Tabu pretraga

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Uvod

- Fred Glover, 1986 [1]
- rešavanje problema kombinatorne optimizacije
- vrsta lokalne pretrage
- modifikacije u odnosu na pohlepnu lokalnu pretragu:
  - tabu lista
  - može izabrati korak sa gorom vrednošću funkcije evaluacije

Pseudokod tabu pretrage

Ulaz: Konfiguracija pocetno_resenje, int max_iteracija
Izlaz: Konfiguracija najbolje_resenje

algoritam TabuPretraga:
    trenutno_resenje = pocetno_resenje
    najbolje_resenje = pocetno_resenje

    za k = 1 do max_iteracija:
        tabu_lista.dodaj(trenutno_resenje)
        okolina = generisi_okolinu(trenutno_resenje)
        izmenjena_okolina = [**sve** konfiguracije **iz** okolina **koje nisu u** tabu_lista]
        trenutno_resenje = selektuj_najbolje_ocenjeno_resenje(izmenjena_okolina)
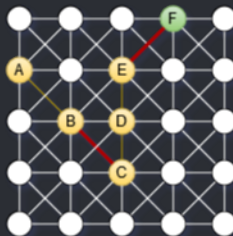
        ako je validno_resenje(trenutno_resenje) **i** f(trenutno_resenje) < f(najboje_resenje)
            najbolje_resenje = trenutno_resenje

vrati najbolje_resenje

Kriterijum aspiracije [2]

- problem memorije
- čuvanje pomeraja, a ne stanja
- problem sličnih pomeraja

Metode poboljšanja algoritma [2]

- pravila pojačavanja
  - usmeravanje ka regijama koje su obećavajuće
  - čuvanje prethodnih konfiguracija na steku
  - vraćanje na dobre kandidate iz prošlosti
  - pravila i ograničenja
- pravila diverzifikacije
  - usmeravanje ka neistraženim delovima
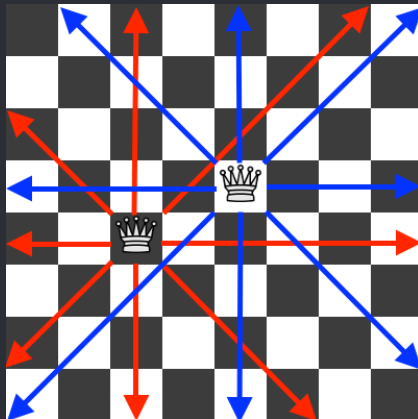 - izbegavanje platoa
  - resetovanje pretrage

Primene

- primarno diskretni domeni, kontinualni koji mogu da se diskretizuju
- TEODORA DOPUNI

CFLP

Problem N-dama

- diskretan problem

- nikoje dve dame se ne napadaju međusobno

- tradicionalno 8 dama, kao NP problem ima N dama

Poređenje s drugim algoritmima

- u rangu sa drugim kvalitetnim lokalnim pretragama
- istraživači se ne slažu [3][4][5][6]
- performanse su situacione - u nekim istraživanjima dala je manje optimalna rešenja sa boljom efikasnošću [7]

POOR

GOOD
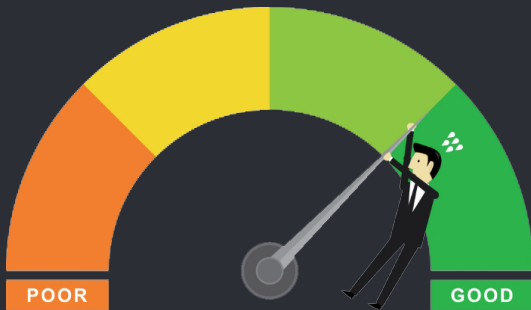
Zaključak

- okolina, pomeraj, tabu lista, izmenjena okolina

- pravila pojačavanja i diverzifikacije

- kriterijum aspiracije

- primene: diskretni i domeni koji mogu smisleno da se diskretizuju

- dobre performanse

Literatura I

[1] Glover, F.: Future paths for integer programming and links to artificial intelligence.
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[2] Fred Glover, Manuel Laguna: Tabu Search.
Springer Science+Business Media, 1997.

[3] Abhay D Lidbe, Alexander M Hainen, Steven L Jones: Comparative study of simulated
annealing, tabu search, and the genetic algorithm for calibration of the microsimulation
model.
SIMULATION, 93(1):21–33, 2017.

[4] Maninder Singh Kamboj, Jyotsna Sengupta: Comparative analysis of simulated
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International Journal of Computer Theory and Engineering, 1(5), 2009.

[5] Connor, A.M, Shea K.: A comparison of semi-deterministic and stochastic search
techniques.
Springer, 2000.

[6] Arostegui, Marvin Jr. i Kadipasaoglu, Sukran N i Khumawala Basheer M.: An empirical
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location problems.
International Journal of Production Economics, 103:742–754, 2006.

[7] E. Osaba, F. Díaz: Comparison of a memetic algorithm and a tabu search algorithm for
the traveling salesman problem.
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strane 131–136, 2012.

Literatura II

[8] Mirjana M. Čangalović, et al.: Tabu Search: A Brief Survey and Some Real-Life
     Applications.
     The Yugoslav Journal of Operations Research, 1996.
     http://elib.mi.sanu.ac.rs/files/journals/yjor/11/yujorn11p5-17.pdf.

HVALA NA PAŽNJI!

Jabberwocky

Lewis Carroll

’Twas brillig, and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogoves,
And the mome raths outgrabe.

“Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!
Beware the Jubjub bird, and shun
The frumious Bandersnatch!”

Lists and locales
Lorem ipsum dolor sit amet

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1. Donec porta, risus porttitor egestas scelerisque video.
   1.1 Nunc non ante fringilla, manus potentis cario.
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Nechť již hříšné saxofony ďáblů rozzvučí síň úděsnými tóny waltzu, tanga a quickstepu! Nezvyčajné krídle šťastných figliarskych ďatľov učia pri kótovanom ústí Váhu mĺkveho koňa Waldemara obžierať väčšie kusy exkluzívnej kôry. The quick, brown fox jumps over a lazy dog. DJs flock by when MTV ax quiz prog. "Now fax quiz Jack!"

Text blocks

In plain, example, and alert flavour

This text is highlighted.

A plain block

This is a plain block containing some highlighted text.

An example block

This is an example block containing some highlighted text.

An alert block

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Definitions, theorems, and proofs
All integers divide zero

Definition

$$\forall a, b \in \mathbb{Z} : a \mid b \iff \exists c \in \mathbb{Z} : a \cdot c = b$$

Theorem

$$\forall a \in \mathbb{Z} : a \mid 0$$

Proof

$$\forall a \in \mathbb{Z} : a \cdot 0 = 0 \qquad \square$$

Numerals and Mathematics
Formulae, equations, and expressions

1234567890 1234567890 $\hat{x},\ \check{x},\ \tilde{a},\ \bar{a},\ \dot{y},\ \ddot{y},$ $\iint f(x, y, z)\, dxdydz$

$$\cfrac{1}{1 + \cfrac{1}{2 + \cfrac{1}{3 + x}}} + \cfrac{1}{1 + \frac{1}{2 + \frac{1}{3+x}}} \qquad F : \begin{vmatrix} F''_{xx} & F''_{xy} & F'_{x} \\ F''_{yx} & F''_{yy} & F'_{y} \\ F'_{x} & F'_{y} & 0 \end{vmatrix} = 0$$

$$\iint_{x \in \mathbb{R}^2} \langle x, y \rangle \, dx \qquad \overline{\overline{a}\boldsymbol{\alpha}^2 + \underline{b}\boldsymbol{\beta} + \overline{\overline{d}\boldsymbol{\delta}}} \qquad]0, 1[\, + \lceil x \rfloor - \langle x, y \rangle$$

$$e^x \ \approx\ 1 + x + x^2/2! + \qquad \binom{n+1}{k} = \binom{n}{k} + \binom{n}{k-1}$$
$$+ \, x^3/3! + x^4/4!$$

Figures
Tables, graphs, and images

Faculty	With TeX	Total	%
Faculty of Informatics	1 716	2 904	59.09
Faculty of Science	786	5 275	14.90
Faculty of Economics and Administration	64	4 591	1.39
Faculty of Arts	69	10 000	0.69
Faculty of Medicine	8	2 014	0.40
Faculty of Law	15	4 824	0.31
Faculty of Education	19	8 219	0.23
Faculty of Social Studies	12	5 599	0.21
Faculty of Sports Studies	3	2 062	0.15

Table: The distribution of theses written using TeX during 2010–15 at MU

Figures

Code listings
An example source code in C

```c
#include <stdio.h>
#include <unistd.h>
#include <sys/types.h>
#include <sys/wait.h>

// This is a comment
int main(int argc, char **argv)
{
        while (--c > 1 && !fork());
        sleep(c = atoi(v[c]));
        printf("%d\n", c);
        wait(0);
        return 0;
}
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Citations
T_EX, LaTeX, and Beamer

T_EX is a programming language for the typesetting of documents. It was created by Donald Erwin Knuth in the late 1970s and it is documented in The T_EXbook [1].

In the early 1980s, Leslie Lamport created the initial version of LaTeX, a high-level language on top of T_EX, which is documented in LaTeX: A Document Preparation System [2]. There exists a healthy ecosystem of packages that extend the base functionality of LaTeX; The LaTeX Companion [3] acts as a guide through the ecosystem.

In 2003, Till Tantau created the initial version of Beamer, a LaTeX package for the creation of presentations. Beamer is documented in the User's Guide to the Beamer Class [4].

Bibliography
T_EX, L^AT_EX, and Beamer

[1] Donald E. Knuth. The T_EXbook. Addison-Wesley, 1984.

[2] Leslie Lamport. L^AT_EX: A Document Preparation System. Addison-Wesley, 1986.

[3] M. Goossens, F. Mittelbach, and A. Samarin. The L^AT_EX Companion. Addison-Wesley, 1994.

[4] Till Tantau. User's Guide to the Beamer Class Version 3.01. Available at `http://latex-beamer.sourceforge.net`.

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