



Venture Capital Portfolio Optimization through Hybrid Approach of Agent-Based Modeling and Modified Harmony Search

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Abstract

Objective: Increasing the competitiveness of countries in the world can be reached only through innovation and the financial aspect is the most important pillar of a national innovation system. Hence, the role of venture capital in developing knowledge-based institutions is vital. However, startup portfolio selection and venture capital firms' syndication have always been critical challenges in VC industry. Hence, the need for integrated methods, based on sophisticated quantitative techniques, is always being felt. In this research, the simulation of startup portfolio optimization is much more similar to real world and the preferences of startups as decision-makers and the interaction between investees and investors are considered. The results could shed light on which investors regarding their attributes and the startup's attributes should syndicate together and how much is their shares.

Methods: Considering the complexity of the problem, the best-known model to simulate the problem is an agent-based modeling. By applying two different computational engines based on ANFIS and ANFIS tuned by PSO and also through the utilization of modified HS, the optimization procedure is preceded.

Results: The proposed solution method is applied to about four various samples and has been executed five times independently. Regarding analysis, the computational engine based on ANFIS tuned by PSO is more efficient and the optimum portfolio is achieved based on it.

Conclusion: Regarding the assumptions of the problem and the agent's attributes in venture capital, the investors' portfolios and their syndication has been optimized in order to lessen risk and increase return on investment.

Keywords: Venture capital, Agent-based modeling, Harmony search, Particle swarm optimization, Adaptive Network Fuzzy Inference System.

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