

# Moirai: Negotiation-through-Interaction for Healthy Exercizing

**Romain Toebosch**  
University of Luxembourg  
[romain.toebosch@uni.lu](mailto:romain.toebosch@uni.lu)

**Carine Lallemand**  
University of Luxembourg  
Eindhoven University of Technology  
[carine.lallemand@uni.lu](mailto:carine.lallemand@uni.lu)

## ABSTRACT

We present Moirai, a device that aids runners in self-regulating their running routine. By negotiating with the device, runners can balance their desire to achieve their goals while preventing overtraining injuries. The interaction relies on the strategic repertoire principle, a five-way taxonomy of strategies used in human-human negotiation. The user and the system can use the following strategies: contending, conceding, compromising, problem-solving, and avoiding. Behavior change design predominantly focuses on the first two: contending relates to hard paternalism, where the user has no choice but to accept, and conceding to soft paternalism or nudging, where the user can deviate from a default. The other three strategies are relatively underexplored, the closest to some of these being the aesthetic of friction. Relying on data and human negotiation strategies to reach a goal that is not solely one of the users, Moirai can appear as a moral agent. We envision these principles as applicable beyond the exercising context to other domains that require self-regulation, such as health, sustainability, or productivity-related applications.

**Author Keywords:** negotiation; tangible interface; recreational running; aesthetics of intelligence; self-regulation; moral agents.



*Some recreational runners hire a running coach to help them define and plan optimal trainings. Trusting their expertise, they follow the coach's instructions and, at times, negotiate adjusted training conditions. The coach ensures that the practice is healthy and won't lead to overuse injuries.*

*Imagine now an interactive artefact overseeing your training. Receiving data about your running sessions and overall health, Moirai is your coach. Moirai acknowledges that you are entitled to have a say in your training choices. Yet it simply believes that you do not always know what is good for you. Moirai wants to help you be reasonable. Behind its bulky appearance, Moirai is a tough negotiator that wishes you well. It uses human-inspired negotiation strategies to reach a shared goal.*

### Aesthetics of Interaction of a negotiation-through-interaction exemplar

Moirai – based on the Greek name of the Fates - is a connected artefact that allows users to ‘negotiate their destiny.’ It is used during the forethought phase of a runner’s journey [6] on the day of the desired run. Three sliders represent three running days: the left slider represents how much distance the user made during the previous run; the middle slider how much they will run today, and the right slider how much they will run the next session. The height of the handle of sliders is running distance, whereas the distance between sliders represents how many days in between runs. How much the user ran their last run and how many days are between it and today are a given, the other variables (how much will be run today and next run and how many days are in between) are up for negotiation.

The sliders’ aesthetics evokes a calm home-feeling, using wood laminate and greyscale colors. The sides of the sliders are made of fabric and soft to the touch, inviting the user to move them around. The front of each slider is a highly reflective white surface which, together with the aluminum handles and reflective middle black strip, give a faint mirror-like effect, as to prompt the user to reflect on with whom they are actually negotiating: with a device, or with themselves?



Strategic Repertoire Principles (de Dreu et al., 2007)

Principle	Definition
Contending	Imposing one's will on the other side. Involves the use of persuasive arguments and positional commitments.
Conceding	Oriented towards accepting and incorporating the counterpart's will. Involves unilateral concessions, unconditional promises and offering help
Compromising	Involves the matching of other's concessions, making conditional promises and threats, and actively searching for a middle ground
Problem solving	Full and open exchange of information about priorities and preferences
Inaction	Part of an overarching contending strategy and used strategically to get further concessions

### Aesthetics of Intelligence and Morality

From a negotiation perspective, Moirai embeds both cooperative and competitive incentives, as the goals of the runner and Moirai do not necessarily align (e.g., reaching milestones vs. preventing overuse injuries), but are dependent on each other. Interaction styles are based on the strategic repertoire principle, a five-way taxonomy of strategies used in negotiation: contending, conceding, compromising, problem solving, and avoiding [2]. *Contending* focusses on imposing one's will on the other side, while *conceding* is oriented towards accepting and incorporating the counterpart's will. *Compromising* involves the matching of other's concessions, while *problem solving* involves full and open exchange of information about priorities and preferences. Finally, *avoiding* is the action of withdrawing or remaining inactive. Sometimes this can be part of an overarching contending strategy, or a genuine result of a decision dilemma. To adjust its strategies, Moirai relies on the running data about previous training sessions (routes, intensity, duration, extracted from activity trackers) combined with the subjective data revealed by the user during the negotiation. The pro-sustainable goal of health and wellbeing is inscribed in its value system.

Moirai is part of a family of interaction devices named Tradeable, inspired by the idea of “trading” with a system [1,4,7]. Like the interactive mirror Hyaku [7], Moirai is a “qualitative interface including quantification behind the scenes”. It echoes with concepts such as the aesthetic of friction [3] or objects with intent [8]. Speculatively, Moirai could make choices and act based on its own value system, make moral demands to its users, and even possibly act autonomously upon an ecosystem of devices (e.g., modifying the route suggested by the running app or the information displayed to the runner). It could deliberately switch negotiation styles to convey or even push its ethical stance of health over performance, even if this is not aligned with the user. This could be exacerbated if the actors creating and promoting Moirai do not share the same values as its user – e.g., an insurance company or health institution trying to reduce medical costs – further impacting users autonomy. Alternatively, users could also themselves want a counterpart arguing for their health when they are striving

for performance, in which Moirai would only represent the internal tension of values the user already has.

As a research-through-design project, Moirai can open discussions around agency and morality related to the sustainable development goal “health and well-being”. The principles of negotiation-through-interaction [1] can be explored in other domains requiring self-regulation, such as sustainability.

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