ABSTRACT:

In this paper, an automation of DNA computing readout method based on real-time Polymerase Chan Reaction(PCR) is developed, which employs a hybrid in vitro-in silico approach. In the in vitro phase, TaqMan-basedreal-time PCR reactions are performed in parallel, to investigate the ordering of pairs of nodes in theHamiltonian Path Problem (HPP), in terms of relative distance from the DNA sequence encoding the knownstart node. The real-time PCR experiment is implemented on DNA Engine Opticon II system. Alternative FuzzyC-Means (AFCM) clustering algorithm is used to identify automatically two different reactions in real-timePCR, followed by in silico algorithm, which in turn, enables extraction of the Hamiltonian path. A softwarecalled "SILICOIN" is built to implement the AFCM clustering and the in silico algorithm, which return thedesired Hamiltonian path.