

## DAFTAR ISI

LEMBAR PENGESAHAN .....	ii
PERNYATAAN .....	iii
PRAKATA.....	iv
ARTI LAMBANG DAN SINGKATAN .....	vi
ABSTRACT.....	vii
INTISARI.....	viii
DAFTAR ISI .....	ix
DAFTAR GAMBAR .....	xii
DAFTAR TABEL.....	xiii
BAB I PENDAHULUAN.....	1
1.1 Latar Belakang .....	1
1.2 Perumusan masalah.....	3
1.3 Batasan Masalah .....	3
1.4 Keaslian penelitian.....	4
1.5 Tujuan Penelitian .....	6
1.6 Manfaat Penelitian .....	6
BAB II TINJAUAN PUSTAKA DAN LANDASAN TEORI.....	7
2.1 Tinjauan Pustaka .....	7
2.2 Landasan Teori.....	8
2.2.1 <i>Face Spoofing</i> .....	8
2.2.1.1 Spoofing 2D.....	9
2.2.1.2 Spoofing 3D.....	9
2.2.2 Citra.....	10
2.2.2.1 Citra biner .....	10
2.2.2.2 Citra Grayscale .....	10
2.2.2.3 Citra Warna .....	11
2.2.2 Visi Komputer .....	11
2.2.2.1 Klasifikasi Citra .....	11
2.2.2.2 Deteksi Objek .....	11
2.2.3 <i>Machine Learning</i> .....	12
2.2.3.1 Supervised Learning .....	12
2.2.3.2 Unsupervised Learning .....	12
2.2.3.3 Reinforcement Learning .....	12
2.2.4 <i>Deep Learning</i> .....	13
2.2.5 <i>Artificial Neural Network (ANN)</i> .....	13
2.2.5.1 Fungsi Aktivasi .....	15
2.2.5.2 Proses Pelatihan .....	17
2.2.6 <i>Convolutional Neural Network</i> .....	18

2.2.6.1	Convolution Layer .....	18
2.2.6.2	Batch Normalization .....	19
2.2.6.3	Pooling Layer.....	20
2.2.6.4	Flatten .....	20
2.2.6.5	Fully Connected Layer.....	20
2.2.6.6	Depthwise .....	21
2.2.7	Arsitektur CNN .....	21
2.2.7.1	Mobilenet .....	22
2.2.7.2	ShuffleNetV2 .....	23
2.2.7.3	SqueezeNext .....	23
2.2.7.4	MobileNetV3 .....	24
2.2.7.5	FeatherNet.....	25
2.2.8	<i>Confusion Matrix</i> .....	25
2.3	Hipotesis .....	26
BAB III METODOLOGI .....		27
3.1	Alat dan Bahan.....	27
3.1.1	Alat.....	27
3.1.2	Bahan.....	28
3.2	Jalannya Penelitian.....	28
3.2.1	Persiapan .....	28
3.2.1.1	Studi Literatur .....	28
3.2.1.2	Persiapan Dataset.....	29
3.2.2	Implementasi Model CNN .....	29
3.2.3	Evaluasi Hasil.....	29
3.2.4	Pembuatan Laporan.....	29
3.3	Perancangan Sistem .....	29
3.3.1	Pengumpulan <i>Dataset</i> .....	30
3.3.2	<i>Preprocessing</i> .....	31
3.3.2.1	Image Color Channel .....	31
3.3.2.2	Image Resize.....	31
3.3.2.3	Rescale Matrix .....	31
3.3.2.4	Image Labeling .....	31
3.3.3	<i>Training</i> .....	32
3.3.3.1	Arsitektur Blok Feathernet.....	32
3.3.3.2	Arsitektur Blok SqueezeNext .....	32
3.3.3.3	Metode yang diusulkan.....	33
3.3.4	Evaluasi.....	34
3.4	Cara Analisis .....	34
BAB IV HASIL DAN PEMBAHASAN.....		35
4.1	<i>Dataset</i> .....	35
4.2	<i>Preprocessing</i> .....	36
4.2.1	Resize.....	36
4.2.2	Labeling .....	37
4.3	<i>Training</i> .....	37
4.3.1	Training Feathernet.....	38



4.3.2	Training SqueezeNext.....	39
4.3.3	Training Metode usulan.....	40
4.3.4	Training Perbandingan BM & SM.....	41
4.4	Evaluasi.....	43
4.5	Analisis Hasil.....	45
BAB V KESIMPULAN DAN SARAN.....		47
5.1	Kesimpulan.....	47
5.2	Saran.....	47
DAFTAR PUSTAKA.....		48