Boris Stilman, Adv Robot Autom 2018, Volume 7
DOI: 10.4172/2168-9695-C4-023

6th Global Summit on
ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS
October 15-16, 2018 Helsinki, Finland

Boris Stilman

University of Colorado & STILMAN Advanced Strategies, USA

Introduction to the primary language: Discovering mysteries of opposing games

It deals with the structure of the Primary Language of the human brain. There will be a demonstration on application of the Algorithm of Discovery (AD) to rediscovering Linguistic Geometry (LG), 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. Due to its scalability, LG serves as a foundation for the development of multiple intelligent defense systems in the USA and abroad. The tutorial includes brief introduction to LG and two examples of discoveries of the major results in LG. It appears that the theory of LG is actually a translation from the Primary Science of visual streams into the Conventional Science of mathematics. The first example includes application of the AD to the development of the grammar of shortest trajectories. These trajectories are the planned routs on the Abstract Board to be taken by the Abstract Pieces to reach local goals. In LG, the trajectories are represented as strings of symbols while the grammar generating those strings is the Grammar of the Language of Shortest Trajectories. The AD constructs the grammar via several visual streams. One of the streams constructs the shortest route over the specific board of square cells. Another stream operating with the set theory symbols generalizes this construction for the Abstract Board. Yet another visual stream operating with the grammar symbols and utilizing other streams as procedure calls generates the actual grammar. The second example includes application of the AD to the discovery of the so-called No-Search Approach in LG. This approach shows that LG generates optimal solutions for a class of opposing games without search and demonstrates construction of those solutions. The AD initiates the Terminal Set Expansion, i.e., expansion of the subsets of terminal states into "bubbles," the larger sets of states. For each of the states from those bubbles the AD constructs visually a class of strategies leading to the respective terminal states. Then, the AD realizes that the bubbles of states permit to decompose the whole game State Space into subspaces. The AD implements decomposition via constructing a visual model 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. Then the AD uses this Chart for constructing classes of potential strategies for all the opposing sides and for pruning those classes that cannot be implemented for a given problem. The final step of the AD, application of the non-pruned potential strategies, leads to construction of the optimal solution – the only real strategy existing in this problem.

Biography

Boris Stilman is a Professor of Computer Science at the University of Colorado Denver, USA and the Chairman & CEO of STILMAN Advanced Strategies, LLC, USA. In 1972-1988, in Moscow, USSR, he was involved in the advanced research project PIONEER led by a former World Chess Champion Professor Mikhail Botvinnik. I combine my professorship at UC Denver with my leadership role of Chairman & CEO at STILMAN. A growing number of applications of LG developed at STILMAN have passed comprehensive testing and are currently transitioning to the real world command and control systems in the USA. The LG software is currently considered vital for the national defense in the USA and UK.

boris@stilman-strategies.com