then generates a text description from the user’s uploaded image using one of the transformer models for Hugging Face’s Image-To-Text Pipeline. The specific model I used is called BLIP (Bootstrapping Language-Image Pre-training for Unified Vision-Language Understanding and Generation), created by Salesforce researchers. The version I used is the one with the Visual Transformer (ViT) base backbone.

The bot was implemented as an app in Python in the online DataButton IDE and Streamlit (an open-source app framework for machine learning and data science web apps, written in Python), in addition to HTML, CSS and Javascript.

Results

The screenshots below show the user interface of StyleBot and some of its outputs in a conversation with an example user:



Please see the included video demo for the full conversation.

Evaluation

Testing was carried out by simulating the behaviour of potential real-world users when conversing/chatting with StyleBot.

I evaluated my system using Colton's Creative Tripod, which involves evaluating a system's creativity, using three things (or metrics):

- The first one is Skill: Stylebot is able to demonstrate an understanding and some evidence of mastery of giving fashion recommendations The second one is Appreciation
- The second one is Appreciation: StyleBot is able to critically assess

the value of what it produces by including an explanation and its reasoning behind items it recommends

- The last one is Imagination: StyleBot is able to take different approaches to producing advice based on both the user's inputs and their method of providing those inputs, either textually or by uploading images.

Based on the outputs produced by StyleBot during testing, (including, but not limited to, the screenshots in the 'Results' section above, the contents of the Example Artefacts folder and the video demo included in my practical work submission), StyleBot achieves a good performance against all three metrics, and can therefore be considered a good creative system.

Conclusions

Overall, I have been able to make a creative software based on AI algorithms and machine learning models that is capable of giving, at the very least, reasonably good and personalized fashion recommendations and suggestions. Therefore, I am able to conclude that AI **can** give good fashion advice.

Even so, here some things that can be improved in future versions of this project:

I currently implemented this as a website, but a possible further improvement would be to develop it as an app that can connect to the email and calendar apps on your phone and provide notifications of fashion/clothing recommendations closer to the date and/or

time of a scheduled event. The app also has poor performance in terms of efficiency, further research and work can be done to optimise its performance when running large models.

Also, more work can be done on prompt engineering the ChatGPT API to give the right kind of advice in line with both computational creativity goals and the intended functionality for the app.

Furthermore, there are some minor bugs in the UI of the app that could not be fixed due to time constraints. These should also be resolved.

Finally, the initial feedback I received on my project proposal was that my project sounded like a very ambitious project. I found this to be quite true, as the app was meant to have an additional feature where the user can link it to their digital calendar and email and it would generate suggestions based on upcoming events of the user discovered through those sources. However, due to time constraints, I had to relegate this to being an extension task and I ended up not being able to do it before the project was due. This is an extra feature that can be added during future iterations of this project.

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