

Multi-objective scheduling of cloud manufacturing resources through the integration of Cat swarm optimization and Firefly algorithm

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ABSTRACT

This paper attempts to minimize the makespan and cost and balance the load rate of the process scheduling of cloud manufacturing resources. For this purpose, a multiobjective scheduling model was established to achieve the minimal makespan, minimal cost and balanced load rate. Next, the cat swarm optimization (CSO) and the firefly algorithm (FA) were combined into a hybrid multi-objective scheduling algorithm. Finally, the hybrid algorithm was verified through CloudSim simulation. The simulation results show that the algorithm output the optimal scheduling plan in a short time. This research not only provides an effective way to find the global optimal solution, within the shortest possible time, to the process scheduling problem of cloud manufacturing resources with multiple objectives, but also promotes the application of swarm intelligence algorithms in job-shop scheduling problems.

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Večkriterijsko razporejanje virov za izdelavo v oblaku z vključitvijo optimizacije s tropom mačk in algoritmom kresnič

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POVZETEK

Ta prispevek poskuša minimizirati čas izdelave in stroške ter uravnorežiti hitrost obremenjevanja postopka razporejanja virov za proizvodnjo v oblaku. V ta namen je bil vzpostavljen večkriterijski model razporejanja za doseganje minimalnega časa izdelave, minimalnih stroškov in uravnorežene stopnje obremenitve. Za optimizacijo razporejanja sta bila v hibridni večkriterijski algoritmi združena optimizacija s tropom mačk (CSO) in algoritmi kresnič (FA). Hibridni algoritmi je bil preverjen s simulacijo CloudSim. Rezultati simulacije kažejo, da algoritmi v kratkem času pripravi optimalni načrt terminiranja proizvodnje. Raziskava ne zagotavlja le učinkovitega načina, da v najkrajšem možnem času poiščemo optimalno globalno rešitev problema razporejanja virov za proizvodnjo v oblaku z več kriteriji, ampak tudi spodbuja uporabo algoritmov s skupinsko inteligenco pri problemih terminiranja proizvodnje po naročilu.

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PODATKI O ČLANKU

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