Table of Notations

$\cup$	Union of sets
$\cap$	Intersection of sets
$A - B$, $A \backslash B$	Set difference
$\overline{A}$	The complement of set A
$\varnothing$	The empty set
2^A, $\mathcal{P}(A)$	The power set of A
$\lvert A \rvert$	Cardinality of a set
$\sum$	Sum
$\prod$	Product
$p \Rightarrow q$	p implies q (logical inference)
$p \Leftrightarrow q$	p and q are logically equivalent
$\stackrel{\text{def}}{=}$	Defined to be equal to (only used if "=" is ambiguous)
$\mathbb{R}$	The set of real numbers
$\mathbb{N}$	The set of natural numbers
$n!$	The factorial of n
∞	Infinity
$\lvert x \rvert$	Absolute value of a number
$\ll$	Much smaller than
$\gg$	Much greater than
$f: A \to B$	A function f from values in A to B
$\max f$	The maximum value of f

$\min f$	The minimum value of f
$\arg\max f$	The argument for which f has its maximum value
$\arg\min f$	The argument for which f has its minimum value
$\lim_{x\to\infty} f(x)$	The limit of f as x tends to infinity
$f \propto g$	f is proportional to g
∂	Partial derivative
$\int$	Integral
$\log a$	The logarithm of a
$\exp(x)$, e^x	The exponential function
$\lceil a \rceil$	The smallest integer i s.t. $i \geq a$
$\vec{x}$	A real-valued vector: $\vec{x} \in \mathbb{R}^n$
$\lvert\vec{x}\rvert$	Euclidean length of $\vec{x}$
$\vec{x} \cdot \vec{y}$	The dot product of $\vec{x}$ and $\vec{y}$
$\cos(\vec{x}, \vec{y})$	The cosine of the angle between $\vec{x}$ and $\vec{y}$
c_{ij}	Element in row i and column j of matrix C
C^{T}	Transpose of matrix C
$\hat{X}$	Estimate of X
$E(X)$	Expectation of X
$\mathrm{Var}(X)$	Variance of X
μ	Mean
σ	Standard deviation
$\bar{x}$	Sample mean
s^2	Sample variance
$P(A\lvert B)$	The probability of A conditional on B
$X \sim \mathrm{p}(x)$	Random variable X is distributed according to p
$\mathrm{b}(r;\, n, p)$	The binomial distribution
$\binom{n}{r}$	Combination or binomial coefficient (the number of ways of choosing r objects from n)
$\mathrm{n}(x;\, \mu, \sigma)$	The normal distribution
$H(X)$	Entropy

$I(X;\ Y)$	Mutual information
$D(\mathrm{p} \parallel \mathrm{q})$	Kullback-Leibler (KL) divergence
$C(\cdot)$	Count of the entity in parentheses
f_u	The relative frequency of u.
w_{ij}, $w_{(i)(j)}$	The words w_i, w_{i+1}, ..., w_j
$w_{i,j}$	The same as w_{ij}
$w_i, \ldots, w_j$	The same as w_{ij}
$O(n)$	Time complexity of an algorithm
*	Ungrammatical sentence or phrase or ill-formed word
?	Marginally grammatical sentence or marginally acceptable phrase

Note. Some chapters have separate notation tables for symbols that are used locally: table 6.2 (Statistical Inference), table 7.1 (Word Sense Disambiguation), table 9.1 (Markov Models), table 10.2 (Tagging), table 11.1 (Probabilistic Context-Free Grammars), and table 14.2 (Clustering).