6 结束语

本文首先针对存在独立模式的程序,改变了其分支函数插桩的方法,解决了其模式所对应的分支无法得到评价的问题;然后设计了一种新的交叉算子,通过获取的每个模式的适应度值,将所有个体中的最优模式通过交叉算子集中到一个个体中,再使用粒子群优化算法进行测试用例生成,其他的个体在进化过程中都可以向这个最优的个体学习,加速粒子群进化;并且在进化过程中,对于每代的最优个体还使用了局部搜索策略,以进一步提高测试用例生成效率;最后,为了评价我们设计的交叉算子对于含有独立模式的程序的有效性,在实验部分与单点交叉、双点交叉和均匀交叉这 3 种交叉方式进行对比,结果表明:我们的交叉算子在交叉过程中由于没有破坏最优模式,而是将其当作一个整体进行交叉,因此效果远好于其他 3 种交叉算子.并且还将本文的方法 CL-PSO 与 PSO,APSO 和 OL-PSO 进行了对比,实验结果表明:CL-PSO 方法在对含有模式的程序进行测试用例生成时,相对于其他方法在覆盖率和平均进化代数上均有一定的优势.

由于本文的 CL-PSO 方法只针对含有独立模式的程序,而对于含有互斥模式的程序,由于模式之间存在相互影响,故本文未对其进行分析和处理.因此,我们下一步工作将分析互斥模式之间的关系,探索互斥模式在程序中受哪些因素的影响,并设计新的组合方式针对含有互斥模式的程序进行测试用例生成.

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