Extension and evaluation of a prototype interaction framework

Duration 4–6 months
Level master
Team Loki (Inria Lille Nord Europe & CRISTAL)
Advisor(s) Damien Pollet (damien.pollet@inria.fr)
Stéphane Huot (stephane.huot@inria.fr)

This project in Human-Computer Interaction (HCI) aims to assess the expressivity of a prototype HCI framework and to identify its design principles, by developing demonstrators of various interaction techniques.

Context
Researchers exploring and prototyping novel interaction techniques challenge the limits of the most widely used frameworks (Cocoa, Qt, Android, JavaFX). Because those frameworks are strongly biased towards conventional interaction techniques, they only provide limited support for novel use-cases. Researchers therefore resort to hacking methods or private APIs to prototype their ideas.

Polyphony is a prototype HCI framework based on the Entity-Component-System model (ECS). In this model, continuously running processes (systems) manage the behavior of interactive elements (entities), which are characterized by dynamically assigned properties (components). While the ECS model goes against established object-oriented practices, it seems much more flexible and better suited for non-anticipated interaction.

Objectives
The objectives of this project are to:
- Implement a small catalogue of demonstrators in Polyphony, covering a diversity of interaction techniques, extending Polyphony with support for the needed additional input and output devices along the way.
- Identify useful programming idioms, design principles and patterns, but also hurdles and compromises wrt. best practices and the sustainability of Polyphony's approach in the long run (testability, modularity, object-oriented design)

References
“Application du modèle Entité-Composant-Système à la programmation d’interactions.”

“Polyphony: Programming Interfaces and Interactions with the Entity-Component-System Model.”
In: PACMHCI (Proceedings of the ACM on Human-Computer Interaction) 3:EICS (2019). ISSN: 2573-0142. DOI: 10.4115/3331150. URL: https://hal.inria.fr/hal-02147180.

Candidate
The candidate must demonstrate an interest in HCI, and strong skills in programming, software engineering and design. He/she will have to demonstrate technical and conceptual creativity. A good level of technical and scientific English is also a plus.