

# Chapter 66

## High Performance Computing of Possible Minds

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### ABSTRACT

*It has been shown that the space of possible minds is vast, actually infinite. Intellectology is a new field of study, which examines in more detail features of possible minds. Among the many open and unexplored questions in this field is the following: “Which activities can minds perform during their lifetime?” This question is very broad, thus our contribution here addresses the sub-question “Which non-boring activities can minds perform?” This issue is ethically relevant for human minds if the predicted significant extension of our lifetime materializes and we are then potentially challenged how to spend this additional time. The space of potential non-boring activities has been called “fun space.” We analyze the relation between various types of minds and the portion of the fun space, which is accessible for them. As a novel result, we demonstrate that human minds can experience two types of fun when transforming information to knowledge: novelty fun and process fun.*

### INTRODUCTION

We motivate the relevance of the question “Which non-boring activities can minds perform?” as follows: There is optimism for a significant extension of the lifetime of humans in the near and medium future. Yet, some people expressed concern that there is not enough accessible fun space, thus much longer lives would not be fulfilling and mostly boring, as examined by Walker (Walker, 2006). Therefore, the subject of this article, to analyze the accessible fun space for various minds, is critical in order to conclude whether an extended lifespan is desirable.

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In addition, future scenarios can be envisaged when humans are enhanced by intelligence amplification and other transhuman features, potentially supported by friendly AI. Further scenarios include transition to substrate-autonomous persons, e.g. through uploading or whole brain emulation (Koene, 2012; Bostrom, 2014). In the latter case, lifetime could increase almost indefinitely, and also former unknown sensations could be perceived. Also for this option, concerns have been raised that it will turn out to be boring for such enhanced humans due to the lack of remaining intellectual challenges. In contrast, others believe the fun space is large enough for either scenario (e.g. Moravec, 1988; Yudkowsky, 2015; Bostrom, 2008)

Yet another view by Pearce is that in a parallel development boredom will be “neurochemically impossible” through advanced technology (Pearce, 2012; Yampolskiy, 2015). Therefore, although human minds are only a small subset of the space of possible minds, for this type of minds the question about sufficient non-boring activities, i.e. enough accessible fun space, is very important.

In addition, we are addressing the question of accessible fun space also for non-human minds by aiming to contribute to one aspect of the field of “intellectology” (Yampolskiy, 2015). Yampolskiy has introduced “intellectology” as a new area of study in order to turn away from a human-centric view regarding minds and to examine in more detail features of any possible minds. This universe of possible mind designs is actually vast and certainly merits investigation; especially given the possible scenario that one group of minds, that is minds of AI agents, may cohabit with us in the not so far future.

This paper is structured as follows: In the following section, we provide an introduction to the space of minds and how it has been explored and defined in the literature. This is followed by an introduction to the space of fun, which enables us to further specify the critical questions for our subject. In the following main section, we present our contribution to the field of “intellectology” by analyzing relationships between the space of minds and the space of fun.

## **RELATED WORK**

First, we present related work to the space of minds. When we reason about minds we tend to think of human minds only. This is because of the anthropomorphic bias. However, in addition, there are other minds, which we encounter on earth, the minds of higher order animals, and then there are various minds, which we can imagine as possibility and perhaps even more beyond our imagination (“unknown unknowns”). Several theoretical surveys on this topic exist and it has been shown that the space of possible minds is vast (e.g. Sloman, 1984; Goertzel, 2006; Hall, 2007; Yudkowsky, 2008; Yampolskiy, 2015).

Examples for potential minds could be human-designed AI minds, self-improving minds, a combination of minds constituting itself a mind and many more. There have been several attempts to classify the space of minds (Yampolskiy, 2015). In fact, the space of human minds forms only a tiny subset within the universe of possible minds (Yudkowsky, 2008). The space of possible minds can be considered as the set of possible cognitive algorithms. Based on this and on the limited number of cognitive algorithms, which human minds can potentially perform, it can be concluded that the majority of possible minds is more intelligent than human minds. Yampolskiy and Fox describe this insight as another example of a Copernican Revolution, i.e. a revision of the view that humanity is central, which in this case refers to minds (Yampolskiy & Fox, 2012).

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