Virgile Sucal
Avignon Université, LIA, UPR 4128
Avignon, France
virgile.sucal@univ-avignon.fr

1 Research interests

The focus of my research lies in the application of dialogue systems within the context of situated robotics. A primary aspect of my work involves **the integration of contextual information** — particularly **audiovisual perceptions** — in the dialogue policy. Another main dimension concerns the control of the **interaction policy**, through the selection of contextually appropriate actions aligned with the user's expressed needs and intentions. In this regard, I explore mechanisms for proactive decision-making in multimodal interaction settings. Additionally, I am interested in enhancing the robot's expressiveness by incorporating **non-verbal communication** cues into the interaction pipeline. My current work aims to investigate and compare various approaches, such as **agentic workflows** or **reinforcement learning**, to address these challenges within a unified framework, with the goal of enabling more consistent and contextually aware **human–robot interaction**.

1.1 Prompt building for multitask management in LLM-based spoken dialogue system

The *muDialBot* project (Lefèvre et al., 2023) is designed to endow a social assistive robot with human-like conversational capabilities and proactive behaviors and deploy it in a real-world clinical setting at Broca Hospital in Paris. Among the various decision-making modules responsible for managing the robot's social features, the dialogue system is built upon large language models (LLMs). Leveraging advances in prompt engineering (Liu et al., 2021) and instruction tuning (Ouyang et al., 2022), LLMs are capable of interpreting embedded information inside prompts as structured knowledge bases to output relevant responses to user queries (Njifenjou et al., 2023).

My primary contribution to the project consisted of a multitask spoken dialogue system powered by an LLM, utilizing a dynamic prompt-building strategy. This method constructs prompts by extracting contextual features from the ongoing conversation and formulating targeted queries to the LLAMA 3 model (Grattafiori et al., 2024).

1.2 LLM-based agentic workflow for proactive situated human-robot interactions

The complete system developed for the *muDialBot* project (Dhaussy et al., 2023), which incorporates the dialogue system presented in the section 1.1, is structured as a pipeline in which multiple independent modules make decisions regarding various aspects of the interaction. However, the lack of coherence among these distinct decision-making policies highlighted the need to consolidate them into a unified process that accounts for interdependencies between the policies.

Building on recent advances in robotics—including developments in path and physical action planning (Huang et al., 2023; Sypherd and Belle, 2024; Moncada-Ramirez et al., 2025; Wang et al., 2025) and object detection (Moncada-Ramirez et al., 2025; Chen et al., 2025; Wang et al., 2025), as well as progress in related fields such as natural language processing (NLP), where LLMs have been utilized in an agentic way to improve tasks like question answering (Shwartz et al., 2020) and memory/tool management in dialogue systems (Sypherd and Belle, 2024), the proposed approach adopts an agentic workflow paradigm. An agentic workflow is defined as a structured process composed of interdependent subprocesses executed according to predefined dependencies. When applied to LLMs, this involves structured sequences of LLM calls guided by specific instructions (Qiao et al., 2025; Zhang et al., 2025).

While prior work has generally treated these components independently, the proposed approach (Sucal et al., 2025) aims to integrate them within a unified agentic workflow. This integration facilitates coordinated control over a wide range of a robot's social capabilities through a consolidated sequential policy, encompassing three main features. **Proactivity** allows the robot to autonomously initiate, adapt, or terminate a dialogue, based on contextual information. **Spoken dialogue management** enables spoken interaction. **Non-verbal communication** allows environmental context management and affective states simulation to enhance human acceptance (Saunderson and Nejat, 2019).

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1.3 Next step: context aware dialogue system configuration relying on reinforcement learning approaches

The approach proposed in Section 1.2 enables control over all robot features involved in the interaction process. Furthermore, leveraging the ability of LLMs to simulate human reasoning (Wei et al., 2022; Ke et al., 2025) introduces a degree of explainability into the decision-making process, which is valuable for prompt refinement.

However, this approach is also the subject of certain limitations. The primary drawback is latency, which arises from the multiple calls to the LLM. Another limitation is the reliance on human-written prompts, which are often suboptimal unless subjected to substantial prompt engineering efforts.

To address these challenges, my current work focuses on developing a reinforcement learning policy to govern the same functionalities as the agentic workflow. This shift also necessitates identifying an effective representation of contextual information so that it can be efficiently used by the algorithm. The new policy being entirely learned, it will not require any additional human intervention.

2 Spoken dialogue system (SDS) research

Beyond the purely technical and scientific challenges associated with the future development of SDS, environmental considerations are becoming increasingly prevalent. Current SDS architectures rely on very large models, whose training entails a substantial environmental cost. Given the conclusions of the latest IPCC reports regarding the climate crisis (IPCC, 2023), the development of future dialogue systems could incorporate environmental factors.

A wide range of existing models already support highly advanced applications, both in research and for the end users. From an environmental perspective, it may therefore be relevant to prioritize research efforts aimed at optimizing the use of existing LLMs, rather than focusing on the large-scale creation of new models. Such an approach could also contribute to a deeper understanding of the underlying mechanisms governing the behavior of these models. For instance, the recent discovery of ChatGPT's ability to simulate theory of mind (Kosinski, 2024) illustrates how LLMs may exhibit emergent capabilities despite the absence of explicit training for such tasks.

3 Suggested topics for discussion

The following topics appear to be relevant foundations for discussion sessions:

- Evaluation of dialogue systems: challenges in the reproducibility of human evaluations, reliability of the LLM-as-a-Judge approach, alternative evaluation methods.
- Multilingualism: integration of low-resource languages in SDS, extension of large language models' conversational capabilities to additional linguistic contexts.
- User privacy: data anonymization, respect for intellectual property rights, and encryption of user data on cloud services.
- Scientific outreach: fostering of responsible and healthy use of conversational and generative AI tools among children, information support to teachers and parents regarding the implications and potential risks associated with such technologies.

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Biographical sketch

Virgile Sucal is currently a PhD student at the Laboratoire Informatique d'Avignon (LIA), within the computer science department of Avignon Université, under the supervision of Professor Fabrice Lefèvre. His thesis is funded by the regional council of Region Sud, in France, and the company ERM Automatismes. He holds a Bachelor's degree in Computer Science and a Master's degree in Artificial Intelligence, both obtained from the same institution. His research focuses on dialogue systems, with a particular interest in their application to situated robotic contexts and the representation of contextual information.