**How Hard, Logico-Mathematically Speaking, is Real War (Including of the Ethically Correct Variety) for an AI:  Answers from Study of the Game *Ekte Krig***

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Point #1:  Paul Scharre (2023) is correct that AI is the pivotal military battleground of the 21st century.  Point #2:  The field of AI has long focused on games; Checkers, Chess, and Go are for instance (adversarial) games that AIs have been built to excel at, courtesy of inordinate effort on the part of AI researchers.  So, a question:  Prowess in what game by an AI would entail military superiority for the nation that possesses that AI?  Answer:  Well, *contra* Scharre, not poker, and more generally, not any game so simple that computational game theory and/or deep learning and/or reinforcement learning can be the basis of an AI’s prowess in the game.  What’s needed is a game that captures real war, in all its hardness.  That game, which we here introduce, is *Ekte Krig*..

To understand *Ekte Krig*, one must first understand easy games of perfect information, such as Chess, Checkers, and Go.  These are all not only Turing-decidable, but — despite what you may have heard from popularizers — of the same particular hardness:  they are all in the same exact, rather humble category in the Polynomial Hierarchy, viz. **EXPTIME-complete**.  We next move to another category of easy games, ones whose play with full information is Turing-decidable, but with only partial information get trickier.  Our paradigmatic example here will be poker.  It is then shown that real war far, far exceeds the simplicity of poker, in any form.  This is shown by placing real war [which includes e.g. both espionage and economic strategy in line with (Bringsjord et al. 2012)] within the hierarchies of much harder problems than those in the Polynomial Hierarchy:  viz. the Arithmetical and Analytical Hierarchies, and the new *Logic Machines* hierarchy (**LM**) that subsumes this pair.  After reviewing some Turing-uncomputable perfect-information games from Motalen, with roots going back to (Govindarajulu 2013), we introduce the game of *Ekte Krig*, Norwegian for “Real War,” and explain: (a) why, unlike Poker, it is logico-mathematically faithful to the hardness of real war, which is easily proved Turing-uncomputable; (b) where, minimally, *Ekte Krig* falls in **LM**; and (c) how an AI able to play *Ekte Krig* can be designed and engineered.  Such an AI would be highly destabilizing, because a nation that possesses it would have nonpareil military power.  Finally, we explain that whereas ethical correctness of a Poker-playing AI is easily obtained, ensuring ethical correctness of an *Ekte Krig*-playing AI will be extraordinarily difficult.

**References**

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