

## DAFTAR GAMBAR

Gambar II. 1 Fusion Sensor .....	7
Gambar II. 2 Perkembangan YOLO .....	8
Gambar II. 3 Algoritma YOLO .....	9
Gambar II. 4 MOS Sensor.....	11
Gambar II. 5 Artificial Neural Network.....	12
Gambar II. 6 Feedforward dan Feedback ANN .....	12
Gambar II. 7 Sigmoid Activation Fuction Grafik .....	14
Gambar II. 8 Tanh Activation Function Grafik .....	14
Gambar II. 9 ReLu Activation Function Grafik.....	15
Gambar II. 10 Komputer .....	15
Gambar II. 11 Intel RealSense D435 .....	16
Gambar III. 1 Alur Penelitian.....	18
Gambar III. 2 Algoritma Sistem.....	18
Gambar III. 3 Blok Diagram .....	19
Gambar III. 4 Arsitektur ANN .....	22
Gambar III. 5 Training Data YOLO.....	24
Gambar III. 6 Train set, Validation set, dan Test set .....	24
Gambar III. 7 Upload Data.....	25
Gambar III. 8 Labelling.....	25
Gambar III. 9 Train Dataset .....	26
Gambar III. 10 Confusion Matrix .....	27
Gambar III. 11 Tempat Uji Coba.....	28
Gambar III. 12 Visualisasi Api Kecil .....	28
Gambar III. 13 Visualisasi Api Sedang .....	29
Gambar III. 14 Visualisasi Api Besar.....	29
Gambar IV. 1 Ultralytics YOLO Version .....	31
Gambar IV. 2 Setting Model .....	32
Gambar IV. 3 Dataset Model.....	33
Gambar IV. 4 Metrics Model .....	33
Gambar IV. 5 Box Loss Model .....	34
Gambar IV. 6 Class Loss Model .....	35

Gambar IV. 7 Object Loss Model .....	36
Gambar IV. 8 Ground Trusth Test 1.8m .....	38
Gambar IV. 9 Ground Trusth Test 1.7m .....	38
Gambar IV. 10 Ground Trusth Test 1.56m .....	38
Gambar IV. 11 Ground Trusth Test 0.15m .....	39
Gambar IV. 12 Training and Validation Accuracy ANN .....	42
Gambar IV. 13 Training and Validation Loss ANN .....	43
Gambar IV. 14 Laboratorium Smart Automation Telkom University Surabaya...	46
Gambar IV. 15 Penomoran Objek .....	47
Gambar IV. 16 Skenario Uji Coba 1 .....	48
Gambar IV. 17 Skenario Uji Coba 2 .....	50
Gambar IV. 18 Skenario Uji Coba 3 .....	51
Gambar IV. 19 Skenario Uji Coba 4 .....	53
Gambar V. 1 Variasi Dataset Api.....	55
Gambar V. 2 Background Dataset .....	56