BAB II

GENETIC ALGORITHM

Dalam bab ini kita akan menjelaskan mengenai Genetic Algorithm dan kegunaan algoritma tersebut dalam game “Splatted”. Genetic Algorithm (atau disebut Algoritma Genetik) adalah sebuah Algoritma yang terinspirasi oleh proses seleksi alam, diciptakan oleh John Holland dan tim-nya pada tahun 1960. Genetic Algorithm dapat dipakai untuk menemukan pilihan terbaik dari sebuah permasalahan, seperti catur, optimisasi Decision Tree dan masih banyak lagi.

1. Metodologi

Di Genetic Algorithm yang didasarkan pada seleksi alam, akan diciptakan sejumlah kandidat solusi yang pada algoritma ini akan berevolusi dengan harapan solusi yang terbaik dapat ditemukan dan digunakan pada masalah yang ada.

1. Terminologi

Sebelum memasuki tahap – tahap dalam sebuah Genetic Algorithm, perlu diperjelas beberapa istilah yang akan sering diulang dalam bab ini, yaitu;

1. Gene, Chromosom (Kromosom)

Kromosom adalah sebuah representasi calon solusi yang dibuat oleh algoritma genetik, umumnya direpresentasikan menggunakan sebuah array 1 dimensi. sementara bagian – bagian yang membentuk Kromosom adalah sebuah Gene, yang merepresentasikan sebuah variabel dalam kromosom, direpresentasikan menggunakan angka, huruf ataupun angka biner.

1. Populasi

Populasi adalah kumpulan dari kromosom – kromosom yang ada. Dalam sebuah populasi dapat berisi satuan hingga ratusan jumlah kromosom yang nantinya akan mempengaruhi kecepatan dari Algoritma tetapi akan meningkatkan kemungkinan mendapat solusi yang lebih baik.



Gambar 2.1

Visualisasi Gene, Kromosom dan Populasi

1. Langkah - langkah Algoritma Genetik

Pada subbab ini akan dijelaskan tahap – tahap dalam Algoritma Genetik dan apa yang terjadi. Tahap – tahap yang dilakukan adalah sebagai berikut;

1. Inisialisasi Populasi

Pada tahap ini, dibuatlah populasi pertama atau juga bisa disebut generasi pertama dengan kromosom – kromosom yang isinya acak. Di sini perlu ditetapkan beberapa hal penting, seperti : cara merepresentasikan solusi, jumlah kromosom dalam 1 populasi dan jumlah iterasi maksimal agar Algoritma bisa berhenti.

1. Seleksi

Setelah populasi pertama dibuat, maka akan dipilih kromosom – kromosom terbaik berdasarkan fitness mereka. Fitness adalah sebuah nilai yang menunjukkan kecocokan antara kromosom dengan solusi yang diinginkan, cenderung bila nilai fitness semakin tinggi, maka itu merupakan tanda bila kromosom semakin bagus. Fitness dihitung menggunakan fungsi, dimana nilai dari seluruh Gene dalam sebuah kromosom akan dimasukkan dalam sebuah rumus atau perhitungan yang mengeluarkan nilai Fitness dari kromosom tersebut.

Setelah mendapatkan fitness dari seluruh kromosom dalam sebuah populasi, kromosom – kromosom dengan nilai Fitness tertinggi akan dipilih untuk “reproduksi”. Metode untuk ber-reproduksi ini ada berbagai macam, tetapi terdapat 2 unsur utama yang harus ada dalam sebuah metode pemilihan kromosom; pemilihan berdasarkan fitness tertinggi dan memiliku unsur. Contoh pemilihan kromosom yang populer adalah metode Roulette Wheel, dimana setiap kromosom yang ada memiliki kesempatan untuk dipilih dan semakin tinggi fitness-nya, semakin tinggi kemungkinan agar kromosom tersebut dipilih.

1. **Type of Canvas**

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Gambar 2.2

Logo ISTTS Kuning Milik Poin a

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Gambar 2.3

Gambar Elang Milik Poin b-2

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Tabel 2.1

**Contoh Data Kode dan Nama Program Studi ISTTS –Tabel Milik Subbab 2.1.2 Poin a**

|  |  |  |
| --- | --- | --- |
| No | Kode | Nama |
| 1 | 01 | D3-Informatika |
| 2 | 10 | S1-Elektro |
| 3 | 11 | S1-Informatika |
| 4 | 12 | S1-Industri |
| 5 | 18 | S1-Sistem Informasi |
| 6 | 17 | S1-Design Komunikasi Visual |
| 7 | 21 | S2-Teknologi Informasi |

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2. Kinnect II

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Tabel 2.2

Organisasi Kampus

|  |  |
| --- | --- |
| No | Nama |
| 1 | Badan Eksekutif Mahasiswa |
| 2 | Himpunan Mahasiswa |
| 3 | Unit Kegiatan Mahasiswa |
| 4 | Unit Kegiatan Kerohanian |
| 5 | Panitia PK |
| 6 | Panitia Kartini Day |

Tabel 2.2

(Lanjutan)

|  |  |
| --- | --- |
| **No** | **Nama** |
| 7 | Panitia Dies Natalis |
| 8 | Panitia Baksos |
| 9 | Panitia Bunkasai |

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1. Virtual Reality

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**(a)**



**(b)**

Gambar 2.4

Waterfall (a) Waterfall Normal. (b) Setelah Diberi Filter

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1. Chairil Anwar, *Deru Campur Debu*, (Jakarta: PT GRAMEDIA PUSTAKA UTAMA, 1992), hlm 9. [↑](#footnote-ref-1)
2. Abdul Khalik, Rapi Armad, Bagus Kuncoro, *Belajar Bahasa Indonesia*, (Surabaya: Dwikarya, 2009), hlm 25. [↑](#footnote-ref-2)
3. Mc. Preganent, *Representative of Natural Habits with Prulal Educaton*. Educational Evaluation and Alanytics. Vol. 4 No. 3, Summer 2003, hlm. 120 [↑](#footnote-ref-3)
4. Richard Whittle, *High Sea Piracy: Crisis in Aden* (http://www.aviationtoday.com/rw/military/attack/High-Sea-Piracy-Crisis-in-Aden\_32500.html, diakses pada tanggal 31 Mei 2013) [↑](#footnote-ref-4)