

1	Basics	
1.1	Artificial Intelligence	9
1.2	Vector Space	10
1.3	Turing Completeness	11
1.4	Turing Test	12
1.5	Expert System	13
1.6	Al winter	13
1.7	ImageNet	14
1.8	coco	14
1.9	MNIST	14
1.10	CIFAR-10	15
1.11	iris	15
1.12	diamonds	16
1.13	tips	16
1.14	推荐网课	17

2	Linear Classifier and Regressor	19
2.1	Linear Function	19
2.2	Linear Classifier	20
2.3	Loss Function	21
2.4	0-1 Loss	21
2.5	Hinge Loss	21
2.6	Square Loss	22
2.7	Exponential Loss	23
2.8	Gradient Descent	23
2.9	Inverse Problem	25
2.10	Condition Number	26
2.11	Overfitting	27
2.12	Regularisation	28
2.13	Norm	30
2.14	p-norm	31
3	Neural Networks and Backpropagation	33
3.1	Neural Network	33
3.2	History	33
3.3	Artificial neuron	36
3.4	Transfer Functions	37
3.5	Gradient Descent	38
3.6	Autoencoder	42
4	Representation and Problem Solving	47
4.1	Knowledge Representation and Reasoning	47
4.2	Knowledge Representation History	47
<i>1</i> 3	Knowledge Penresentation Rasics	50

4.4	Propositional Logic	52
4.5	Search Problem Solving	55
5	Graph Theory and Decision Tree	61
5.1	Graph	61
5.2	Directed Graph	62
5.3	Bipartite Graph	63
5.4	Incidence Matrix	64
5.5	Adjacency Matrix	65
5.6	Eulerian Path	66
5.7	Hamiltonian Path	66
5.8	Dijkstra's Algorithm	67
5.9	Decision Tree	70
5.10	Decision Tree learning	71
5.10.1	Details	72
5.11	Information Gain	73
5.12	ID3	75
5.12.1	Details	76
6	Clustering	79
6.1	Unsupervised Learning	79
6.2	Cluster Analysis	79
6.3	Hierarchical Clustering	80
6.4	Metric	81
6.5	Single-linkage Clustering	82
6.5.1	Overview	82
6.5.2	Algorithm	82
6.6	Complete-linkage Clustering	83
6.6.1	Overview	
440	Algorithm	02

6.7	UPGMA	84
6.8	k-means	85
6.8.1	Description	. 85
6.8.2	Algorithms	
6.8.3	Complexity	. 87
6.9	Expectation–Maximisation	87
6.9.1	Description	. 88
7	Bayesian Prediction	91
7.1	Bayes' Theorem	91
7.2	Distribution-version of Bayesian Inference	92
7.3	Frequentist	94
7.4	Testing for Statistical Independence	95
8	Applications	. 97
8.1	Computer Vision	97
8.1.1	Recognition	. 98
8.1.2	Detection	. 98
8.1.3	Pose Estimation	
8.1.4	Tracking	
8.1.5	Fusion	. 99
8.2	Natural Language Processing	100
9	Experiment I	103
9.1	Setosa 鸢尾花和 Versicolour 鸢尾花二分类问题	103
9.1.1	数据:	103
9.1.2	实验课具体要求:	
9.1.3	评分依据:	
9.1.4	实验报告:	
9.1.5	深入学习:	105
9.2	Diamonds 回归预测问题	105
9.2.1	数据:	105
9.2.2	实验课具休要求:	109

	7
· · · · · · · · · · · · · · · · · · ·	110
实验报告:	110
Experiment II	111
CIFAR-10 数据集分类(全连接神经网络与卷积神经网络)	111
数据:	111
实验课具体要求:	113
评分依据:	113
实验报告:	113
MNIST 数据集聚类(k-means)	113
数据:	113
实验课具体要求:	113
评分依据:	113
实验报告:	114
Experiment III	115
自选 Kaggle 任意一数据集并进行任务测评	115
数据:	115
实验课具体要求:	116
评分依据:	116
实验报告:	116
Experiment IV	117
MNIST 示例实现 Windows 下 C++ 部署调用	117
实验课具体要求:	117
实验报告:	117
运行结果样例:	118
	实验报告: Experiment II CIFAR-10 数据集分类(全连接神经网络与卷积神经网络)数据: 实验课具体要求: importance MNIST 数据集聚类(k-means)数据: 实验课具体要求: importance importance Experiment III 自选 Kaggle 任意一数据集并进行任务测评数据: 实验课具体要求: importance Experiment IV MNIST 示例实现 Windows 下 C++ 部署调用 实验课具体要求: 实验课具体要求: 实验课具体要求: 实验课具体要求: 实验课具体要求: 实验课具体要求: 实验课具体要求: 实验课具体要求: 实验课具体要求:

13