

DAFTAR GAMBAR

Gambar 2.1 Bagian - bagian otak.....	18
Gambar 2.2 Citra MRI (a) otak normal, (b) meningioma, (c) glioma, (d) pituitary, (e) schwannoma, (f) neurocytoma.....	20
Gambar 2.3 Skema MRI.....	23
Gambar 2.4 Mesin MRI.....	23
Gambar 2.5 Volumetrik citra MRI otak.....	23
Gambar 2.6 Segmentasi tumor otak.....	25
Gambar 2.7 Augmentasi citra otak	25
Gambar 2.8 Grafik peran AI pada bidang medis	27
Gambar 2.9 Skema Mesin Learning.....	28
Gambar 2.10 Arsitektur sederhana CNN	31
Gambar 2.11 Arsitektur U-Net	32
Gambar 2.12 <i>Contracting path</i> U-net.....	32
Gambar 2.13 <i>Expanding path</i> U-net	34
Gambar 2.14 <i>Mask</i> pada tumor otak.....	36
Gambar 3.1 Tampilan Google Colaboratory.	40
Gambar 3.2 Alur Penelitian Segmentasi Tumor Otak.	43
Gambar 3.3 Folder <i>images</i>	45
Gambar 3.4 Folder <i>mask</i>	45
Gambar 3.5 Harapan Visualisasi Test Model Akhir.	51
Gambar 3.6 Desain Sistem	52
Gambar 4.1 <i>Output</i> Model dari U-Net.....	57
Gambar 4.2 Hasil <i>training</i> percobaan 20 <i>epoch</i> LR $1e^{-3}$	63
Gambar 4.3 Hasil <i>validation</i> percobaan 20 <i>epoch</i> LR $1e^{-3}$	63
Gambar 4.4 Hasil <i>training</i> percobaan 40 <i>epoch</i> LR $1e^{-3}$	67
Gambar 4.5 Hasil <i>validation</i> percobaan 40 <i>epoch</i> LR $1e^{-3}$	67
Gambar 4.6 Hasil <i>training</i> percobaan 60 <i>epoch</i> LR $1e^{-3}$	72
Gambar 4.7 Hasil <i>training</i> percobaan 60 <i>epoch</i> LR $1e^{-3}$	73
Gambar 4.8 Hasil <i>training</i> percobaan 80 <i>epoch</i> LR $1e^{-3}$	78
Gambar 4.9 Hasil <i>validation</i> percobaan 80 <i>epoch</i> LR $1e^{-3}$	78

Gambar 4.10 Hasil <i>training</i> percobaan 100 <i>epoch</i> $LR1e^{-3}$	84
Gambar 4.11 Hasil <i>validation</i> percobaan 100 <i>epoch</i> $LR1e^{-3}$	84
Gambar 4.12 Hasil pelatihan percobaan variasi <i>learning rate</i> $1e^{-3}$	91
Gambar 4.13 Hasil pelatihan percobaan variasi <i>learning rate</i> $1e^{-4}$	96
Gambar 4.14 Hasil evaluasi metrik 20 <i>epoch</i>	100
Gambar 4.15 <i>Output</i> model 20 <i>epoch</i> $1e^{-3}$	101
Gambar 4.16 <i>Output</i> model 20 <i>epoch</i> $1e^{-4}$	102
Gambar 4.17 Hasil evaluasi metrik 40 <i>epoch</i>	104
Gambar 4.18 <i>Output</i> model 40 <i>epoch</i> $1e^{-3}$	104
Gambar 4.19 <i>Output</i> model 40 <i>epoch</i> $1e^{-4}$	105
Gambar 4.20 Hasil evaluasi metrik 60 <i>epoch</i>	107
Gambar 4.21 <i>Output</i> model 60 <i>epoch</i> $1e^{-3}$	108
Gambar 4.22 <i>Output</i> model 60 <i>epoch</i> $1e^{-4}$	109
Gambar 4.23 Hasil evaluasi metrik 80 <i>epoch</i>	110
Gambar 4.24 <i>Output</i> model 80 <i>epoch</i> $1e^{-3}$	111
Gambar 4.25 <i>Output</i> model 80 <i>epoch</i> $1e^{-4}$	112
Gambar 4.26 Hasil evaluasi metrik 100 <i>epoch</i>	114
Gambar 4.27 <i>Output</i> model 100 <i>epoch</i> $1e^{-3}$	115
Gambar 4.28 <i>Output</i> model 100 <i>epoch</i> $1e^{-4}$	115