

Brief Contents

1	Introduction	1
I	Fundamentals	3
2	Probability	5
3	Statistics	63
4	Graphical models	143
5	Information theory	217
6	Optimization	255
II	Inference	337
7	Inference algorithms: an overview	339
8	Gaussian filtering and smoothing	353
9	Message passing algorithms	395
10	Variational inference	433
11	Monte Carlo methods	477
12	Markov chain Monte Carlo	493
13	Sequential Monte Carlo	537
III	Prediction	567
14	Predictive models: an overview	569
15	Generalized linear models	583
16	Deep neural networks	623
17	Bayesian neural networks	639
18	Gaussian processes	673
19	Beyond the iid assumption	727

IV	Generation	763	
20	Generative models: an overview		765
21	Variational autoencoders	781	
22	Autoregressive models	811	
23	Normalizing flows	819	
24	Energy-based models	839	
25	Diffusion models	857	
26	Generative adversarial networks		883
V	Discovery	915	
27	Discovery methods: an overview		917
28	Latent factor models	919	
29	State-space models	969	
30	Graph learning	1031	
31	Nonparametric Bayesian models		1035
32	Representation learning	1037	
33	Interpretability	1061	
VI	Action	1091	
34	Decision making under uncertainty		1093
35	Reinforcement learning	1133	
36	Causality	1171	