Algorithm inspired by slime mold foraging

February 27 2020, by David Bradley

Credit: CC0 Public Domain

Nature has provided a great deal of inspiration for computer scientists developing search algorithms and ways to solve complicated problems with as little computing power as possible. Ant colonies, beehives, bat hunting, and now slime mold foraging can be used as models on which an algorithm can be constructed.

Writing in the *International Journal of Innovative Computing and Applications*, Anthony Brabazon and Sean McGarraghy of the University College Dublin, Dublin, Ireland, explain how 99.5% of the living things on earth lack neurones and yet are proven success stories despite what we, as neuronal creatures, might whimsically perceive as a deficiency. One group of organisms that have been rather successful for millions of years are the so-called slime molds. The term is an informal name for several different groups of organisms that are actually unrelated. They are not molds, rather they are organisms that can live freely as single cells, but under certain conditions will form communicating aggregates that work in concert as if they are a multicellular reproductive structure.

The team explains that the plasmodial slime mold Physarum polycephalum, which forms from aggregates of individual amoebae, encases itself in a thin membrane and can act as a single organism. The researchers explain how "Inspiration has been drawn from some of its foraging behaviour to develop algorithms for graph optimisation." They report examples of the algorithms that can be developed and make suggestions as to how future research might proceed to utilise the benefits and minimise any limitations.

Of course, the slime mold itself is, despites its lack of neurons, carrying out computations all the while, chemical computations, you might say. So, in a sense modelling its behaviour in an algorithm is an excellent foundation.

"Of course," the team concedes, "it is also important to note that the developed algorithms are very simplified representations of (the imperfectly understood) real-world foraging behaviours of P. polycephalum and other slime molds and doubtless future biological research concerning these organisms will open up new avenues of investigation."

More information: Anthony Brabazon et al. Slime mould foraging: an inspiration for algorithmic design, *International Journal of Innovative Computing and Applications* (2020). DOI: 10.1504/IJICA.2020.105316

Provided by Inderscience