

## Integration of Large Language Models in Fashion Storytelling for Crowdfunding Campaigns

Hyosun An<sup>1</sup>, Yerim Choi<sup>2,3</sup>, Dain Ji<sup>2</sup>, Suji Kim<sup>2</sup>, Seyeon Kim<sup>2</sup>, Minjung Park<sup>4</sup>

<sup>1</sup>Dept. of Clothing and Textiles, Pai Chai University

<sup>2</sup>Dept. of Data Science, Seoul Women's University

<sup>3</sup>ai.m Inc.

<sup>4</sup>Dept. of Fashion Industry, Ewha Womans University

Keywords: fashion product, storytelling, crowdfunding campaigns, large language model, AI

### Introduction

Artificial intelligence (AI) technology is presenting innovative management paradigms and reshaping the online ecosystem in the fashion industry. Particularly, the fashion industry faces various challenges such as product oversupply, uncertain demand, environmental issues, and labor conditions. In response, leveraging entrepreneurial stories in crowdfunding campaigns introduces co-creation of value propositions and showcases the development process, thereby mobilizing resources from crowds. Many studies argue that crowdfunding is an innovative and functional way of bringing new fashion items to the market. They have analyzed various factors that make fashion product crowdfunding campaigns successful, also examining different narrative styles framed and interlinked to appeal to funders. Successful campaigns differ from unsuccessful ones in using narratives more coherently (Manning & Bejarano, 2017). This background leads us to investigate a framework for applying large language models (LLMs) for entrepreneurial stories within crowdfunding campaigns. While LLMs generate coherent sentences based on given topics or concepts, their ability to accurately reflect the unique values of crowdfunding projects and the dynamics of the fashion domain may be limited. Hence, collaborative efforts between fashion domain experts and IT professionals are crucial to developing LLMs that capture these complexities. This research aims to delineate the research and development process, fostering collaboration between fashion domain specialists and computer science experts to refine LLMs modeling tailored for fashion storytelling in crowdfunding campaigns.

### Literature review

Fashion storytelling in crowdfunding campaigns

Crowdfunding represents a service ecosystem wherein designs are co-produced, and value is co-created. Manning and Bejarano (2017) suggest that crowdfunding projects employ various narrative styles to convey the project's value. These styles, such as "ongoing journey" or "outcome in progress," are diverse and serve different purposes. The former invites participation in the project's journey with creative initial ideas and bold visions, while the latter succinctly describes the project's accomplishments to garner support for subsequent stages. Additionally, previous research has identified that storytelling elements in crowdfunding fashion campaigns are utilized and combined in various ways. This utilization of narrative styles in fashion storytelling within crowdfunding campaigns reflects the tangibility of project outcomes, the sophistication of technology, and the social orientation of projects. Furthermore, successful campaigns are distinguished from unsuccessful ones by their coherent use of narratives.

## Generative AI and LLMs

Recent advancements in generative AI technology, utilizing deep learning and machine learning algorithms, have garnered significant attention for their ability to learn patterns from input data and generate new data while preserving the characteristics of the original dataset (Baidoo-Anu & Ansah, 2023). Particularly, LLMs have demonstrated impressive capabilities across a wide range of complex and economically valuable tasks, challenging previously held beliefs about the necessity of human cognition for these tasks (Naveed et al., 2023). These LLMs specialize in text generation, producing natural-sounding sentences based on provided topics or ideas, with advantages including understanding complex language contexts and delivering sentences with high accuracy, naturalness, and style (Ozdemir, 2023). LLMs show significant promise in storytelling (Yuan et al., 2022). Incorporating user preferences into LLMs offers a considerable advantage in ensuring accurate outputs. Particularly, accurately reflecting the characteristics of the fashion domain necessitates close collaboration between experts in the fashion field and IT professionals. This underscores the importance of integrated technological development through academia-industry collaboration.

## Methods

This study aims to discuss the requirements for Fashion Storytelling LLMs supporting crowdfunding campaigns through collaborative research between fashion domain experts and IT professionals and to define the research and development process. First, fashion campaigns from the past year on Korean crowdfunding platforms such as Wadiz and Tumbbug were collected, and content analysis was conducted to analyze the components of crowdfunding fashion storytelling. Second, two rounds of expert interviews were conducted. The first interview, a Focus Group Interview (FGI), involved five fashion research and development experts and one computer engineering expert, discussing the requirements for LLMs in crowdfunding fashion storytelling. The second interview comprised question-answer sessions and consultations with four industry experts proficient in LLMs technology. Subsequently, the identified requirements were applied to the LLMs training stages proposed by Naveed et al. (2024) to develop a framework for the LLMs modeling process for crowdfunding fashion storytelling and derive suitable elements and guidelines for each process.

## Findings and discussion

Firstly, through the FGI, several requirements emerged regarding the design and development of LLMs for fashion storytelling. These requirements included the necessity for entrepreneurial stories across different project types, where project histories and potential futures were framed and interlinked in narratives to effectively communicate and interact with supporters. Secondly, the LLMs modeling process was delineated into six stages, each with detailed activities: data collection and preprocessing, pre-training, fine-tuning, reward modeling, reinforcement learning, and aligned LLMs construction. During the data collection and preprocessing as well as the pre-training stages, the primary tasks are typically carried out by computer engineering experts. In subsequent stages such as fine-tuning, reward modeling, reinforcement learning, and aligned LLMs construction, both groups work together to refine the model and integrate domain-specific knowledge. Specifically, in the fine-tuning stage, fashion experts and computer engineering experts collaborate to establish the lexical relationships between fashion entrepreneurial values

and design elements into a knowledge graph. In the reward modeling stage, fashion experts evaluated the model's responses to enhance its quality, and in the reinforcement learning stage, the model was optimized to reflect fashion expertise. During the aligned LLMs stage, the model adjusted to meet user demands by generating outputs in response to queries or commands and iteratively refining the model using these outputs as inputs.

### Conclusions and further research

This study underscores the importance of collaboration between fashion experts and IT professionals in developing LLMs for fashion storytelling in crowdfunding. The identified requirements emphasize the need for entrepreneurial narratives and the integration of project histories to engage supporters effectively. The outlined LLMs modeling process highlights the involvement of fashion experts in fine-tuning stages as crucial for tailored model development. In future research, we aim to conduct empirical experiments following the step-by-step process derived from this study.

### Funding

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2024S1A5A2A03038464)

### References

- Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, 7(1), 52-62.
- Manning, S., & Bejarano, T. A. (2017). Convincing the crowd: Entrepreneurial storytelling in crowdfunding campaigns. *Strategic Organization*, 15(2), 194-219.
- Naveed, H., Khan, A. U., Qiu, S., Saqib, M., Anwar, S., Usman, M., ... & Mian, A. (2023). A comprehensive overview of large language models. *arXiv preprint arXiv:2307.06435*.
- Ozdemir, S. (2023). *Quick Start Guide to Large Language Models: Strategies and Best Practices for Using ChatGPT and Other LLMs*. Addison-Wesley Professional.
- Yuan, A., Coenen, A., Reif, E., & Ippolito, D. (2022). Wordcraft: story writing with large language models. In Proceedings of the 27th International Conference on Intelligent User Interfaces, 841-852.