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1 Research interests

My primary research focus lies in the domain of *Text Style Transfer (TST)*, a fascinating area within Natural Language Processing (NLP). *TST* involves the transformation of text into a desired style while approximately preserving its underlying content. In my research, I am also driven by the goal of incorporating *TST* techniques into NLP systems, particularly within the realm of dialogue systems. I am intrigued by the concept of *Stylized Dialog Response Generation*, which aims to enhance the versatility and adaptability of dialog systems in generating text responses with specific style attributes. By advancing our understanding of *TST* and its integration into dialogue systems, my research seeks to contribute to the broader field of human-computer interaction. Through the development of robust and versatile dialogue systems with enhanced style transfer capabilities, we can facilitate more engaging and personalized conversational experiences.

1.1 Text Style Transfer

Text style transfer (*TST*) is an NLG task that aims to automatically control the style attributes of a text while preserving the style-independent content (Jin et al., 2022; Hu et al., 2022). In McDonald and Pustejovsky (1985), style is defined as a notion that refers to the manner in which semantics is expressed. Style has also been defined in Hovy (1987) by its pragmatic aspects, which can be expressed as a variety of concepts, such as sentiment, emotion, humor, similes, personality, politeness, formality, simplicity, or authorship, which is generally expressed in the *TST* research as a variety of styles (Jin et al., 2022; Hu et al., 2022). Table 1 shows some basic examples of *TST*.

My research interests in the field of *Text Style Transfer (TST)* encompass several important areas:

- Exploring methods to perform *TST* task without direct supervision (i.e., in case of the unavailability of the parallel data).
- Developing models that accurately control style attributes while preserving the style-independent content in the generated text.

- Deal with the barriers of lack of training and evaluation datasets in *TST* tasks.
- Designing comprehensive evaluation measures tailored specifically to *TST* tasks to ensure reliable assessments of system performance.
- Build *TST-based* downstream applications.

In my research, I have developed a sentiment transfer model (Mukherjee et al., 2022) that accurately controls sentiment attributes in generated text, striking a balance between style transfer and content preservation. Additionally, I have proposed a polite chatbot (Mukherjee et al., 2023) that generates polite and coherent responses based on the given context.

Moving forward, my future research will focus on further tackling the challenges in *TST* tasks, introducing innovative automatic evaluation measures, providing benchmark models and datasets for the *TST* community, and building *TST-based* applications.

1.2 Stylized Dialog Response Generation

In the field of dialogue systems, researchers are using Text Style Transfer (*TST*) techniques to generate dialog responses with different styles. *TST* allows them to manipulate the style of the generated text, such as making it more informal or adding specific emotions or politeness. This enhances the flexibility and adaptability of dialog models to produce text that matches desired style attributes. While traditional research in dialogue response generation focused on producing grammatically correct and contextually relevant responses, it was found that simply being coherent may not make the chatbot engaging.

Politeness plays a crucial role in enhancing interactions and relationships between participants. To address this, we developed a polite chatbot model that generates responses that are both polite and coherent in the given context (Mukherjee et al., 2023).

Researchers also explored generating persona-based responses to maintain consistency and capture background information (Li et al., 2016). They encoded personas of individuals to model human-like behavior. For

	Source Style	Target Style
Impolite → Polite:	Shut up! the video is starting!	Please be quiet, the video will begin shortly.
Negative → Positive:	The food is tasteless.	The food is delicious.
Informal → Formal:	The kid is freaking out.	That child is distressed.

Table 1: *TST* examples regarding sentiment, polarity, and formality.

example, the Emotional Chatting Machine introduced by Zhou et al. (2018) generates responses with emotional tones based on the content.

By leveraging TST techniques and exploring different style attributes, including conversational style, emotion, and politeness, researchers aim to create more engaging and personalized dialog systems. These efforts contribute to aligning dialog systems with user preferences and expectations.

2 Spoken dialogue system (SDS) research

In the next 5 to 10 years, the field of dialogue research will witness significant advancements. Young researchers have the opportunity to contribute to transformative developments in Spoken Dialogue Systems (SDS).

The convergence of academia and industry will narrow the gap between theoretical advancements and practical applications. This collaboration will lead to more robust and adaptable SDS architectures, enabling non-experts to create virtual conversational agents and collaborative assistants easily.

Key questions to address include leveraging language models for practical task-oriented dialogue systems, incorporating cognitive modeling to enhance goal-driven behavior, and focusing on user-centricity and extreme personalization.

There are differences between SDS research in academia and industry, with academia emphasizing fully automated learning and interpretability, while industry research gradually incorporates neural components into hand-coded systems.

SDS will be widely used in various scenarios, including voice assistants in everyday devices, specialized applications like car assistants and healthcare, and "AI for good" initiatives for accessibility and inclusivity.

In summary, the future of SDS research lies in the convergence of academia and industry, the development of user-centric and personalized dialogue systems, and collaboration between interdisciplinary researchers.

3 Suggested topics for discussion

As we delve into the exciting realm of spoken dialogue systems (SDS) research, we propose three thought-provoking topics for discussion during the event. These topics not only align with our expertise but also resonate

with the interests and relevance to the young research community.

Stylistic Expressiveness in Dialogue Systems: One area of focus is exploring the potential of text style transfer (TST) in stylized dialog response generation. Discussions can revolve around advancements in generating stylistically expressive responses, including but not limited to polite dialog generation, personalized dialog generation, and other forms of stylized dialog response generation. Sharing best practices, challenges, and novel techniques to achieve high-quality and contextually appropriate stylized responses would enrich our understanding of how to enhance the naturalness and user satisfaction in SDS interactions.

Evaluation Metrics for Stylized Dialog Systems:

Evaluation plays a crucial role in assessing the effectiveness and performance of SDS, particularly in the context of stylized dialog response generation. Engaging in discussions about the development of evaluation methodologies, metrics, and benchmarks specific to stylistic qualities would greatly benefit the research community. By addressing challenges such as subjective assessment, cross-system comparison, and capturing the nuances of style, we can establish standardized evaluation practices that facilitate fair and comprehensive evaluations of different stylized dialog systems.

Ethical Considerations in Stylized Dialog Systems:

Given the increasing adoption of SDS and the impact it has on human-computer interactions, ethical considerations are paramount. Engaging in discussions about the ethical implications of stylized dialog systems, such as potential biases, fairness, transparency, and privacy concerns, would enable us to develop responsible and socially aware SDS solutions. By collectively exploring ways to mitigate biases, ensure user privacy, and foster inclusivity in stylized dialog systems, we can shape the future of SDS research with a strong ethical foundation.

These suggested topics provide opportunities for knowledge exchange, critical thinking, and collaboration among researchers interested in text style transfer and stylized dialog response generation. By delving into these areas, we can foster innovation, address challenges, and drive the advancement of SDS technologies with a focus on user-centricity and ethical considerations.

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Biographical sketch

Sourabrata Mukherjee is an aspiring researcher currently pursuing his fourth year of a Ph.D. program at Charles University in the Czech Republic, under the guidance of Ondřej Dušek. Before starting his Ph.D., he worked as a machine learning engineer in the software industry. Sourabrata Mukherjee obtained his master’s degree in computer science from the esteemed National Institute of Technology in Durgapur, India.

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