

## DAFTAR ISI

|                                                     |      |
|-----------------------------------------------------|------|
| HALAMAN PENGESAHAN PEMBIMBING .....                 | iii  |
| HALAMAN PENGESAHAN PENGUJI.....                     | iv   |
| KARYA ASLI TUGAS AKHIR .....                        | v    |
| PERNYATAAN BEBAS PLAGIASI.....                      | vi   |
| ABSTRAK .....                                       | vii  |
| ABSTRACT .....                                      | viii |
| KATA PENGANTAR .....                                | ix   |
| DAFTAR ISI.....                                     | x    |
| DAFTAR GAMBAR.....                                  | xii  |
| DAFTAR TABEL .....                                  | xiii |
| DAFTAR MODUL PROGRAM .....                          | xiv  |
| BAB I PENDAHULUAN .....                             | 1    |
| 1.1 Latar Belakang Masalah .....                    | 1    |
| 1.2 Rumusan Masalah.....                            | 2    |
| 1.3 Batasan Masalah .....                           | 2    |
| 1.4 Tujuan Penelitian. ....                         | 2    |
| 1.5 Manfaat Penelitian .....                        | 2    |
| 1.6 Tahapan Penelitian .....                        | 3    |
| 1.7 Sistematika Penulisan .....                     | 3    |
| BAB II TINJAUAN LITERATUR.....                      | 5    |
| 2.1 Jaringan Komputer.....                          | 5    |
| 2.2 Serangan pada Jaringan Komputer .....           | 5    |
| 2.3 Intrusion Detection System (IDS).....           | 6    |
| 2.4 <i>Dataset</i> CIC-IDS2017.....                 | 6    |
| 2.5 Synthetic Minority Over-sampling Technique..... | 7    |
| 2.6 <i>Principal Component Analysis</i> .....       | 8    |
| 2.7 <i>Extreme Gradient Boosting</i> .....          | 10   |
| 2.8 Evaluasi.....                                   | 12   |
| 2.9 Penelitian Terdahulu .....                      | 14   |
| BAB III METODOLOGI PENELITIAN .....                 | 17   |
| 3.1 Metode Penelitian .....                         | 17   |
| 3.2 Pengumpulan Data .....                          | 18   |
| 3.3 <i>Pre-Processing</i> .....                     | 18   |
| 3.3.1 <i>Data Cleaning</i> .....                    | 19   |
| 3.3.2 <i>Data Mapping</i> .....                     | 19   |
| 3.3.3 <i>Resampling Data</i> .....                  | 20   |
| 3.3.4 <i>Splitting Data</i> .....                   | 21   |

|                                                   |    |
|---------------------------------------------------|----|
| 3.3.5 <i>Oversampling Data</i> .....              | 21 |
| 3.3.6 Reduksi Dimensi .....                       | 22 |
| 3.4 Modeling .....                                | 23 |
| 3.5 Pengujian Model .....                         | 26 |
| BAB IV HASIL PENGUJIAN DAN PEMBAHASAN .....       | 29 |
| 4.1 Hasil Penelitian .....                        | 29 |
| 4.2 Implementasi Pengumpulan Data .....           | 29 |
| 4.3 Implementasi <i>Pre-Processing</i> .....      | 30 |
| 4.3.1 <i>Implementasi Data Cleaning</i> .....     | 30 |
| 4.3.2 <i>Implementasi Data Mapping</i> .....      | 32 |
| 4.3.3 <i>Implementasi Resampling Data</i> .....   | 34 |
| 4.3.4 <i>Implementasi Splitting Data</i> .....    | 34 |
| 4.3.5 <i>Implementasi Oversampling Data</i> ..... | 35 |
| 4.3.6 <i>Implementasi Reduksi Dimensi</i> .....   | 36 |
| 4.4 <i>Implementasi Modeling</i> .....            | 37 |
| 4.5 Pengujian Model .....                         | 38 |
| 4.6 Pembahasan .....                              | 41 |
| BAB V PENUTUP .....                               | 43 |
| 5.1 Kesimpulan .....                              | 43 |
| 5.2 Saran .....                                   | 43 |
| DAFTAR PUSTAKA .....                              | 44 |