

DAFTAR ISI

| | |
|---|-----|
| HALAMAN PENGESAHAN..... | iii |
| PERNYATAAN..... | iv |
| HALAMAN MOTTO DAN PERSEMBAHAN..... | v |
| PRAKATA..... | vii |
| DAFTAR ISI..... | ix |
| INTISARI..... | xv |
| ABSTRACT..... | xvi |
| BAB I PENDAHULUAN..... | 1 |
| 1.1. Latar Belakang..... | 1 |
| 1.2. Rumusan Masalah..... | 2 |
| 1.3. Batasan Masalah..... | 3 |
| 1.4. Tujuan Penelitian..... | 3 |
| 1.5. Manfaat Penelitian..... | 3 |
| 1.6. Sistematika Penulisan..... | 3 |
| BAB II TINJAUAN PUSTAKA..... | 5 |
| BAB III LANDASAN TEORI..... | 9 |
| 3.1. <i>Text Mining</i> | 9 |
| 3.2. Analisis Sentimen..... | 10 |
| 3.3. Twitter..... | 11 |
| 3.4. Twitter API..... | 11 |
| 3.5. <i>Preprocessing</i> | 12 |
| 3.5.1. Tokenisasi..... | 13 |
| 3.5.2. <i>Stopwords Removal</i> | 13 |
| 3.5.3. <i>Stemming</i> | 14 |
| 3.6. <i>Term Document Matrix</i> | 14 |
| 3.6.1. <i>Term Frequency</i> | 15 |
| 3.6.2. <i>Term Frequency-Inverse Document Frequency (TF-IDF)</i> | 15 |
| 3.7. <i>Support Vector Machine (SVM)</i> | 16 |
| 3.8. Multinomial Naïve Bayes (MNB)..... | 20 |

| | | |
|---------------------------------------|---|----|
| 3.9. | Random Forest (RF)..... | 22 |
| 3.10. | Evaluasi Performa..... | 22 |
| 3.10.1. | <i>Accuracy</i> | 23 |
| 3.10.2. | <i>Precision</i> | 23 |
| 3.10.3. | <i>Recall</i> | 23 |
| 3.10.4. | <i>F1 Score</i> | 24 |
| BAB IV ANALISIS DAN PERANCANGAN | | 25 |
| 4.1. | Alat dan Bahan..... | 25 |
| 4.2. | Deskripsi Penelitian | 25 |
| 4.3. | Tahapan Penelitian..... | 26 |
| 4.4. | Rancangan Pengumpulan Data..... | 29 |
| 4.5. | Perancangan Sistem Klasifikasi Sentimen | 31 |
| 4.5.1. | Pengumpulan Data Awal..... | 32 |
| 4.5.2. | Pelabelan Data | 32 |
| 4.5.3. | <i>Preprocessing</i> Data | 33 |
| 4.6. | Perancangan Ekstraksi Fitur | 40 |
| 4.6.1. | <i>Term Frequency</i> (TF)..... | 40 |
| 4.6.2. | <i>Term Frequency – Invers Document Frequency</i> (TF-IDF) | 41 |
| 4.7. | Pembagian Data | 42 |
| 4.8. | Perancangan Pelatihan..... | 42 |
| 4.9. | Perancangan Pengujian | 44 |
| 4.10. | Evaluasi Performa Klasifikasi Sentimen..... | 45 |
| BAB V IMPLEMENTASI..... | | 46 |
| 5.1. | Implementasi Pengumpulan Data..... | 46 |
| 5.2. | Implementasi <i>Preprocessing</i> | 51 |
| 5.2.1. | <i>Case Folding</i> | 52 |
| 5.2.2. | <i>URLs Removal</i> | 53 |
| 5.2.3. | <i>Brackets Removal</i> | 54 |
| 5.2.4. | <i>Mentions Removal</i> | 54 |
| 5.2.5. | <i>Non Alpha Numerical Removal</i> | 55 |
| 5.2.6. | <i>Stopwords Removal</i> | 56 |
| 5.2.7. | <i>Stemming</i> | 56 |

| | | |
|------------------------------------|--|----|
| 5.3. | Implementasi Ekstraksi Fitur..... | 58 |
| 5.3.1. | <i>Term Frequency</i> | 58 |
| 5.3.2. | <i>Term Frequency – Inverse Document Frequency</i> | 59 |
| 5.4. | Implementasi Pembagian <i>Dataset</i> | 60 |
| 5.5. | Implementasi Pelatihan | 61 |
| 5.5.1. | Deklarasi Fungsi SVM..... | 62 |
| 5.5.2. | Deklarasi Fungsi MNB..... | 70 |
| 5.5.3. | Deklarasi Fungsi RF..... | 71 |
| 5.6. | Implementasi Pengujian | 71 |
| 5.6.1. | Deklarasi Klasifikasi Data Uji..... | 72 |
| 5.6.2. | Deklarasi Mendapatkan 10 Kata Yang Sering Muncul.... | 72 |
| 5.6.3. | Deklarasi Menghitung Nama Pemain di tiap Sentimen ... | 73 |
| 5.6.4. | Deklarasi Menampilkan Sentimen Pertandingan..... | 74 |
| BAB VI HASIL DAN PEMBAHASAN | | 76 |
| 6.1. | Hasil Pengumpulan Data dan Pelabelan Manual..... | 76 |
| 6.2. | Hasil <i>Preprocessing</i> | 77 |
| 6.3. | Hasil Ekstraksi Fitur TF atau TF-IDF | 78 |
| 6.4. | Hasil Pembagian Kelompok Data..... | 80 |
| 6.5. | Hasil Klasifikasi Data Latih | 81 |
| 6.5.1. | Pelatihan Support Vector Machine | 81 |
| 6.5.2. | Pelatihan Multinomial Naïve Bayes..... | 84 |
| 6.5.3. | Pelatihan Random Forest..... | 85 |
| 6.6. | Hasil Klasifikasi Data Uji..... | 89 |
| 6.6.1. | Pengujian Support Vector Machine | 89 |
| 6.6.2. | Pengujian Multinomial Naïve Bayes | 89 |
| 6.6.3. | Pengujian Random Forest..... | 90 |
| 6.6.4. | Hasil Perhitungan Performa..... | 90 |
| BAB VII KESIMPULAN DAN SARAN | | 97 |
| 7.1. | Kesimpulan..... | 97 |
| 7.2. | Saran..... | 97 |
| DAFTAR PUSTAKA | | 98 |