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The Primary Language of Scientific Discoveries, Part 1

In this tutorial, I will make a deeper dive into the topic of my keynote talk by introducing the audience to the structure of the Primary Language of the human brain following the ideas of J. von Neumann. In 1957, he suggested existence of the Primary Language as opposed to the Secondary (conventional) languages utilized for talking, reading and writing. According to our hypothesis, there should be algorithms based directly on the Primary Language. They were developed by humans subconsciously in ancient times. They include the Algorithm of Discovery (AD) utilized for all the discoveries and Linguistic Geometry (LG) utilized for efficient war fighting. More precisely, LG is a type of game theory that permits solving a class of opposing games by constructing (not searching) the solution and this way avoid combinatorial explosion.

The tutorial includes brief introduction to LG and application of the simulated AD to rediscovering the major result in LG. It is the so-called No-Search Approach. This approach shows that LG generates optimal solutions for a class of opposing games without search and demonstrates construction of those solutions. The essence of this approach is the efficient decomposition of the game state space. The AD implements decomposition via constructing a visual model of the state space called a State Space Chart. This Chart serves as a strategic “geographical map” of the state space by providing guidelines for “travel” from state to state. The AD uses this Chart for traveling from the start state to the set of goal states. It appears that the travel path is the optimal strategy. All the required information will be included in the tutorial.

Biography

Boris Stilman received MS in Mathematics from Moscow State University, Russia, in 1972, and two PhDs in Electrical Engineering and Computer Science from National Research Institute for Electrical Engineering, Russia, in 1984. Based on his 17-year experience in the research project PIONEER led by a former World Chess Champion Professor Mikhail Botvinnik, Dr. Stilman developed Linguistic Geometry (LG), a new theory for solving abstract board games. In 1991-2018, Dr. Stilman was developing the theory and applications of LG at the University of Colorado. A leap in the development LG was made in 1999, when he (with a group of scientists and engineers) founded STILMAN Advanced Strategies, LLC. A growing number of applications of LG developed at STILMAN passed comprehensive testing and powered intelligent defense systems around the world. In 2010, Dr. Stilman broadened the scope of his research on intelligent systems via investigating the structure of the Primary Language of the human brain.

Dr. Stilman published several books and over 200 research papers. He is a recipient of numerous R&D awards including those from the US government agencies such as DARPA and major companies such as Boeing.

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