Wegfindung

Vergleich verschiedener Algorithmen

Ablauf der Versuche

Generieren eines zufälligen Graphen Visualisierung durch Layout Anwenden der Suchalgorithmen

Auswerten der Laufzeit-Statistiken

Generieren eines zufälligen Graphen

Visualisierung durch Layout

Anwenden der Suchalgorithmen

Auswerten der Laufzeit-Statistiken

- Prozedurale Generierung
- Seed-Funktion von Pseudozufallsgenerator
- Wunscheinstellungen durch Nutzer möglich
- Beliebige Gerichtetheit, gemischt

$$e = max \left(1, R\left(0, min\left(\frac{n}{2} - 1, e_{max}\right)\right)\right)$$

Generieren eines zufälligen Graphen Visualisierung durch Layout

Anwenden der Suchalgorithmen Auswerten der Laufzeit-Statistiken

- Kraft-basierte, schrittweise Simulation
- Fruchterman-Reingold Algorithmus (1991)
- Gleichmäßige Verteilung der Knoten und Rahmen

$$k = \sqrt{\frac{w \cdot h}{n}}$$

$$F_a(x) = \frac{x^2}{k} \qquad F_r(x) = \frac{k^2}{x}$$

$$t(s) = \frac{w}{10} - \frac{w}{s_a \cdot 5000} \cdot s$$

Generieren eines zufälligen Graphen

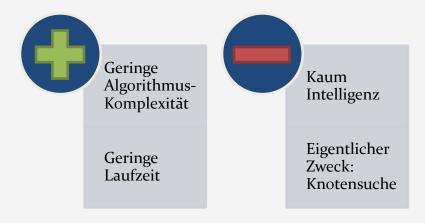
Visualisierung durch Layout

Anwenden der Laufzeit-Statistiken

- Suche des kürzesten/günstigsten Wegs von A nach B
- Verschiedenste Ansätze für Sonderfälle & Bedürfnisse
- Vergleichbar durch Laufzeit-Ergebnis Relation
- ❖ Zwei Simulationsarten: Einzel- und Massensuche
- Animationsmodus zum Nachverfolgen der Abläufe



- "Gehen" in eine durch Gewichte bestimmte Richtung
- Linearer Algorithmus-Verlauf
- **❖** Zeitkomplexität: O(E +V)



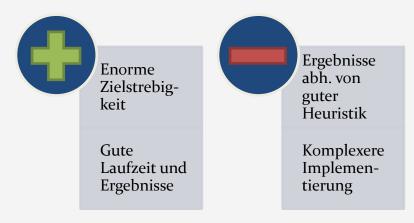


- Erfunden von E. W. Dijkstra, 1956
- * Kategorisiert als *Greedy*-Algorithmus
- ❖ Zeitkomplexität: O(V²)





- Peter Hart, Nils Nilsson und Bertram Raphael, 1968
- ❖ Gesehen als Allrounder und meistverbreitet
- Zeitkomplexität: abh. von Heuristik-Funktion
- Stets weiterentwickelt (Fast-Stacks etc.)





❖ A-Star als klarer Favorit, Opfern von ein wenig Genauigkeit für Geschwindigkeit nachvollziehbar

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Dijkstra	223,76864	<u>78</u>	<u>6</u>	36	115	30
<u>A-Star</u>	109,71132	94	<u>6</u>	<u>19</u>	<u>29</u>	<u>11</u>

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