Seattle Public Library
Collection Management
Strategies

October 31, 2018
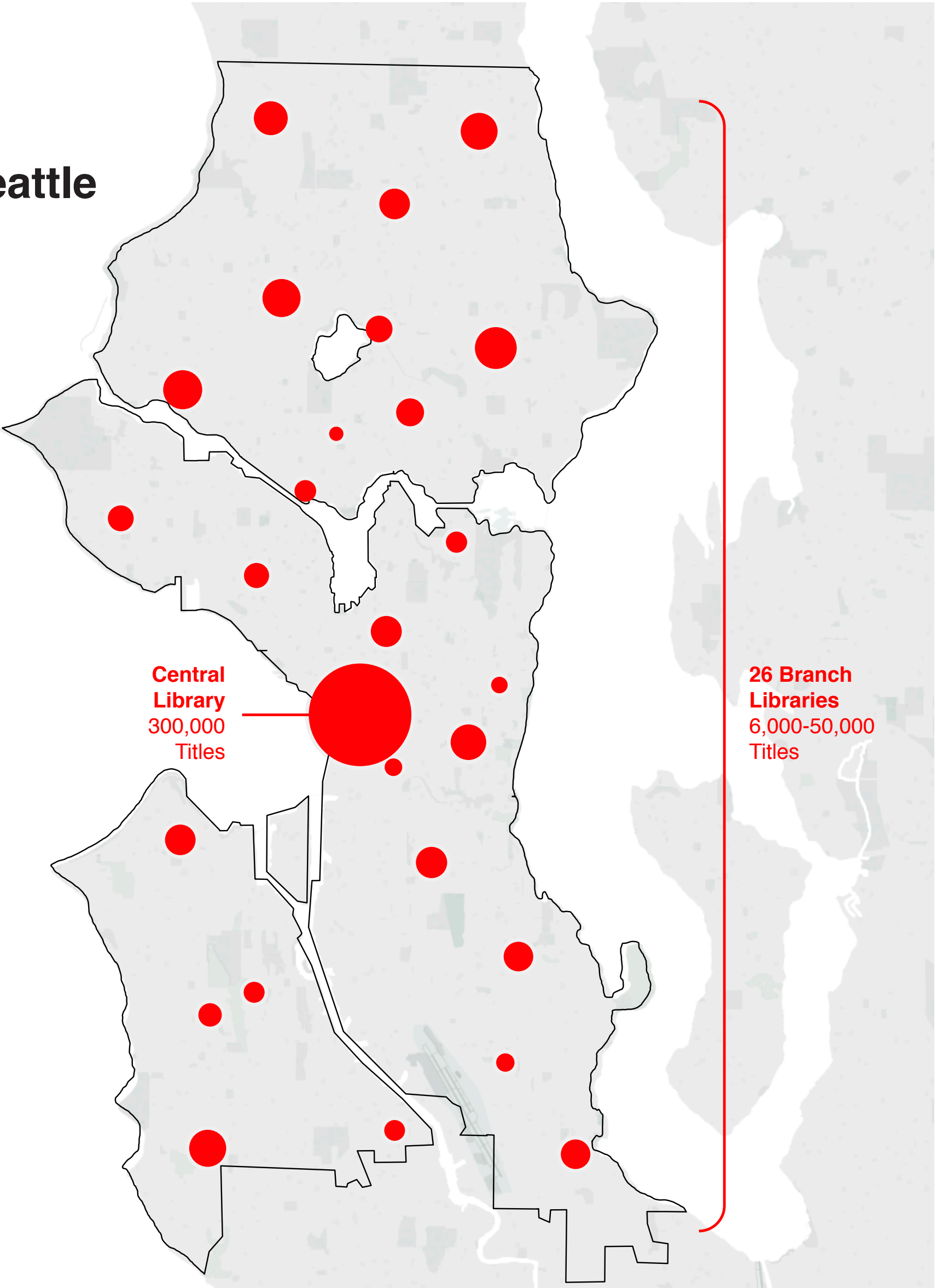Daniel Hui
Project 3

Seattle Public Library

History

1891 - Seattle Public Library founded

1956 - Voters approve $5M bond for new
      Central Library

1981 - Library begins use of Email

1982 - Apple II public computers installed

1988 - Fully computerized circulation system
      completed

1998 - Voters approve $196.4 M bond for
      new Central Library and to double
      square footage of Branch Libraries

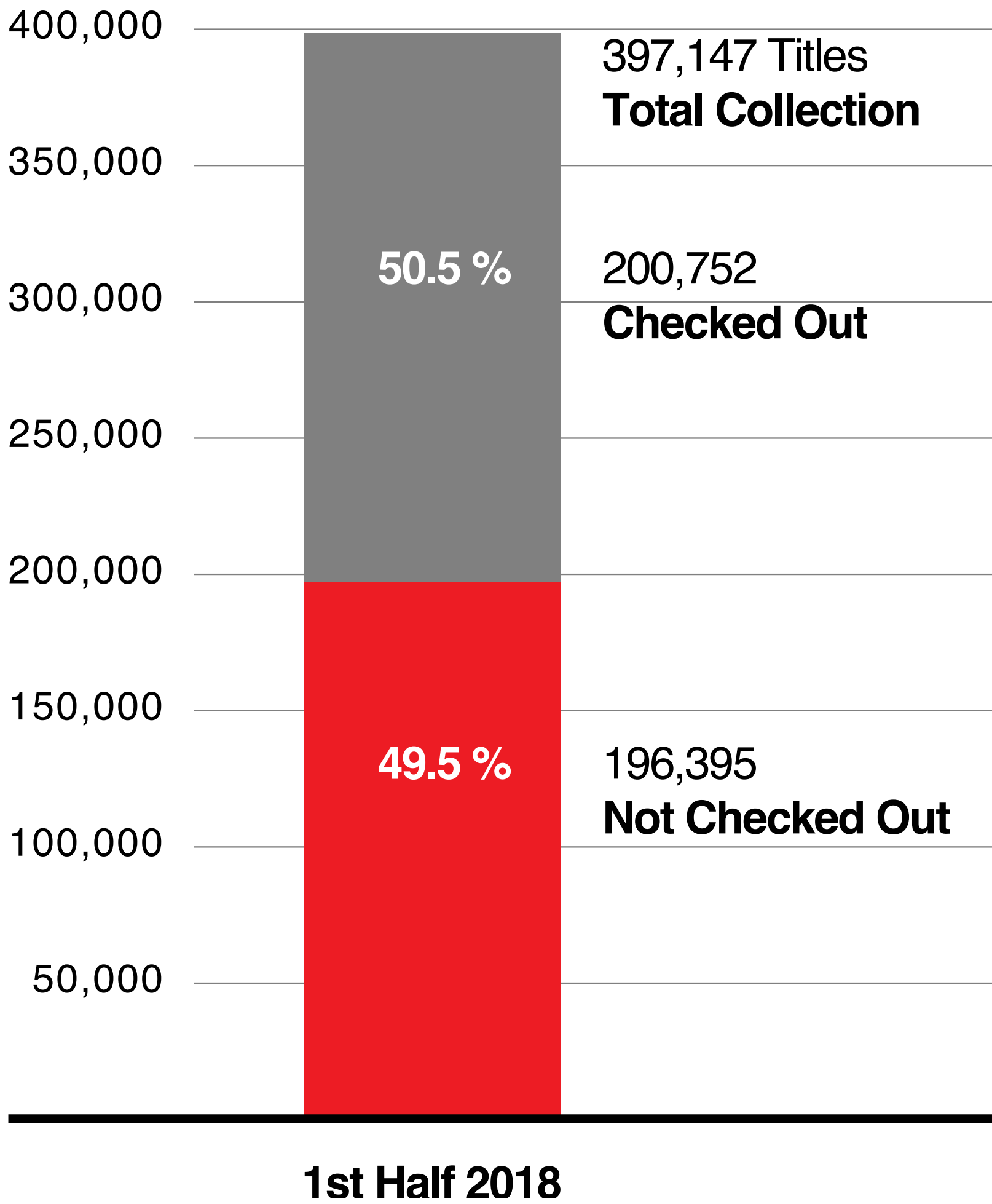2012 - Voters approve $123 M in new Library
      taxes

Overview

1 Central Library

26 Branch Libraries

Adult Books: 2,923,421

Children's Books: 2,483,277

Visits / Year: 5,481,047

Seattle Population: 724,745

Seattle

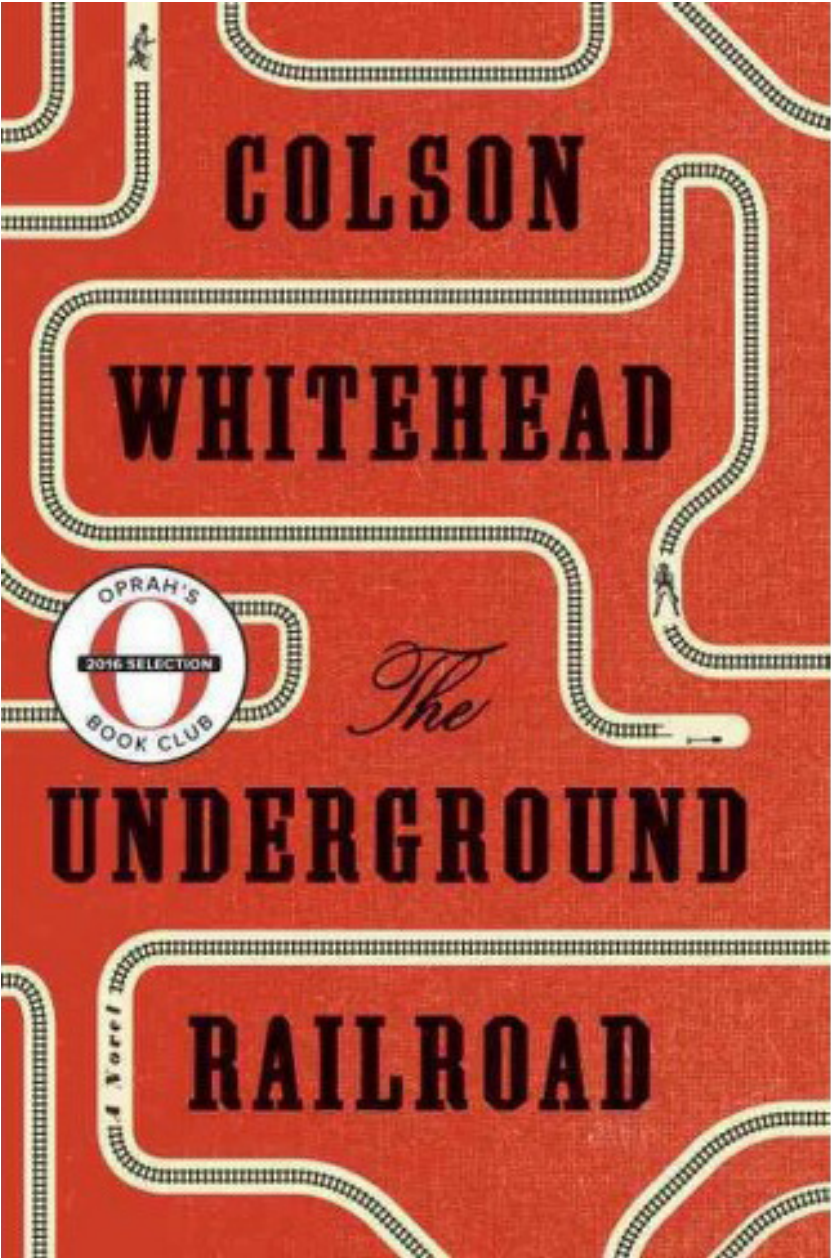Central Library
300,000 Titles

26 Branch Libraries
6,000-50,000 Titles

Seattle Public Library

Checkout Activity
First Half of 2018

400,000 — 397,147 Titles
Total Collection

50.5 % — 200,752
Checked Out

49.5 % — 196,395
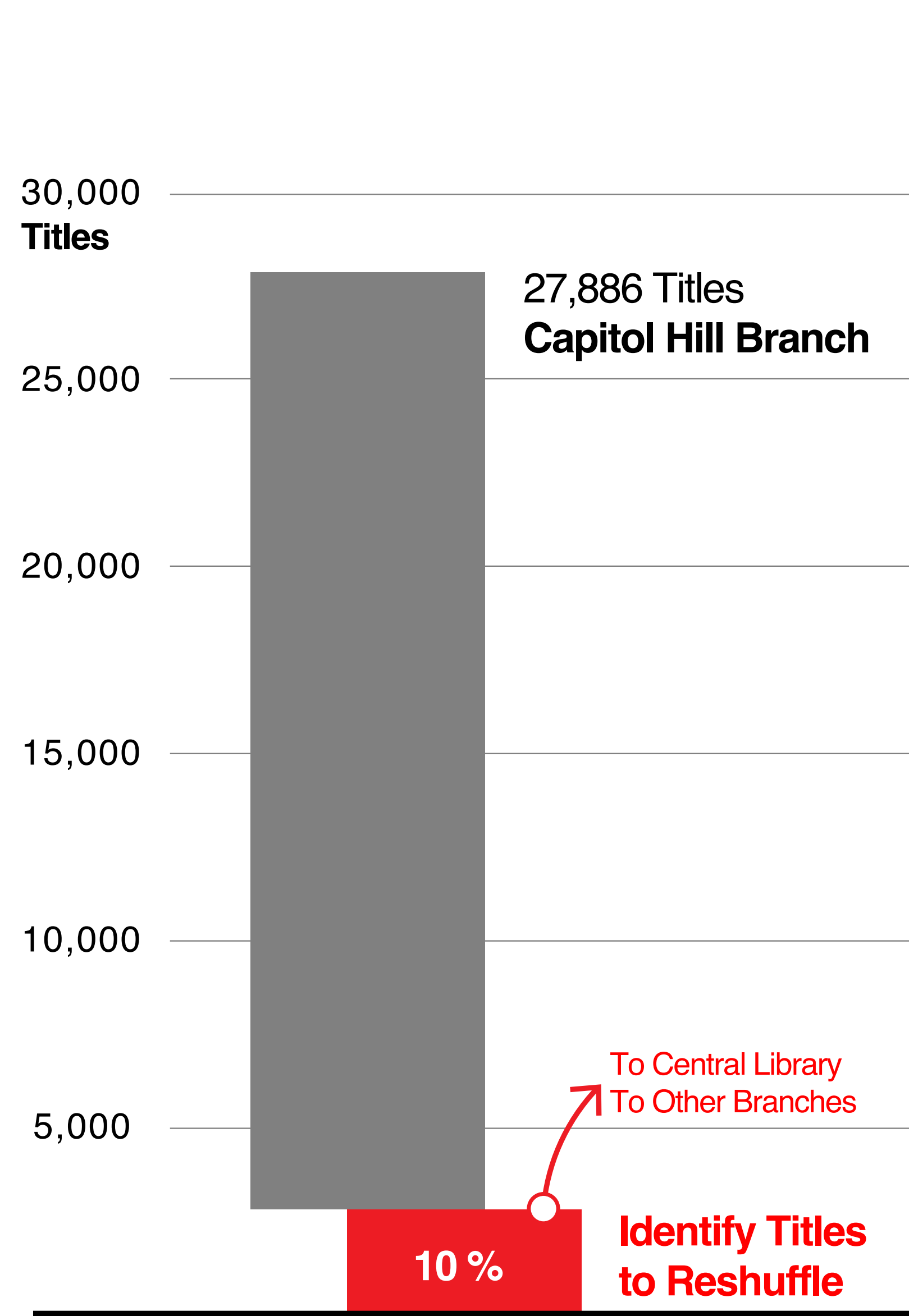**Not Checked Out**

1st Half 2018

Most Borrowed Title
First Half of 2017

The Underground Railroad
Whitehead, Colson, 2016

Checked Out
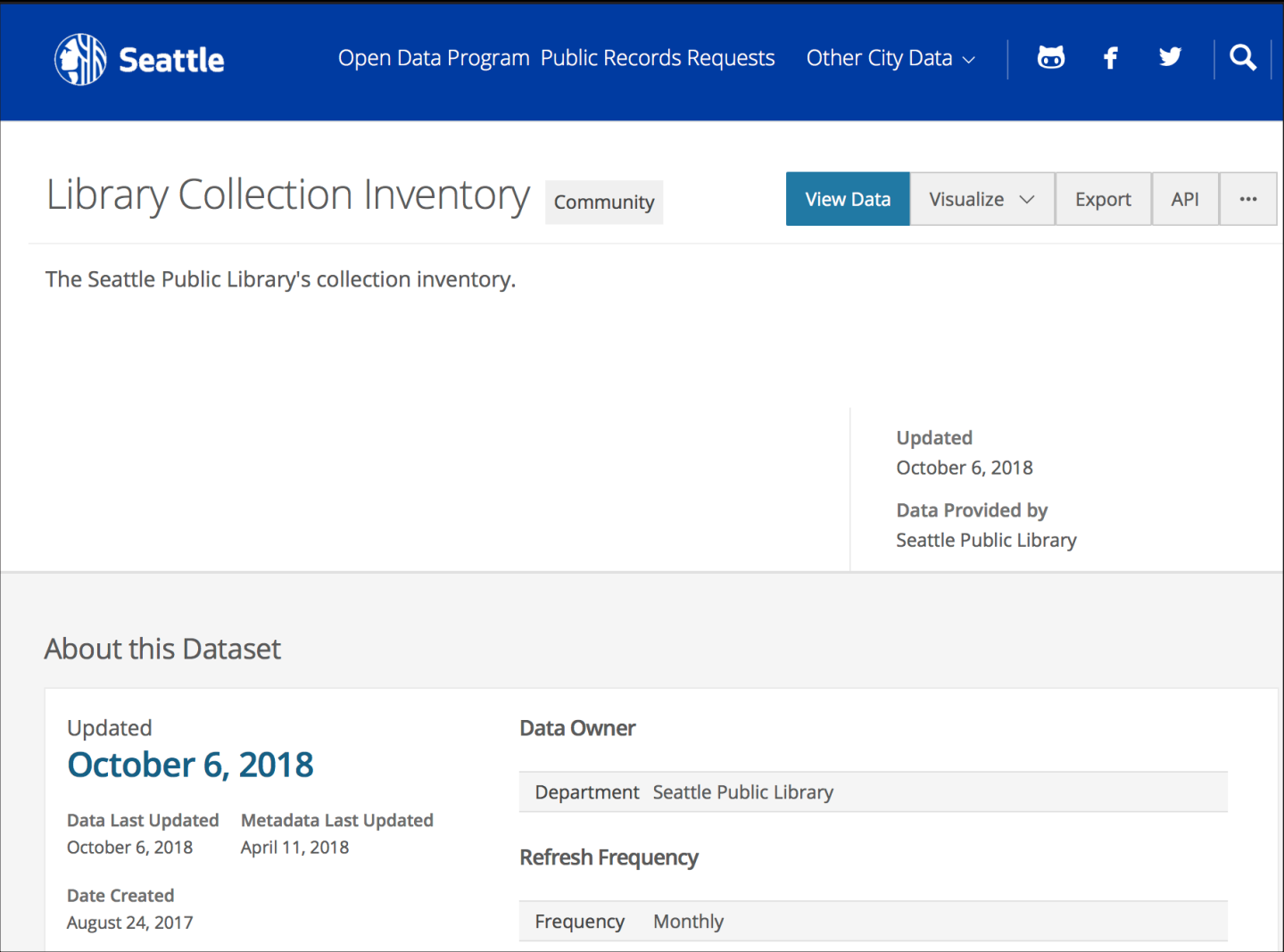1561 Times

Goal: Predict Which Books Won't Get Checked Out

30,000
Titles

27,886 Titles
Capitol Hill Branch

25,000

20,000

15,000

10,000

To Central Library
To Other Branches

5,000

10 %
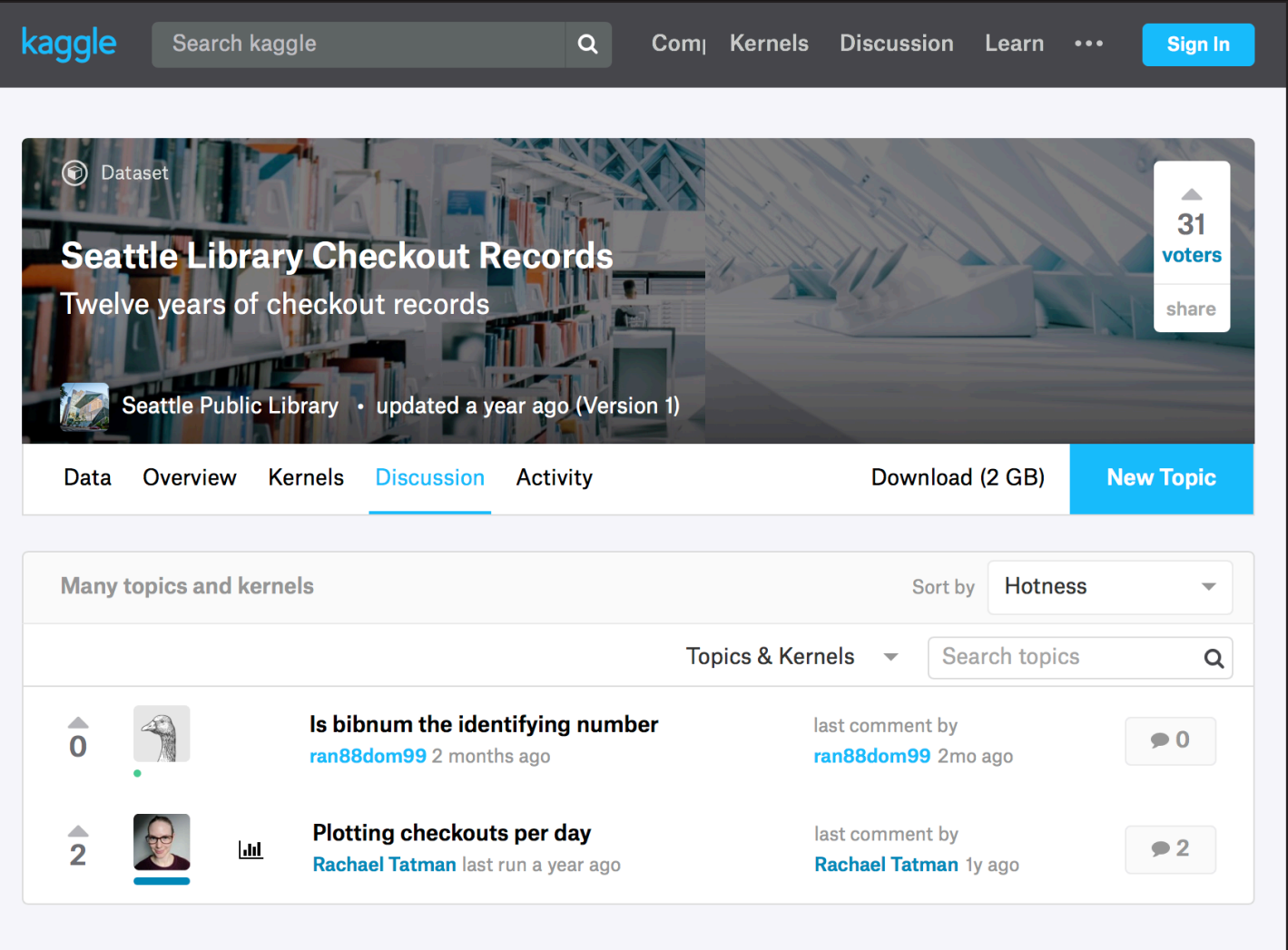
**Identify Titles
to Reshuffle**

Data Sources

Kaggle
kaggle.com

Seattle Open Data
data.seattle.gov

Seattle Public Library
Datasets

① **Checkout Data 2017-Present**
11.3 Million Rows

② **Collection Inventory Data**
18.8 MIllion Rows

③ **Data Dictionary**
555 Rows

Features

Book Detail Features

Title	Non-Fiction	Teen
ISBN	Biography	Mystery
Year	Large Print	Comic
Fiction	Picture	African American
Language	Children	

Library Collection Features

- Branches
- Total Copies
- Central Library
- + Each of 26 Branches

Patron Borrowing Features

- Trailing 30 Days
- Trailing 90 Days
- Trailing 180 Days
- Prior Year

Classification Models

Baseline Prediction

Results

Accuracy: 0.745

Precision: 0.750

Recall: 0.728

F1:   0.739

If a Title was checked out last year in the same period, predict it will be checked out

XG Boost Model

Validation Set Results

Accuracy: 0.812

Precision: 0.786

Recall: 0.853

F1:   0.818

Logistic Model

Validation Set Results
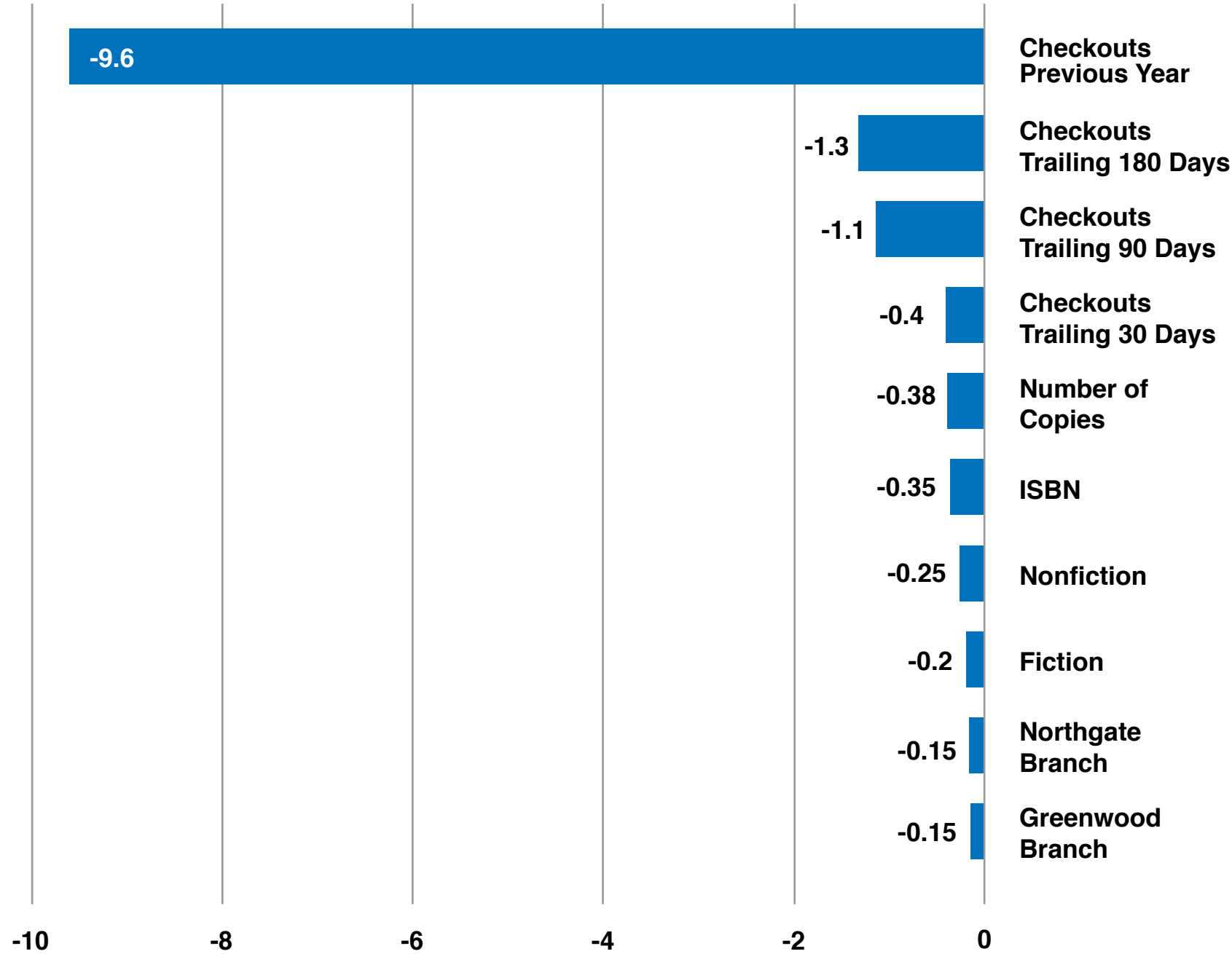
Accuracy: 0.804

Precision: 0.757

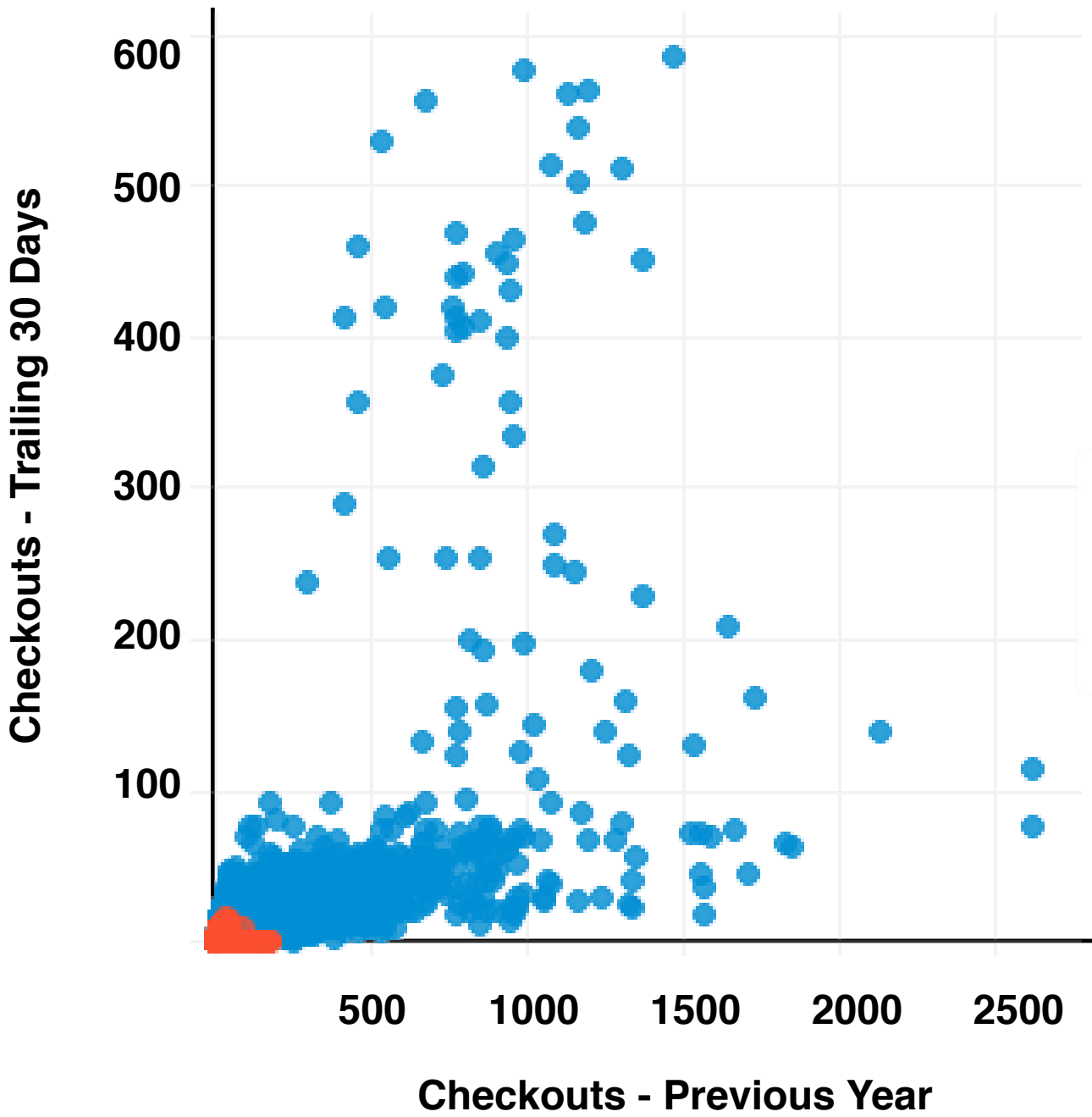Recall: 0.891

F1:   0.818

Holdout Test Set Results

Accuracy: 0.806

Precision: 0.758

Recall: 0.895

F1:   0.821

Feature Evaluation

Coefficients of Scaled Features
Top Ten

-9.6	Checkouts Previous Year
-1.3	Checkouts Trailing 180 Days
-1.1	Checkouts Trailing 90 Days
-0.4	Checkouts Trailing 30 Days
-0.38	Number of Copies
-0.35	ISBN
-0.25	Nonfiction
-0.2	Fiction
-0.15	Northgate Branch
-0.15	Greenwood Branch

Trailing Checkouts
Prior Year vs. 30 Days

Collection Holdings
Branch Locations vs Number of Copies
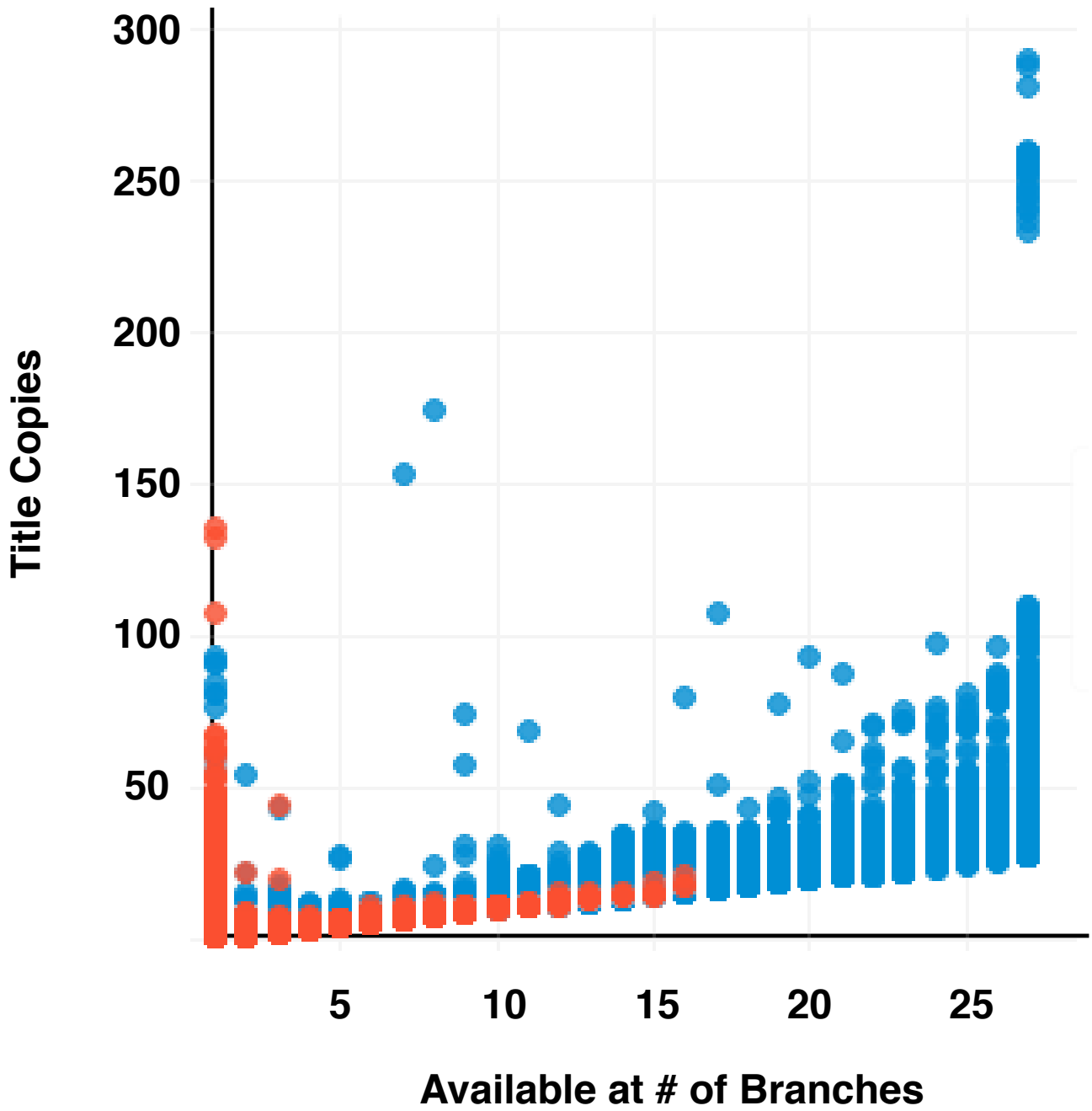
Collections Management Tool

The Seattle Public Library
SpaceFinder: Collections Management

Library Branch	Probability Threshold		Precision Score	Titles: Remove	Titles: Total	Percent
South Park	0.5000	0.9600	0.7560	1,803	12,537	14.38%

1294808	A picture book of Anne Frank / David A. Adler ; illustrated by Karen Ritz.	082341003X	South Park	1	1993
1298462	A picture book of Frederick Douglass / David A. Adler ; illustrated by Samuel Byrd.	0823410021	South Park	1	1993
1326221	Loans and grants from Uncle Sam : am I eligible and for how much?.	N/A	South Park	1	1993
1361629	A picture book of Sojourner Truth / David A. Adler ; illustrated by Gershom Griffith.	0823410722	South Park	1	1994
1382448	Cómo motivar a los niños a leer : lecto-juegos y algo más / Martha Sastrías de Porcel.	9688604496	South Park	1	1992
1390754	Cool salsa : bilingual poems on growing up Latino in the United States / edited by Lori M. Carls..	0805031359	South Park	1	1994
1639175	Canto familiar / Gary Soto ; [illustrated by Annika Nelson].	0152000674	South Park	1	1995
1650122	Romancero gitano / Federico García Lorca.	0140255834	South Park	1	1996
1659724	Bartlett's Roget's thesaurus.	0316101389	South Park	1	1996
1662222	Bienes raíces : an English-Spanish real estate dictionary.	0793113342	South Park	1	1996
1704889	Chester Square / Jaime Hernandez.	1560972556	South Park	1	1996
1705743	La bruja de Navidad / texto e ilustraciones de Steven Kellogg ; traducción de Osvaldo Blanco.	0803719965	South Park	1	1996
1736766	Collected stories / Franz Kafka ; edited and introduced by Gabriel Josipovici.	0679423036	South Park	1	1993
1748298	Artesanía mexicana : ideas, diseños y proyectos paso por paso / [versión en español, Herenia ..	968184906X	South Park	1	1994
1748884	Financial aid for African Americans.	N/A	South Park	1	1997
1748886	Financial aid for Asian Americans.	N/A	South Park	1	1997
1758922	Santa Evita / Tomás Eloy Martínez.	067977629X	South Park	1	1997
1759817	Leyendas mexicas y mayas / Otilia Meza.	9683802419	South Park	1	1991
1767791	Opposites / illustrated by Clare Beaton = Los contrarios / ilustraciones de Clare Beaton.	0764100319	South Park	1	1996
1786402	Financial aid for Hispanic Americans.	N/A	South Park	1	1997
1805400	El gusto del mercado Mexicano / escrito y ilustrado por Nancy María Grande Tabor = A taste of ..	0881068209	South Park	1	1996
1806451	Children's traditional games : games from 137 countries and cultures / by Judy Sierra, Robert K..	0897749677	South Park	1	1995
1822820	U.S. immigration made easy.	N/A	South Park	1	1989
1836873	How music came to the world : an ancient Mexican myth / retold by Hal Ober ; illustrated by Car..	0395675235	South Park	1	1994
1847636	Jackal : the complete story of the legendary terrorist, Carlos the Jackal / John Follain.	1559704667	South Park	1	1998
1853384	--y no se lo tragó la tierra / Tomás Rivera.	1558851518	South Park	1	1996
1862325	Escudos rotos / texto e iconografia, Claudia Burr, Krystyna Libura, Ma. Cristina Urrutia.	9687381000	South Park	1	1993
1862327	De lo que contaron al fraile / texto e iconografia, Krystyna Libura, Claudia Burr, Ma. Cristina Urr..	9687381043	South Park	1	1994
1862328	El diario de una marquesa / [texto e iconografía, José Joaquín Blanco, Claudia Burr, Luis Gera..	9687381051	South Park	1	1994

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South Park

The Infrastructure of Knowledge
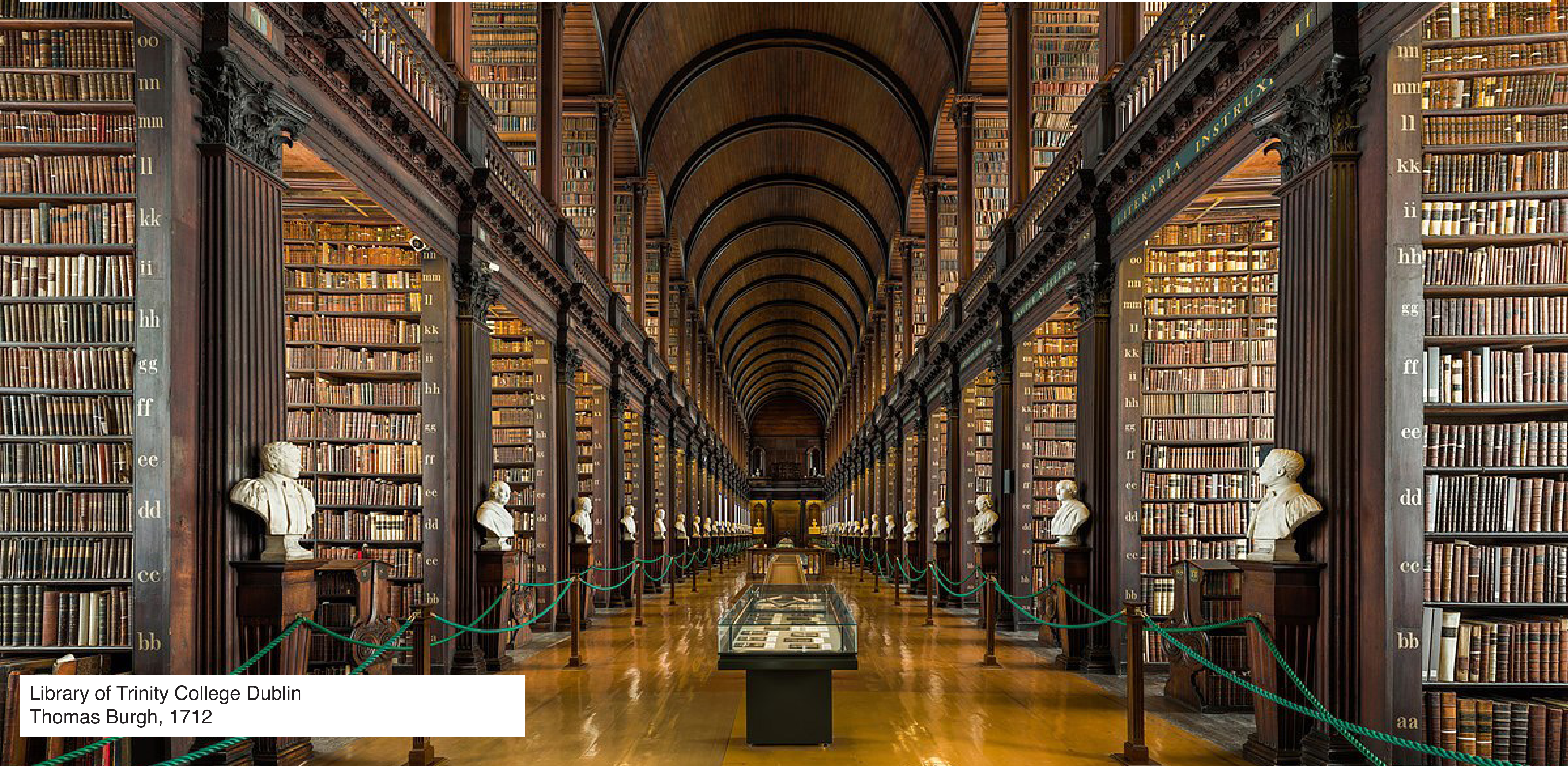
Library of Trinity College Dublin
Thomas Burgh, 1712

The Infrastructure of Knowledge

Data Center

The Infrastructure of Knowledge

Seattle Central Library
Rem Koolhaas / OMA, 2004

The Infrastructure of Knowledge

The New York Times

ARCHITECTURE; The Library That Puts on Fishnets and Hits the Disco

By **HERBERT MUSCHAMP**   MAY 16, 2004

AT a dark hour, Seattle's new Central Library is a blazing chandelier to swing your dreams upon. If an American city can erect a civic project as brave as this one, the sun hasn't set on the West. In more than 30 years of writing about architecture, this is the most exciting new building it has been my honor to review. I could go on piling up superlatives like cars in a multiple collision, but take my word: there's going to be a whole lot of rubbernecking going on.

The new library, which opens next Sunday, was designed by Rem Koolhaas/OMA of the Netherlands in collaboration with the Seattle firm LMN Architects. Joshua Ramus of OMA was the partner in charge. It is the centerpiece of an ambitious initiative to revamp and expand Seattle's library system citywide. This is Seattle, don't forget: a city where fortunes have been made on the premise that books, and even cities, may be rendered obsolete by digital technology. Yet this new library sets an example for cities nationwide.

What cities need most of all are strong clients, like Deborah L. Jacobs, Seattle's city librarian. This is a client who knows exactly what she wants. Terrifying. But there's never been a great building without a strong client in the history of the world, and Ms. Jacobs is now up there with popes and princes as an instigator of fabulous cities.

THE NEW YORKER

HIGH-TECH BIBLIOPHILIA

Rem Koolhaas's new library in Seattle is an ennobling public space.
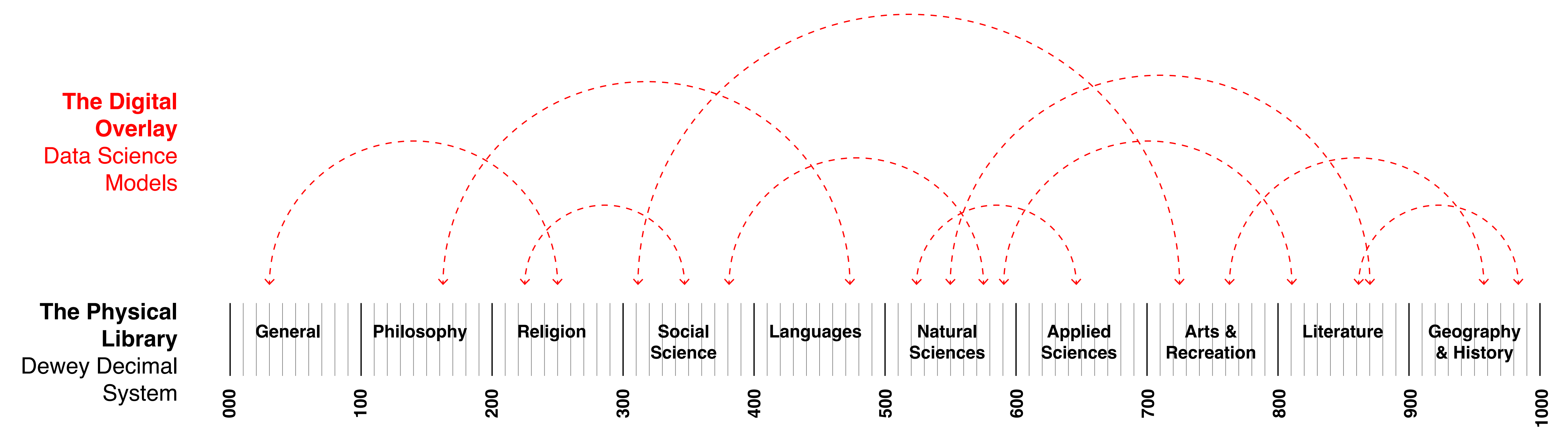
By **Paul Goldberger**

If you wanted to build a new library downtown somewhere, Rem Koolhaas is probably the last architect you would think to hire. For years, Koolhaas has been ranting about how traditional cities don't matter anymore, and how the rise of new technologies has made public space obsolete, and how when people leave their houses the only thing they want to do is shop.

The result is the most important new library to be built in a generation, and the most exhilarating. Koolhaas has always been a better architect than social critic, and the building conveys a sense of the possibility, even the urgency, of public space in the center of a city. The design is not so much a rejection of traditional monumentality as a reinterpretation of it, and it celebrates the culture of the book as passionately, in its way, as does the New York Public Library on Fifth Avenue. The Seattle building is thrilling from top to bottom. Koolhaas and Ramus started out by investigating how libraries actually work, and how they are likely to change. They went with Deborah Jacobs, Seattle's chief librarian, and

Libraries
The Original Classification Engine

The Digital Overlay
Data Science Models

The Physical Library
Dewey Decimal System

| General | Philosophy | Religion | Social Science | Languages | Natural Sciences | Applied Sciences | Arts & Recreation | Literature | Geography & History |

000 — 100 — 200 — 300 — 400 — 500 — 600 — 700 — 800 — 900 — 1000

Next Steps
Model with Book Features Only

Incorporate Book Title Features

Title	Non-Fiction	Teen	**+**	+ 100 Title Word Vectors
ISBN	Biography	Mystery		
Year	Large Print	Comic		
Fiction	Picture	African American		
Language	Children			
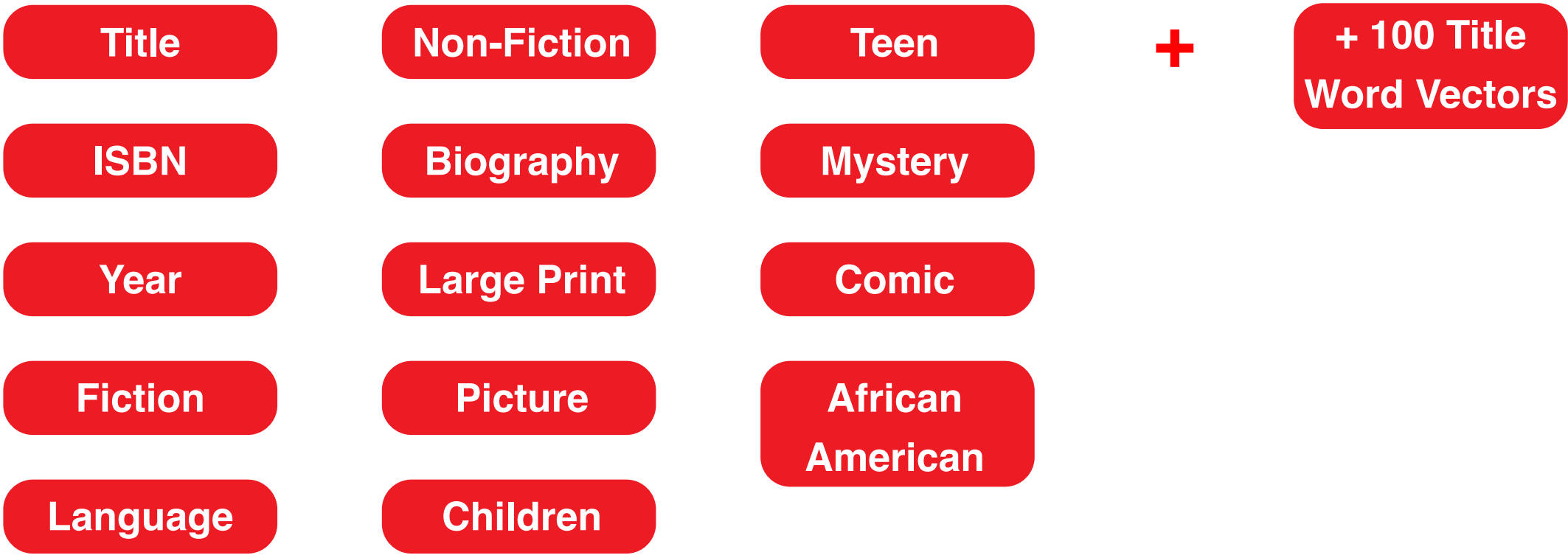
XGBoost Model - Validation Score

Accuracy: 0.729

Precision: 0.747

Recall: 0.717

F1:   0.732

Incorporate Bibliocommons Data
Webscraped 4000 Titles

Title	Non-Fiction	Teen	**+**	Reviews
ISBN	Biography	Mystery		Ratings
Year	Large Print	Comic		Pages
Fiction	Picture	African American		Size
Language	Children			

XGBoost Model - Validation Score

Accuracy: 0.790

Precision: 0.700

Recall: 0.807

F1:   0.750