Chapter 1
Social Tagging Systems

Social Tagging Systems (STS for short) are web applications where users
can upload, tag, and share resources (e.g., websites, videos, photos, etc.) with
other users. STS promote decentralization of content control and lead the
web to be a more open and democratic environment. As we will see in the
course of this book, STS put forward new challenges and opportunities for
recommender systems, but before we delve into how to design and deploy
efficient recommender systems for STS, in this chapter we formally define
social tagging systems and their data structures, elaborate on the different
recommendation tasks demanded by STS users, introduce real-world STS
that already feature recommendation services, and fix the notation we will
use throughout the book. The chapter is based on work published in [9].

1.1 Introduction

The idea of tagging objects with categories in order to make them more
recognizable and understandable was first systematized by Aristotle in his
Categories treatise\(^1\), where he analyzes the differences between classes and
objects. Since then, categorization has been used for a wide range of differ-
ent purposes, such as library classification, product catalogs, biological tax-
onomies, yellow pages of telephone directories, web catalogs, semantic web
ontologies, etc. A property shared by most of these classification systems is
that there is a restricted and selective number of persons involved in the
conception, assignment, and maintenance of the categories. Those persons
are usually experts on the respective domain, e.g., biologists for biological
taxonomies and librarians for document categorization. However, with the ad-

\(^1\) An English translation of the original Aristotle treatise is provided by E. M. Edghill
vent of social tagging systems, the democratization of content creation and
categorization enabled ordinary users to become the “experts” themselves.

Social tagging systems are Web 2.0 applications concerned with the publica-
tion and tagging of web resources by ordinary internet users. These systems
are now widespread, with millions of people using them daily to organize
and retrieve on-line content. STS, such as Delicious, Bibsonomy, Flickr, Last.fm, etc., bring people together through their shared interests, e.g.,
music in Last.fm, photos in Flickr, and scientific publication references and
bookmarks in Bibsonomy. In STS users can upload resources, e.g., URLs of
websites in Delicious, BibTeX entries in Bibsonomy, photos in Flickr, sound
tracks in Last.fm, etc., and annotate them with a list of freely chosen key-
words typically called tags. Although the primary goal of tags is to help
individual users to organize and retrieve their own content, the exposition
of tags by the system ends up benefiting other users since they can adopt
each other’s tags for browsing and annotating resources. With the increase
of tagging activity, a lightweight collaborative classification system, typically
known as folksonomy, emerges. STS have raised a lot of attention recently
due to their potential to improve search and personal organization of re-
sources, while introducing new opportunities for data mining and new forms
of social interaction.

This chapter is structured as follows: In Section 1.2 we present a formal
model of folksonomies and in Section 1.3 we show how users can navigate the
folksonomy through tag clouds. In Section 1.4 we present the different data
structures of STS. In Section 1.5 we present the recommendation tasks in
STS and in Section 1.6 we briefly present some real-world STS that already
feature some kind of recommendation service. In Section 1.7 we fix some
general notation to be used throughout the book. We finally close with further
reading and references.

1.2 Folksonomies

Folksonomies are the underlying structure of social tagging systems. They
result from the practice of collaboratively creating and managing tags to an-
notate and categorize content. Tags, in general, are a way of grouping content
by category to make it easy to view by topic. This is a grass-root approach to
organize a site and help users to find content they are interested in. Formally,
a folksonomy is defined as a relational structure \( F := (U, R, T, Y) \) in which

\[ \text{http://www.delicious.com/} \]
\[ \text{http://www.bibsonomy.com/} \]
\[ \text{http://www.flickr.com/} \]
\[ \text{http://last.fm/} \]
\[ \text{The term folksonomy refers to a blend of the two words folk and taxonomy.} \]