

## DAFTAR ISI

|  |      |
|--|------|
| ABSTRAK .....  | i    |
| <i>ABSTRACT</i> .....  | ii   |
| LEMBAR PENGESAHAN .....  | iii  |
| LEMBAR PERNYATAAN ORISINALITAS .....   | iv   |
| KATA PENGANTAR .....   | v    |
| DAFTAR ISI.....  | vii  |
| DAFTAR GAMBAR .....  | xi   |
| DAFTAR TABEL.....  | xii  |
| DAFTAR ISTILAH .....   | xiii |
| BAB I PENDAHULUAN.....   | 1    |
| I.1 Latar Belakang .....   | 1    |
| I.2 Rumusan Masalah .....  | 4    |
| I.3 Tujuan Penelitian .....  | 4    |
| I.4 Batasan Penelitian .....   | 5    |
| I.5 Manfaat Penelitian .....   | 5    |
| I.6 Sistematika Penulisan.....   | 5    |
| BAB II TINJAUAN PUSTAKA.....   | 7    |
| II.1 Tunanetra.....  | 7    |
| II.2 <i>Data mining</i> .....  | 7    |
| II.3 Perbandingan Metode <i>Data mining</i> KDD, SEMMA dan CRISP-DM .          | 8    |
| II.3.1 KDD ( <i>Knowledge Discovery in Databases</i> ) .....                   | 8    |
| II.3.2 SEMMA ( <i>Sample, Explore, Modify, Model, Assess</i> ).....            | 9    |
| II.3.3 CRISP-DM ( <i>Cross Industry Standard Process for Data mining</i> )     | 10   |
| II.4 CRISP-DM ( <i>Cross Industry Standard Process for Data mining</i> ) ..... | 11   |
| II.5 <i>Artificial Intelligence</i> .....                                      | 13   |
| II.5.1 <i>Deep learning</i> .....  | 14   |
| II.6 <i>Convolutional Neural Network (CNN)</i> .....                           | 16   |
| II.7 <i>Computer Vision</i> .....  | 17   |
| II.8 <i>Object Detection</i> .....   | 19   |
| II.9 YOLO.....   | 20   |
| II.9.1 Cara Kerja YOLO .....   | 21   |

|          |  |    |
|----------|--|----|
| II.9.2   | YOLOv5.....                                    | 22 |
| II.9.2.1 | <i>Backbone</i> .....                          | 23 |
| II.9.2.2 | <i>Neck</i> .....                              | 23 |
| II.9.2.3 | <i>Head</i> .....                              | 23 |
| II.10    | <i>Confusion matrix</i> .....                  | 24 |
| II.10.1  | <i>Accuracy</i> .....                          | 24 |
| II.10.2  | <i>Precision</i> .....                         | 25 |
| II.10.3  | <i>Recall</i> .....                            | 25 |
| II.10.4  | <i>F1-score</i> .....                          | 25 |
| II.10.5  | <i>Intersection Over Union (IoU)</i> .....     | 26 |
| II.10.6  | <i>Average Precision (AP)</i> .....            | 26 |
| II.10.7  | <i>Mean Average Precision (mAP)</i> .....      | 26 |
| II.11    | Aplikasi Web.....                              | 26 |
| II.12    | Python.....                                    | 27 |
| II.13    | JavaScript.....                                | 28 |
| II.14    | HTML ( <i>HyperText Markup Language</i> )..... | 28 |
| II.15    | CSS ( <i>Cascading Style Sheets</i> ).....     | 29 |
| II.16    | Replit.....                                    | 29 |
| II.17    | Penelitian Terdahulu.....                      | 31 |
| II.18    | Alasan Memilih YOLOv5.....                     | 34 |
| BAB III  | Metodologi Penelitian.....                     | 36 |
| III.1    | Tahapan Penelitian.....                        | 36 |
| III.2    | Sistematika Penyelesaian Masalah.....          | 36 |
| III.2.1  | <i>Business Understanding</i> .....            | 37 |
| III.2.2  | <i>Data Understanding</i> .....                | 38 |
| III.2.3  | <i>Data Preparation</i> .....                  | 39 |
| III.2.4  | <i>Modeling</i> .....                          | 39 |
| III.2.5  | <i>Evaluation</i> .....                        | 39 |
| III.2.6  | <i>Deployment</i> .....                        | 40 |
| BAB IV   | ANALISIS DAN PERANCANGAN.....                  | 41 |
| IV.1     | <i>Business Understanding</i> .....            | 41 |
| IV.2     | <i>Data Understanding</i> .....                | 45 |
| IV.3     | <i>Data Preparation</i> .....                  | 48 |

|          |  |    |
|----------|--|----|
| IV.3.1   | <i>Labeling Data</i> .....   | 48 |
| IV.3.2   | <i>Splitting Data</i> .....  | 50 |
| IV.3.3   | <i>Resize Gambar</i> .....   | 52 |
| IV.3.4   | <i>Modify Classes</i> .....  | 52 |
| IV.3.5   | <i>Data Augmentation</i> .....   | 53 |
| IV.4     | <i>Modeling</i> .....  | 55 |
| IV.4.1   | <i>Persiapan Model</i> .....   | 56 |
| IV.4.2   | <i>Pelatihan Model</i> .....   | 57 |
| IV.5     | <i>Evaluation</i> .....  | 59 |
| IV.6     | <i>Deployment</i> .....  | 59 |
| BAB V    | <b>IMPLEMENTASI DAN PENGUJIAN</b> .....                                      | 61 |
| V.1      | <i>Hasil Training YOLOv5</i> .....   | 61 |
| V.1.1    | <i>Confusion matrix</i> .....  | 61 |
| V.1.2    | <i>F1 Confidence Curve</i> .....   | 62 |
| V.1.3    | <i>Precision-Confidence Curve</i> .....                                      | 62 |
| V.1.4    | <i>Precision-Recall Curve</i> .....  | 63 |
| V.1.5    | <i>Recall-Confidence Curve</i> .....   | 64 |
| V.1.6    | <i>Training and Validation Loss</i> .....                                    | 64 |
| V.1.6.1  | <i>Train/Box Loss</i> .....  | 65 |
| V.1.6.2  | <i>Train/Obj Loss</i> .....  | 65 |
| V.1.6.3  | <i>Train/Cls Loss</i> .....  | 65 |
| V.1.6.4  | <i>Metrics/Precision</i> .....   | 65 |
| V.1.6.5  | <i>Metrics/Recall</i> .....  | 65 |
| V.1.6.6  | <i>Val/Box Loss</i> .....  | 65 |
| V.1.6.7  | <i>Val/Obj Loss</i> .....  | 66 |
| V.1.6.8  | <i>Val/Cls Loss</i> .....  | 66 |
| V.1.6.9  | <i>Metrics/mAP_0.5</i> .....   | 66 |
| V.1.6.10 | <i>Metrics/mAP_0.5:0.95</i> .....  | 66 |
| V.1.7    | <i>Hasil Prediksi</i> .....  | 66 |
| V.2      | <i>Hasil Deteksi Objek Pada Aplikasi Web</i> .....                           | 69 |
| V.3      | <i>Tabel Hasil Uji Coba Total Latency(s), Detection Latency (s), FPS.</i> .. | 69 |

|                |   |    |
|----------------|---|----|
| V.3.1          | <i>Analisis Total Latency</i> .....           | 70 |
| V.3.2          | <i>Analisis Detection Latency</i> .....       | 71 |
| V.3.3          | <i>Analisis FPS (Frames Per Second)</i> ..... | 72 |
| BAB VI         | KESIMPULAN DAN SARAN.....                     | 73 |
| VI.1           | Kesimpulan .....                              | 73 |
| VI.2           | Saran.....                                    | 74 |
| DAFTAR PUSTAKA | .....   | 75 |