Review of: "Applications of Deep reinforcement learning in MEMS and nanotechnology"

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Potential competing interests: No potential competing interests to declare.

This paper reviews applications of DRL in the fields of micro-electro-mechanical systems (MEMS) and nanotechnology. DRL has been used to enhance the design, manufacturing, and control of micro- and nanoscale systems.Notable applications include optimizing MEMS device designs, controlling nanomaterial synthesis, enabling precise nanorobotic manipulation,automating nanofabrication, directing nanoparticle self-assembly, and optimizing MEMS/nanotechnology fabrication processes.DRL allows for greater precision, increased autonomy, and enhanced performance. However, challenges remain regarding computational complexity, data availability, and responsible AI adoption. Continued DRL research and development focused on micro- and nanoscale systems hold promise for transformative innovations in electronics, medicine, energy, and other domains.However, before the paper is accepted, the authors should consider the following issues:

1. This article proposes that DRL can increase process efficiency in manufacturing by continuously learning from real-time data.This enables adaptive control of fabrication processes,which lowers errors and increases yield rates.However,if we learn real-time data and update status and policies while running the machine, will it significantly slow down the efficiency of the machine?

2.This article proposes that DRL may considerably improve the design process, creating highly effective and high-performance MEMS devices and nanoscale structures by using autonomous agents to explore and pinpoint ideal configurations in the vast design space.However, depending on the reward settings, it may be difficult to obtain the optimal solution. So can you explain how to accurately locate the ideal position?

3.This article proposes that the procedure is time-consuming and computationally expensive when using conventional design methods, which frequently need extensive simulations and human iterations to obtain an optimal configuration.However,the parameter design of DRL is also a tedious process. Could you present specific experimental data to prove that DRL performs better than traditional methods?

4.Due to the possibility that DRL agents could explore unexplored areas of the design space and provide subpar or harmful results, safety and dependability issues are raised.Could you explain how to overcome data scarcity through transfer learning, and implement safety measures to assure robust and dependable performance in real-world circumstances

5. The controlled growth of nanowires with specific morphologies and compositions was achieved due to the optimisation of nanowire synthesis made possible by DRL, according to a study from the Massachusetts Institute of Technology (MIT).Could you explain how DRL controls the material composition of nanowires?

6. This article proposes that the uncertainty, noise and restricted observability of operating at the nanoscale provide serious difficulties. Could you explain how DRL achieves nanoscale operations from the perspective of algorithm design?