Automatic Design of Algorithms through Evolution (ADATE)

Roland Olsson

Faculty of Computer Science, Østfold University College, Norway
roland.olsson@hiof.no
http://www-ia.hiof.no/~rolando/

Automatic Design of Algorithms through Evolution (ADATE) is a system for automatic functional programming that is able to synthesize recursive programs with automatic invention of recursive help functions.

The invited talk will first present two recent applications of ADATE where it appears to be highly competitive with the best known alternative methods. The first application is synthesis of programs that drive an autonomous vehicle given input from gyros and range sensors. In the second application, ADATE generates algorithms for image segmentation, that is separating a possibly noisy image into regions representing objects of interest.

The autonomous driving example shows that ADATE is suitable for reinforcement learning and does not need explicitly provided outputs in order to generate desirable programs.

We will explain the basic program transformations employed by ADATE as well as briefly discuss the combinatorial search algorithms needed to efficiently and effectively search for suitable transformation combinations. The talk will also show the population management of ADATE and how it considers both the time complexity of synthesized programs and the need for syntactic complexity minimization in order to avoid overfitting.