

# **M259 Visualizing Information**

Elings 2611 Tues-Thurs 3:30-5:20pm

Office Hours: Tuesday 2:00-3:30pm

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Prof. George Legrady

# Course Overview

**Wk 1-2 Data Mining / Knowledge Discovery (MySQL)**  
Discover unexpected, interesting patterns in a large dataset

**Wk 2-3 2D Frequency Data Mapping (Processing)**  
Acquire visual language basics

**Wk 4-5 3D Interactive Visualization (Processing)**  
Design in 3D, interactive space, implement algorithms

**Wk 6 Review & Presentation**

**Wk 7 Correlation (Processing, JSON)**  
Data correlation between SPL and another source

**Wk 8 Student Defined Project**  
Each student chooses their data source

**Wk 9 Student Project Presentation**

# Course Knowledge Acquisition

- 1) how to identify and **retrieve significant data** from a dataset with MySQL
- 2) Develop skills in the **fundamentals of visual language** through programming
- 3) Visualize abstract data to **reveal patterns** and relationships
- 4) **Normalize data** to enhance legibility and coherence
- 5) Implement interactivity within 3D volumetric visualization
- 6) **Correlate** 2 sets of data from diverse sources
- 7) **Visual Language:** How form, color, space, timing, movement, etc. impact on content (this is the primary goal of the course)

# Course Assignments

Every project has **conceptual, technical** and **aesthetic** challenges:

**1. MySQL Data discovery**

(What is an interesting query?)

**2. 2D Visualization**

(3 or more data properties)

**3. 3D Spatialization and Interactivity**

(What does 3D & Interactivity contribute)

**4. Correlation**

(Correlation between 2 different datasets provide new insight)

# An Interdisciplinary Process

We want to integrate diverse Expertises:

- Analytical: theoretical, cultural, information research (*social scientist*)
- Technical: Statistical aggregation and computational processes (*engineer, scientific*)
- Aesthetic: Visual design, expression (*artist, designer, architect*)

## Course Format

**Tues:** Lectures, visualization analysis

**Thur:** Technical lab

## Course Resources

**WEBSITE:** Course syllabus, code samples, references, and project results

**BLOG:** Post your concepts, sketches, share algorithms, visualization techniques here

**Past Finished Projects:** Finished projects with documentation

# Software Resources

- MySQL open-source relational database management system
- MySQL Workbench to access the data
- Processing Java-based scripting language used by graphic designers
- JSON a text-based data-interchange format for data correlation
- P5 a JavaScript library to port Processing on the web

## Projects & Data Source

To allow us to quickly master examples and share solutions

Everyone uses the same data for the MySQL, 2D & 3D assignments so that

- Results can be compared and shared
- & learn quickly from previous projects

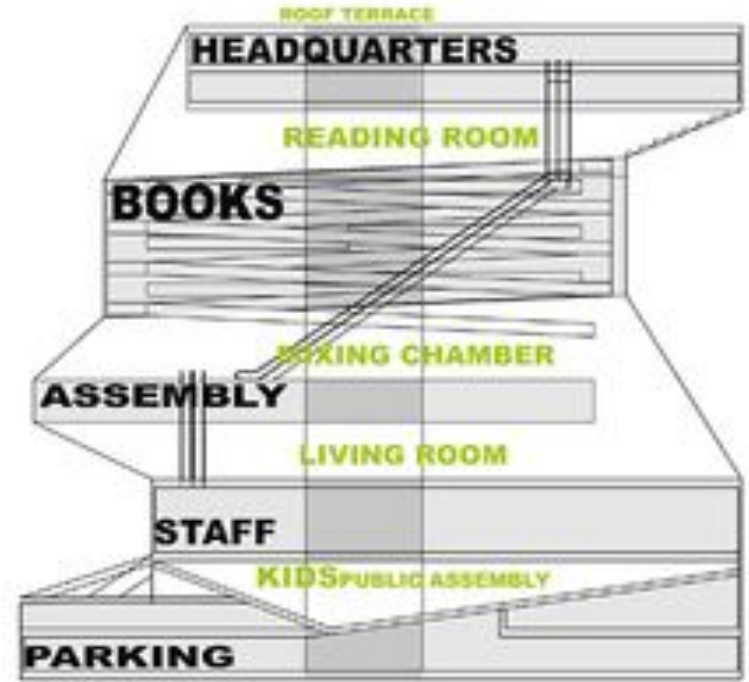
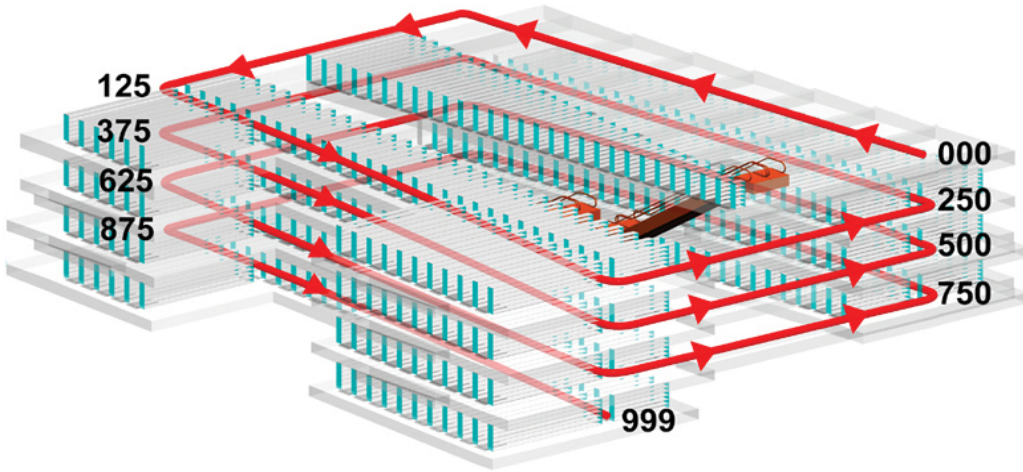
Each student decides on their data source for the final project







# Architectural Design





# Making Visible the Invisible

- 4 animations, visualizing checkout activities of the past hour
- Approximately 20,000 – 36,000 per day
- Over 90 million transactions to-date
- Possibly the longest running, dynamic data visualization artwork
- Located behind Information Desk in the Mixing Chamber
- Project collects data over time. Used in the M259 course

Total Items  
2005.09.12 16:43:40

Dewey Items  
2005.09.12 16:43:40

Non-Dewey Items  
2005.09.12 16:43:40

Books  
2005.09.12 16:43:40

DVDs  
2005.09.12 16:43:40

Other Media (cd, video, etc.)  
2005.09.12 16:43:40

12433 Total Items  
in circulation today

Past hour

5116 Dewey Items  
in circulation today

Past hour

7317 Non-Dewey Items  
in circulation today

Past hour

6881 Books  
in circulation today

Past hour

1932 DVDs  
in circulation today

Past hour

1226 Other Media  
in circulation today

Past hour

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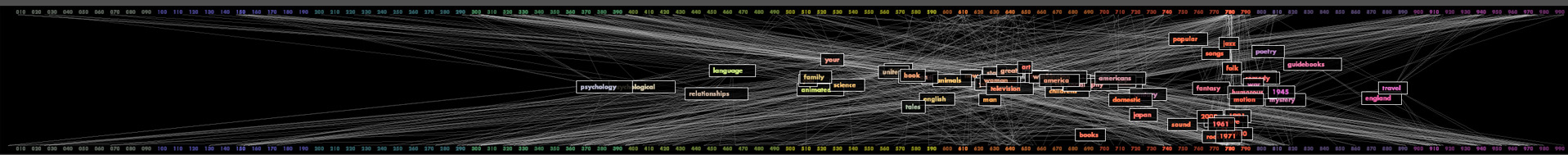
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0-99	100-199	200-299	300-399	400-499	500-599	600-699	700-799	800-899	900-999
Generalities	Philosophy & Psychology	Religion	Social Science	Language	Humor	Technology & Applied Science	Arts	Dance	Geography & History
Look out kindergarten here I come	Cyberchase The snails snafu	Carpathian Disaster DEATH OF AN ARMY	Motorcycle diaries	Baby road trip Beach	Maurice	Melli the sound of	Laura Numeroffs 10 step guide to living with your monster	Hope the sound of Bookshop Comfy armchair	Atlantis Kites return
Ancient ones	sky wings falling like the stars	complete stories	Dahl drawing book	Seconds of pleasure stories	Enduring love	World is not enough	Shark tale	George and Martha	Orange Blossom
Scoby Doo meets the Boo Brothers	Devilant ways	Freemason's "road"	Freemason's "road"	Survivor in death	Enduring love	Aphrodite	Boyz n the city	Maui's Revenge	Orange Blossom
Killer emils	Dark on the run	Max Kasha's big music	Max Kasha's big music	Survivor in death	Enduring love	Aphrodite	Boyz n the city	Maui's Revenge	Orange Blossom
Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and	Rolling peacock is deleted and





# Data as Cultural Analysis

- Patrons **check-out** books, cds, dvds from the Seattle Public Library
- Each time someone checks out a movie, book, cd, a cultural choice is made
- Visualization receives data by the hour
- Appx 30000 per day; 10 million annually
- Over 90 million datasets since September 2005
- Data a significant resource: Can be mined for a broad range of cultural trends
- Can be correlated with other data sources: NYTimes, Apple iTunes, Amazon, etc.





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# The Seattle Public Library Data & its Metadata

The metadata for each item in the collection is *multivariate*

## Ordinal (*In a numeric sequence*)

- **CollectionCode**: Assigned when object enters system
- Dewey Classification (Dewey numeric)

## Interval Scale (*Time-Stamp*)

- Check-out/check-in hour, day, month, year

## Categorical (*Not necessarily numerically orderable*)

- **BibNumber**: Each title has a specific number, copies of titles all have same number
- **Barcode**: Each item has a unique number on RFID sticker
- **CallNumber**: by which to locate items on shelves - Ordinal if Dewey, otherwise categorical

## Semantic (*Text-based*)

- **Title**: Each Item has a title
- **ItemType**: books, cds, dvds, music sheets, etc.
- **Subjects**: Keywords (arbitrary labeling)

# MySQL: Select itemNumber, cout, collcode, itemtype, barcode, title, callNumber, deweyClass, subj from inraw where year(cout) = 2007 and month(cout) >= 1 and month(cout) <= 4 limit 50;

itemNumber	cout	collcode	itemtype	barcode	title	callNumber	deweyClass	subj
2124890	2007-01-02 09:20:00	nacd	accd	0010053294418	tigers have spoken	CD 782.421642 C2665T	782.421642	Rock music 2001 2010^Country music 2001 2010
1963406	2007-01-02 09:12:00	cafic	acbk	0010046075908	Heart on the line	FIC ARNOLD	NULL	Love stories^Women television producers and directors New York State N...
1348064	2007-01-02 09:03:00	nalpfc	acbk	0010047150288	Too hot to handle	FIC LOWELL	NULL	Love stories^Large type books^Ranch life Fiction
264450	2007-01-02 09:13:00	canf	acbk	0010027180271	Governing public schools new times new requirements	371.2 DANZBER 1992	371.2	School boards Rating of
436074	2007-01-02 09:13:00	cs9	acbk	0010002326972	great deception the inside story of how the Kremlin took over Cuba	972.91 M741G	972.91	Cuba History 1959^Communism Cuba^Soviet Union Foreign relations Cu...
660741	2007-01-02 09:13:00	canf	acbk	0010041599258	Logic or The right use of reason in the inquiry after truth with a va...	160 L793W 1996	160	Locke John 1632 1704^Logic Early works to 1800^Conduct of life Early w...
2225714	2007-01-02 09:12:00	cafic	acbk	0010050230746	Something about Emmaline	FIC BOYLE2005	NULL	Love stories^Historical fiction^Regency fiction^London England Fiction
860548	2007-01-02 09:14:00	canf	acbk	0010048238389	Understanding installation art from Duchamp to Holzer	709.04 R7277U 2003	709.04	Installations Art^Art Modern 20th century
15316	2007-01-02 09:12:00	cs9	acbk	0000103502175	Frank B Kellogg a biography	B K292 B	NULL	Kellogg Frank B Frank Billings 1856 1937^Statesmen United States Biography
418329	2007-01-02 09:13:00	cs9	acbk	0010002324977	German raider Atlantis	940.953 F8517G	940.953	World War 1939 1945 Naval operations German^Atlantis Ship
745716	2007-01-02 09:13:00	cafic	acbk	0010033394031	Zabelle	FIC KRICORI1998	NULL	Armenian American women Massachusetts Boston Fiction
1529347	2007-01-02 09:14:00	canf	acbk	0000102981248	Reservation narrow gauge Omak Creek railroad Bow Arrow Short Li...	385.52097 L587R	385.52097	Biles Coleman Lumber Company History^Logging railroads Washington St...
1558007	2007-01-02 09:13:00	canf	acbk	0010004731641	place no one knew Glen Canyon on the Colorado	779 P833P2a	779	Glen Canyon Utah and Ariz^Glen Canyon Utah and Ariz Pictorial works
1681487	2007-01-02 09:12:00	canf	acbk	0010002691342	Buddhism in translations passages selected from the Buddhist sacr...	294 W252B	294	Buddhism Sacred books
1688675	2007-01-02 09:14:00	canf	acbk	0010048100100	death in Washington Walter G Krivitsky and the Stalin terror	327.1247 K4592D 2003	327.1247	Krivitsky W G Walter G 1899 1941^Espionage American^Espionage Soviet...
2424499	2007-01-02 09:13:00	canf	acbk	0010054269096	101 diseases you dont want to get	614.5 P8715o 2005	614.5	Epidemiology Popular works^Diseases Popular works
27939	2007-01-02 09:09:00	nafic	acbk	0010040162363	Twilight in Texas	FIC THOMAS	NULL	Love stories^Texas Fiction^Texas Rangers Fiction
1534336	2007-01-02 09:00:00	nanf	acbk	0010041237933	Boundless healing meditation exercises to enlighten the mind and...	294.34435 T387B 2000	294.34435	Mind and body^Meditation Buddhism^Healing Religious aspects Buddhism
2205408	2007-01-02 09:14:00	canf	acbk	0010050859288	fragrance of faith the enlightened heart of Islam	297 R1294F 2004	297	Islam
2631813	2007-01-02 09:14:00	nanf	acbk	0010053789672	How to reduce workplace conflict and stress how leaders and their...	658.1053 M327H 2005	658.1053	Teams in the workplace^Interpersonal conflict^Mediation^Negotiation^O...
702785	2007-01-02 09:13:00	canf	acbk	0010034758416	home of the blizzard a true story of Antarctic survival	919.8904 MAWSON 1998	919.8904	Antarctica Discovery and exploration^Australasian Antarctic Expedition 1...
1168659	2007-01-02 08:58:00	nab	acbk	0010045761730	Lives of mothers daughters growing up with Alice Munro	B M9265M 2001	NULL	Novelists Canadian 20th century Family relationships^Novelists Canadian...
2498965	2007-01-02 09:14:00	canf	acbk	0010054107684	Foxes in the henhouse how the Republicans stole the South and th...	324.70973 R2999J6 2006	324.70973	Democratic Party U S^Republican Party U S 1854^Politics Practical United...
1076021	2007-01-02 09:13:00	canf	acbk	0010045523353	False intimacy understanding the struggle of sexual addiction	241.66 Sch196F 1997	241.66	Sex addicts Rehabilitation^Intimacy Psychology Religious aspects Christia...
1703576	2007-01-02 09:12:00	canf	acbk	0010025511717	Lakota recollections of the Custer fight new sources of Indian milit...	973.82 LAKOTA 1991	973.82	Dakota Indians Wars 1876^Little Bighorn Battle of the Mont 1876 Person...
2033121	2007-01-02 09:13:00	cafic	acbk	0010020070768	Furors die a novel	FIC HOFFMAN	NULL	NULL
2633117	2007-01-02 09:06:00	nanf	acbk	0010042818186	devils dictionary of business monkey business high finance and lo...	330.0207 V895D 2005	330.0207	Finance Dictionaries^Business Dictionaries
295289	2007-01-02 09:13:00	canf	acbk	0010041330571	Running with the Buffaloes a season inside with Mark Wetmore Ad...	796.42809 C7193L 2000	796.42809	Colorado Buffaloes Cross country team^Cross country running Colorado...
2684484	2007-01-02 09:13:00	canew	acbk	0010054076608	opened grave Sherlock Holmes investigates his ultimate case	FIC JAMES2006	NULL	Mystery fiction^Holmes Sherlock Fictitious character Fiction^Missing pers...
756568	2007-01-02 09:14:00	canf	acbk	0010028375219	Transforming vision writers on art	810.80357 TRANSFO 1994	810.80357	Art^American poetry 20th century^Art Poetry
1437750	2007-01-02 09:13:00	cs9	acbk	0000102286903	De Shazer the Doolittle raider who turned missionary a true and th...	B D459W	NULL	Missions Japan^De Shazer Jacob 1912
67201	2007-01-02 09:45:00	nchol	jcbk	0010045871109	Jothams journey a storybook for Advent	J YTREEID	NULL	Family Prayer books and devotions English^Advent Prayer books and dev...
1336766	2007-01-02 09:44:00	cs9o	acbk	0010001512887	Burri	B B942B	NULL	Burri Alberto 1915
2582486	2007-01-02 09:44:00	ncnew	jcbk	0010050556819	Lady in the water a bedtime story	E SHYAMAL	NULL	Imaginary creatures Fiction
1978356	2007-01-02 09:45:00	cs6ro	arbk	0010019836690	Bullard Arms	338.76834 J241B	338.76834	Bullard James Herbert 1842 1914^Bullard Repeating Arms Company Hist...
1404338	2007-01-02 09:44:00	canf	acbk	0010038257472	Perfect bones a six point plan to promote healthy bones	616.716 L5785P 2000	616.716	Osteoporosis Popular works^Women Nutrition
2347671	2007-01-02 09:44:00	nanf	acbk	0010050592780	Satisfaction the science of finding true fulfillment	155.9 B4581S 2005	155.9	Satisfaction
468341	2007-01-02 09:41:00	nafic	acbk	0010022410574	Fly fishing tales literary bait by angling authors	FIC FLY FIS1994	NULL	Fishing stories American^Fly fishing Fiction
1558499	2007-01-02 10:02:00	nanf	acbk	0010037361580	Chariots of the gods unsolved mysteries of the past	001.94 DANIKEN 1999	001.94	Archaeology^Life on other planets^Civilization Ancient Extraterrestrial in...
2064174	2007-01-02 09:41:00	canf	acbk	0010036046778	way of agape	241.4 MISSLER 1999	241.4	Agape^Love Religious aspects Christianity
18430	2007-01-02 09:41:00	canf	acbk	0010026014141	Future of medicine toward a science of prevention based on ancie...	613 DUGLISS 1993	613	Medical care United States^Medicine Preventive United States
614085	2007-01-02 09:41:00	canf	acbk	0010045701462	Tanker operations a handbook for the person in charge PIC	623.88245 H8627T 2001	623.88245	Tankers Handbooks manuals etc
1591175	2007-01-02 09:39:00	caesl	bcbk	0010034398809	Angliiskii iazyk prosto o slozhnom prakticheskii kurs	RUSSIAN 428.24917 L576A	428.24917	English language Textbooks for foreign speakers Russian
2670845	2007-01-02 08:48:00	canf	acbk	0010051680022	Gorgeous disaster the tragic story of Debra LaFave	364.153 L131L 2006	364.153	Sexual abuse victims United States Case studies^Female sex offenders U...
1064531	2007-01-02 10:16:00	nacd	accd	0010040958539	Spirituals in concert	CD784.73 B3225	784.73	Spirituals Songs^Songs High voice with instrumental ensemble^Songs Hi...
965750	2007-01-02 09:38:00	capf	acbk	0010025431536	Kathy and Mo show parallel lives	812.54 GAFFNEY 1992	812.54	Women Drama
1970799	2007-01-02 09:39:00	nafic	acbk	0010046761242	revelation	FIC LITTLE	NULL	Horror fiction
1006825	2007-01-02 10:17:00	cacd	accd	0010046200415	peaceful Christmas	CD 782.21723 P3133	782.21723	Christmas music^New Age music
1831232	2007-01-02 10:17:00	canf	acbk	0010048571573	Tauntons family home idea book	728.37 St546T 2003	728.37	Architecture Domestic United States^Interior architecture United States^R...

# Typical daily Dewey activity

## 20 most active

hour	789	613	784	917	746	973	796	398	616	914	791	306	332	305	158	792	811	658	635	895	
0	0	0	0	0	8	0	4	12	1	0	0	0	1	0	0	1	0	5	0	0	4
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
7	1	2	0	5	0	1	1	0	0	1	0	0	0	0	2	1	0	1	0	0	2
8	15	58	57	109	38	90	39	73	25	50	41	34	20	31	13	33	33	14	24	42	
9	27	71	48	134	40	87	62	73	41	70	78	36	35	42	12	32	52	14	28	45	
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11	1560	1149	1125	969	880	1006	786	966	702	701	567	610	453	556	542	526	628	488	532	560	
12	2185	1683	1878	1177	1025	1108	1156	889	881	935	782	706	779	700	715	625	788	680	647	960	
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14	3336	2698	2227	1811	1890	1744	1685	1487	1421	1271	1144	1146	1059	1044	1062	1041	990	962	1105	1140	
15	3995	2810	2426	1870	1850	1813	1703	1417	1444	1360	1388	1142	1187	1172	1073	1143	1139	1074	1139	1044	
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17	4322	2870	2547	2203	1992	1817	1904	1374	1438	1416	1322	1402	1366	1317	1346	1359	1152	1248	1045	798	
18	2398	1574	1381	1012	1024	1034	1059	630	756	615	719	682	678	680	677	685	604	562	532	280	
19	2233	1557	1284	1050	845	942	1027	643	612	524	595	713	706	594	623	645	562	651	497	341	
20	48	18	17	35	9	15	25	18	9	6	15	4	3	3	4	6	11	17	22	4	
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22	0	2	2	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	
23	6	1	2	5	1	0	6	0	0	0	4	2	2	0	2	7	1	1	0	0	





## Data Query Example

**Question:** How has the popularity of JD Salinger's book "Catcher in the Rye" or the lead character "Holden Caulfield" changed during the period 2005 to 2011, separated by year?

**Process:** A simple single query visualization. Minimal design, and use of color to fully utilize available space.

2005

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2006

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2007

16

2008

62

2009

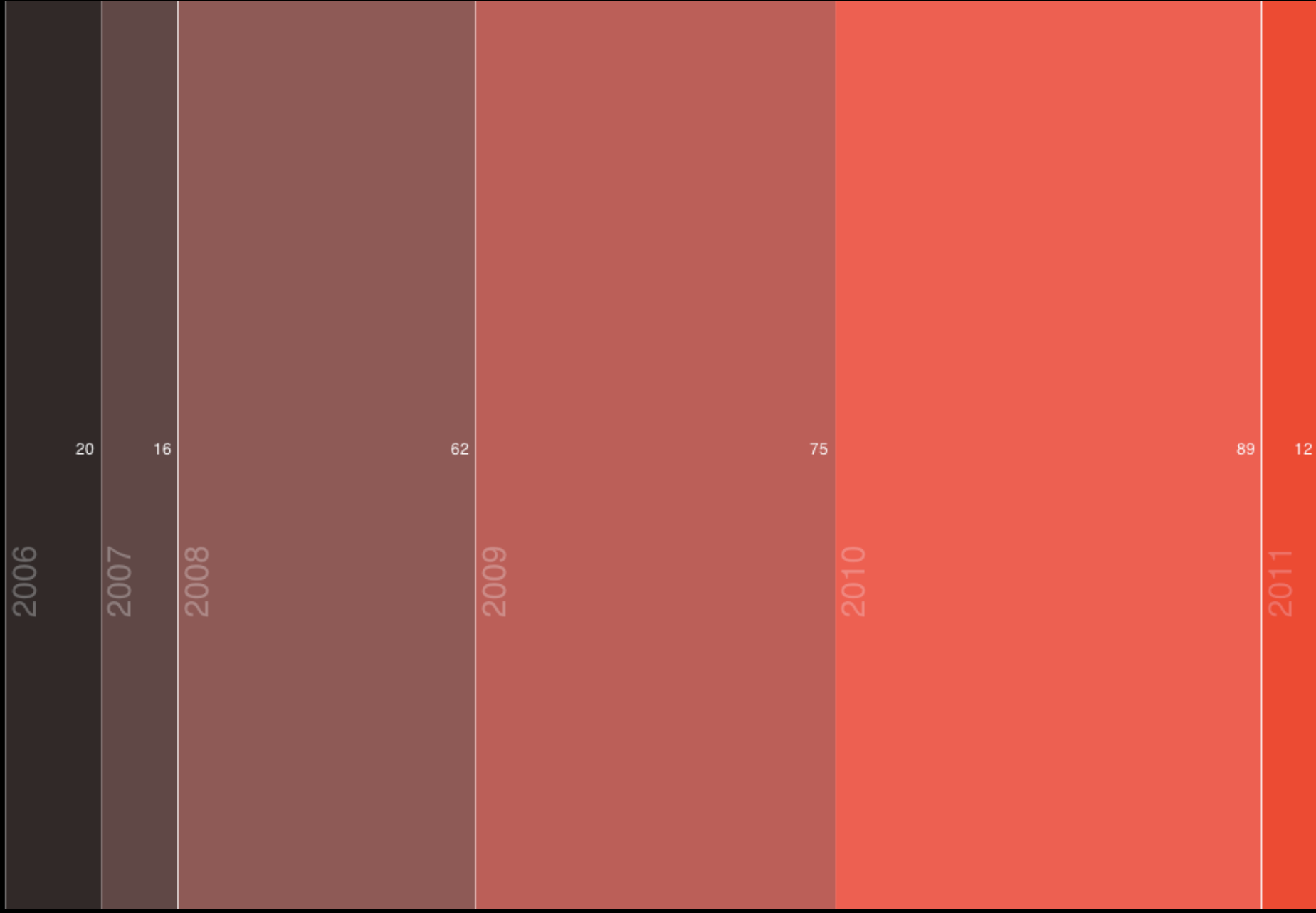
75

2010

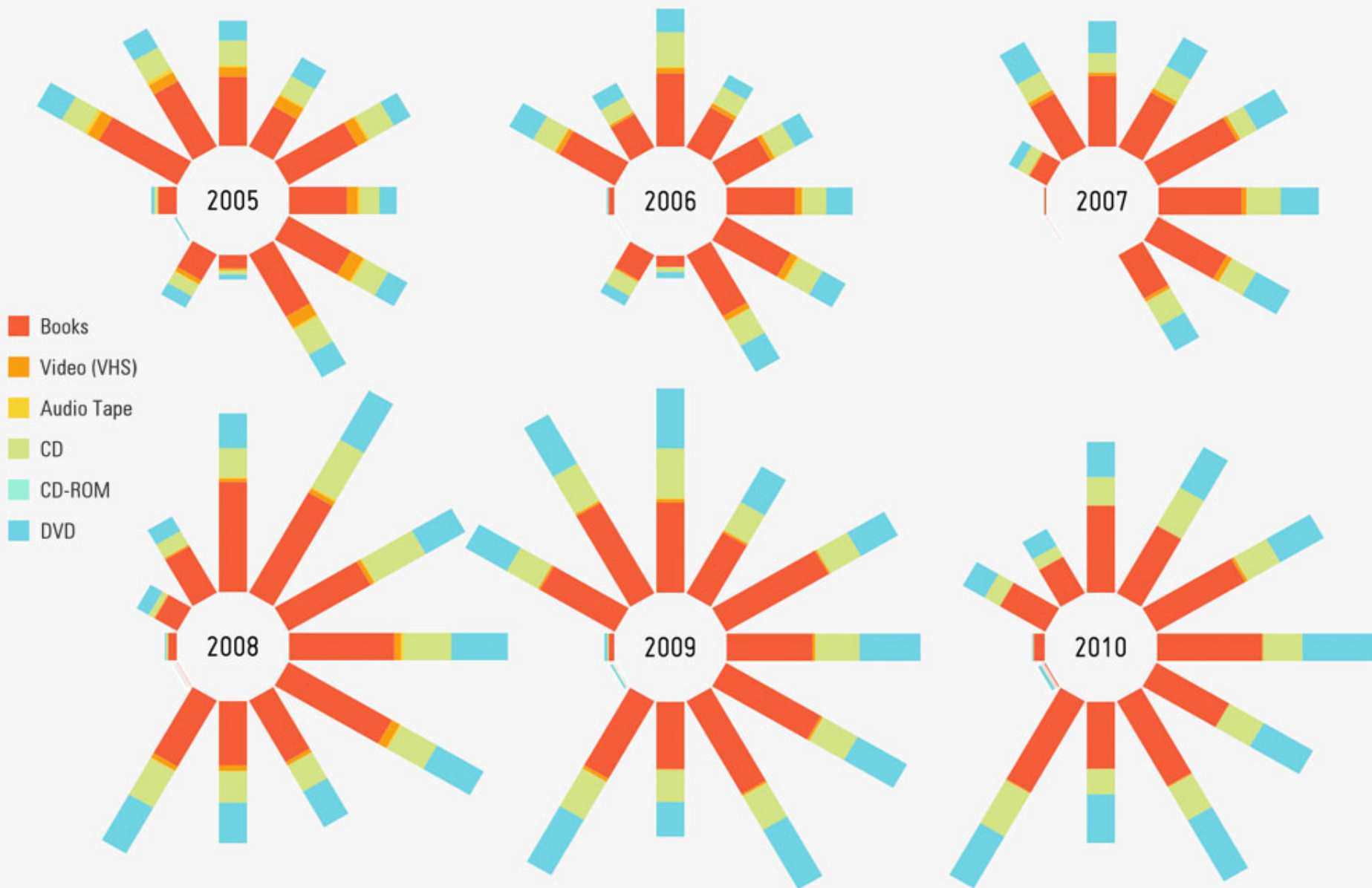
89

2011

12

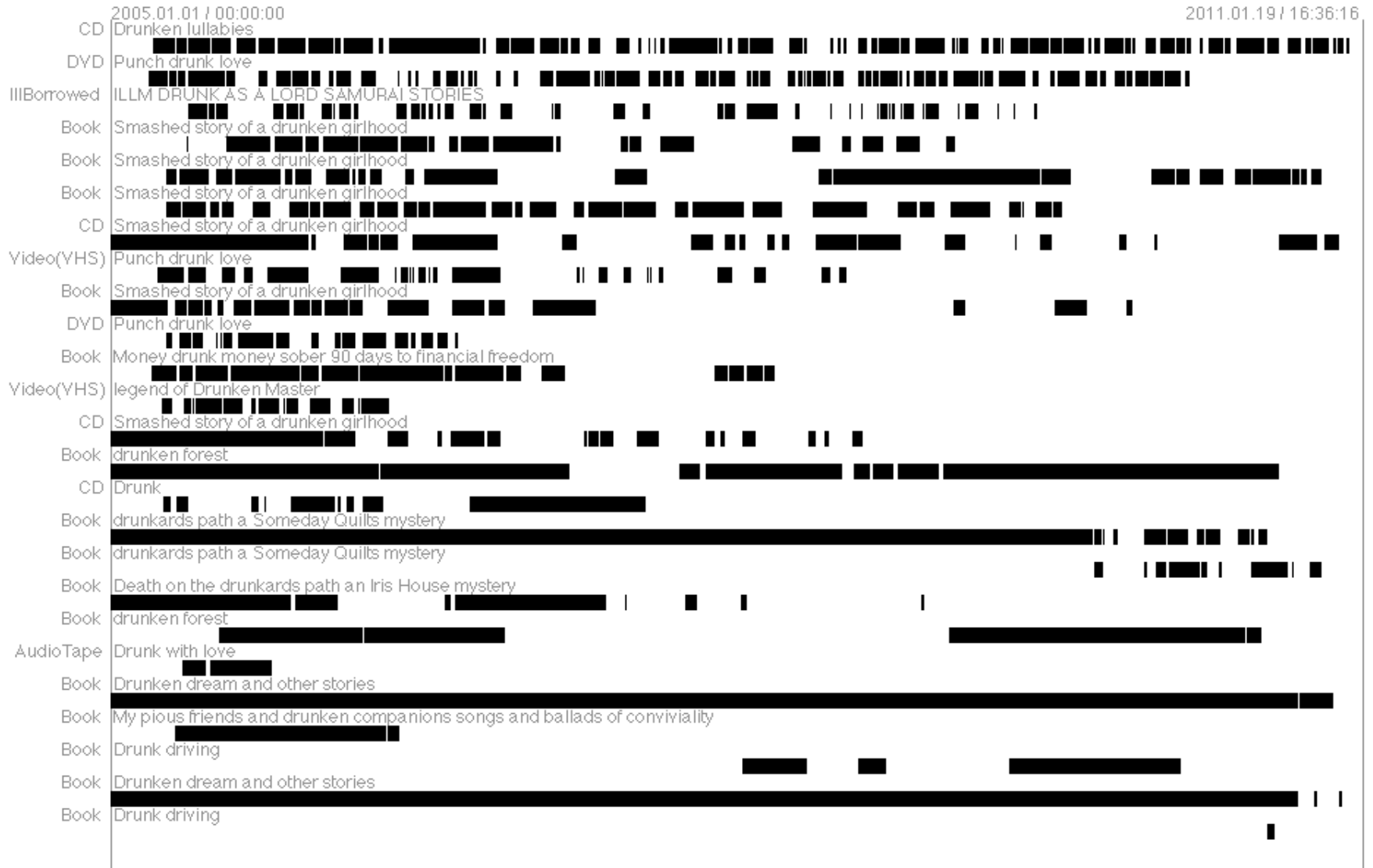






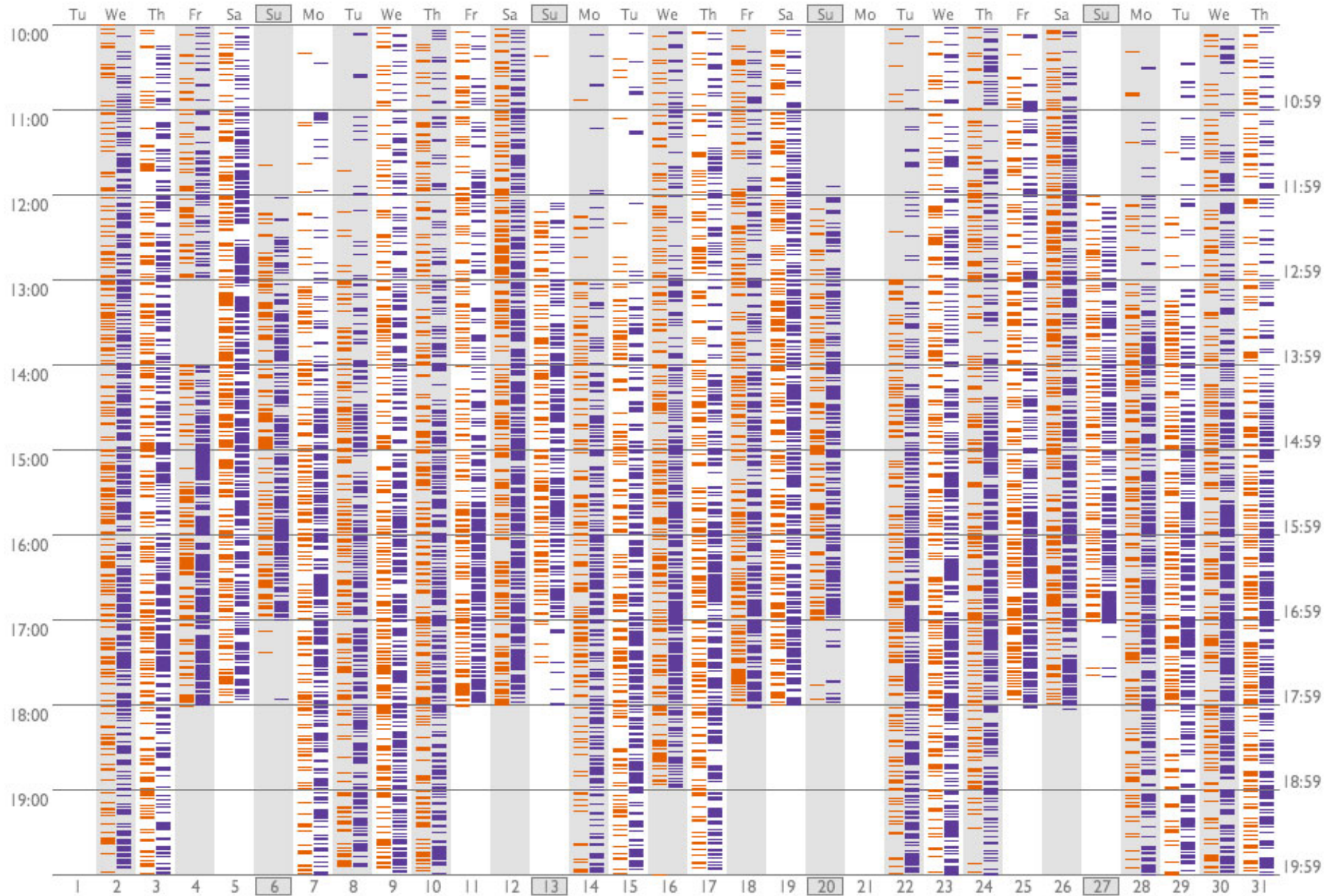
November 10, 9am to 8pm, 2005, 2006, 2007, 2008, 2009, 2010

title like '%drunk%' group by collcode;



[641] [741]  
food + drink v drawing + drawings

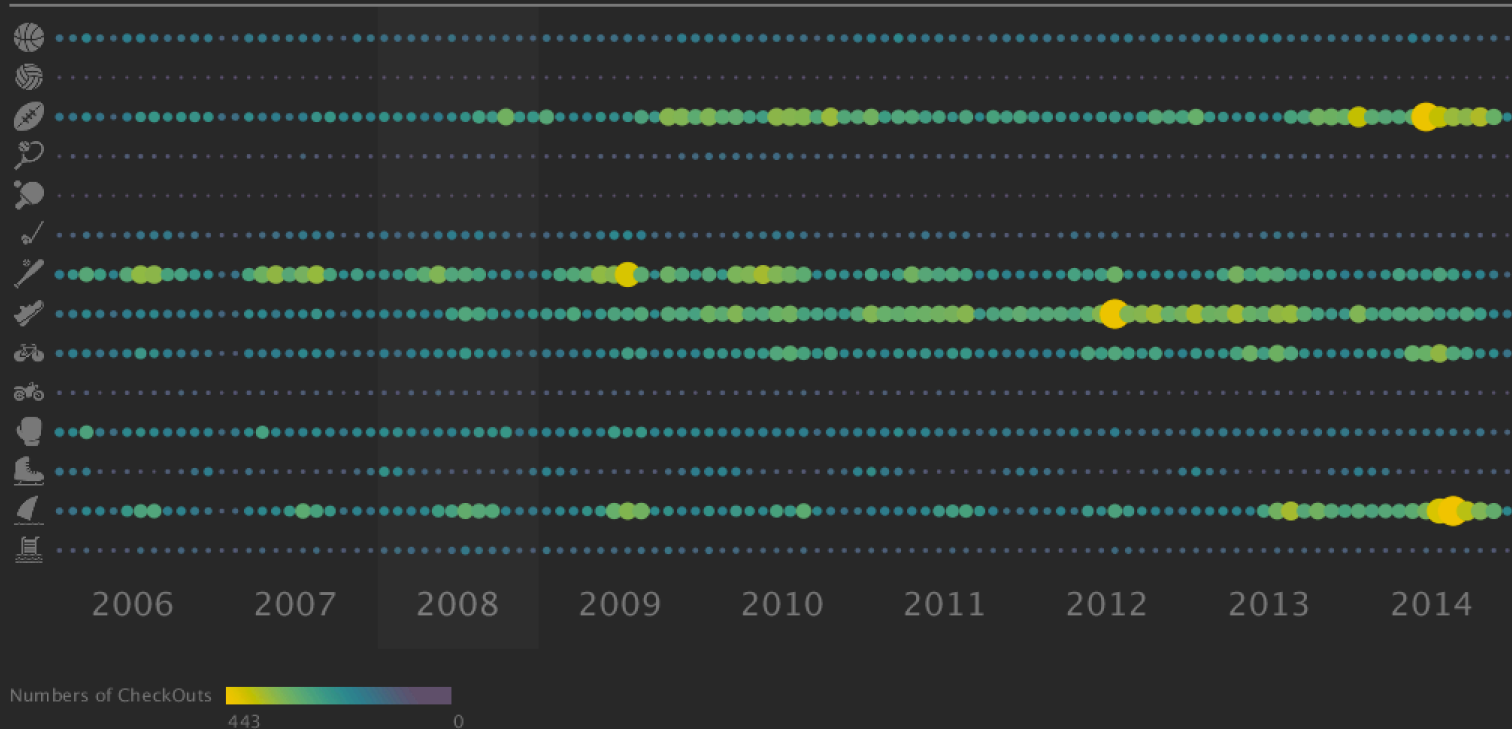
time items checked out / day  
month of january



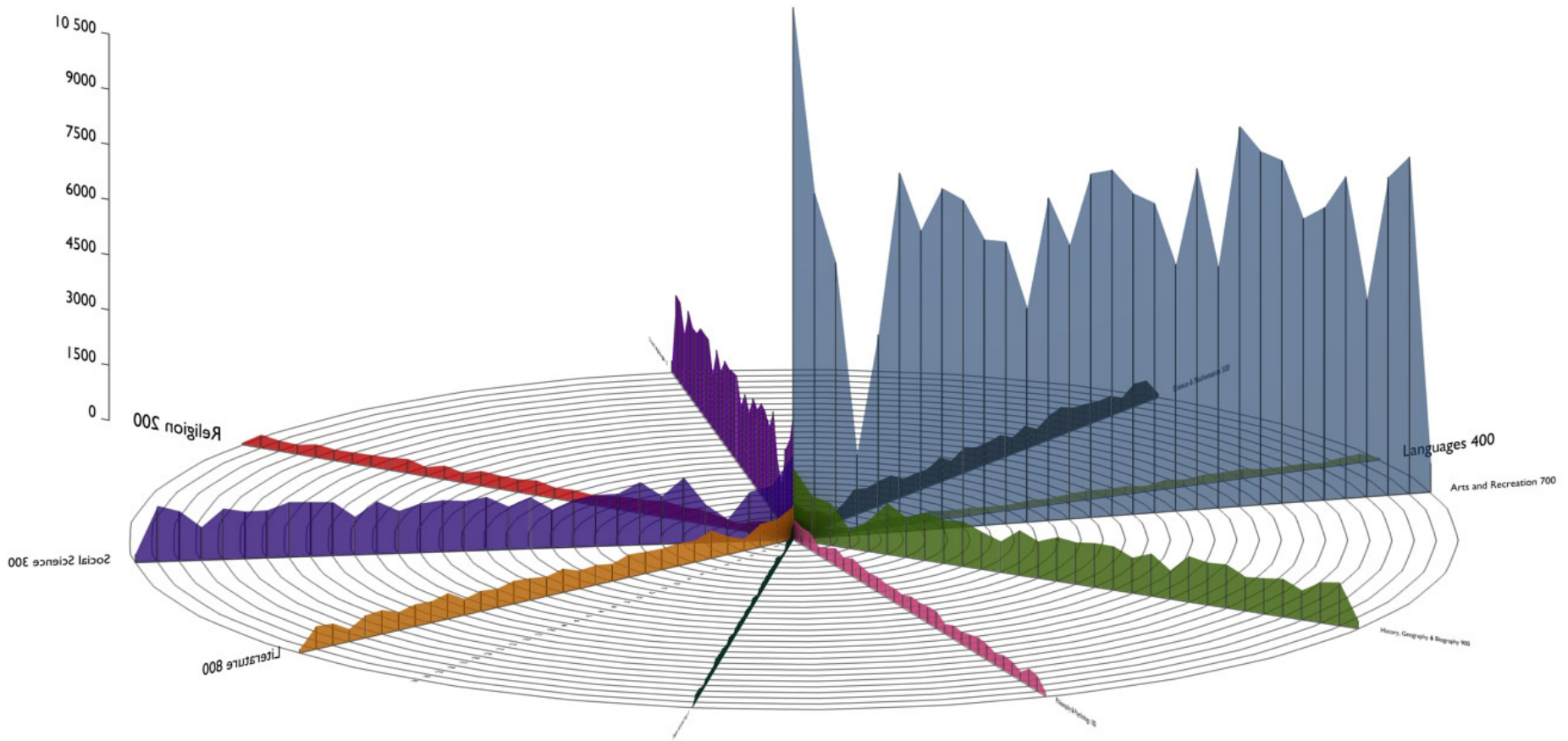
# How Reading Preferences of Books about Sports in the Library Varies with Time

Checkout times of the sports related books in the Seattle Public Library

Junxiang Yao  
MAT259 PROJ 1b



# Volume of Dewey Activities



# Top 25 Dewey categories 2006-2014

	2006	2007	2008	2009	2010	2011	2012	2013	2014
782 Vocal music	657750	721853	1006571	1060888	868834	774273	665173	700986	593881
741 Drawing & drawings	158295	201324	312239	354992	323449	330355	315883	366327	334448
641 Food & drink	65057	67695	99965	121586	125332	121088	116785	137652	125462
781 General principles & musical forms	82066	79529	107747	109614	90869	75959	62922	66173	61207
613 Personal health & safety	45227	43632	61698	69461	65593	61935	56773	61824	50671
398 Folklore	39845	38035	50875	52707	53403	50482	46519	51337	45293
796 Athletic & outdoor sports & games	34380	32561	38817	42247	44010	39552	37113	40243	39833
917 Geography of South America	39684	35096	40760	39546	35287	32660	30101	35325	34345
616 Diseases	20419	21025	27711	29572	30783	31993	30817	34247	31410
789 Not assigned or no longer used	73223	68907	81785	82129	65317	53936	39824	36572	30845
746 Textile arts	25431	27902	39846	42885	40551	39058	34315	36683	29033
791 Public performances	25355	23240	30165	37187	35966	34799	31029	32736	28085
973 United States	32823	31155	42087	42253	33891	29942	28671	30198	25967
914 Geography of & travel in Europe	26029	21671	22858	22489	20251	18843	18709	24124	25444
306 Culture & institutions	20867	20265	27332	29848	29218	28702	25989	28742	24006
599 Mammalia (Mammals)	18354	16843	21175	22274	20500	20242	21384	25018	23832
940 History of Europe	19949	18692	23822	24143	23512	22826	21790	22787	22698
792 Stage presentations	20546	21101	27299	28246	26509	25376	22394	22098	22229
158 Applied psychology	15175	17365	21914	22247	21172	19775	20593	25702	22020
811 American poetry in English	19182	19333	24485	25675	23911	22671	20281	23207	21159
745 Decorative arts	17982	17718	23134	25661	25695	24278	22567	23684	20007
636 Animal husbandry	17494	16494	21404	24755	21680	21436	21963	22178	19135
658 General management	17487	15602	20868	23521	22493	21660	18913	20892	19050
332 Financial economics	18573	17640	24030	25262	23902	22333	17976	18527	18254
305 Groups of people	19305	19014	21563	22664	22339	21106	19896	22861	18054



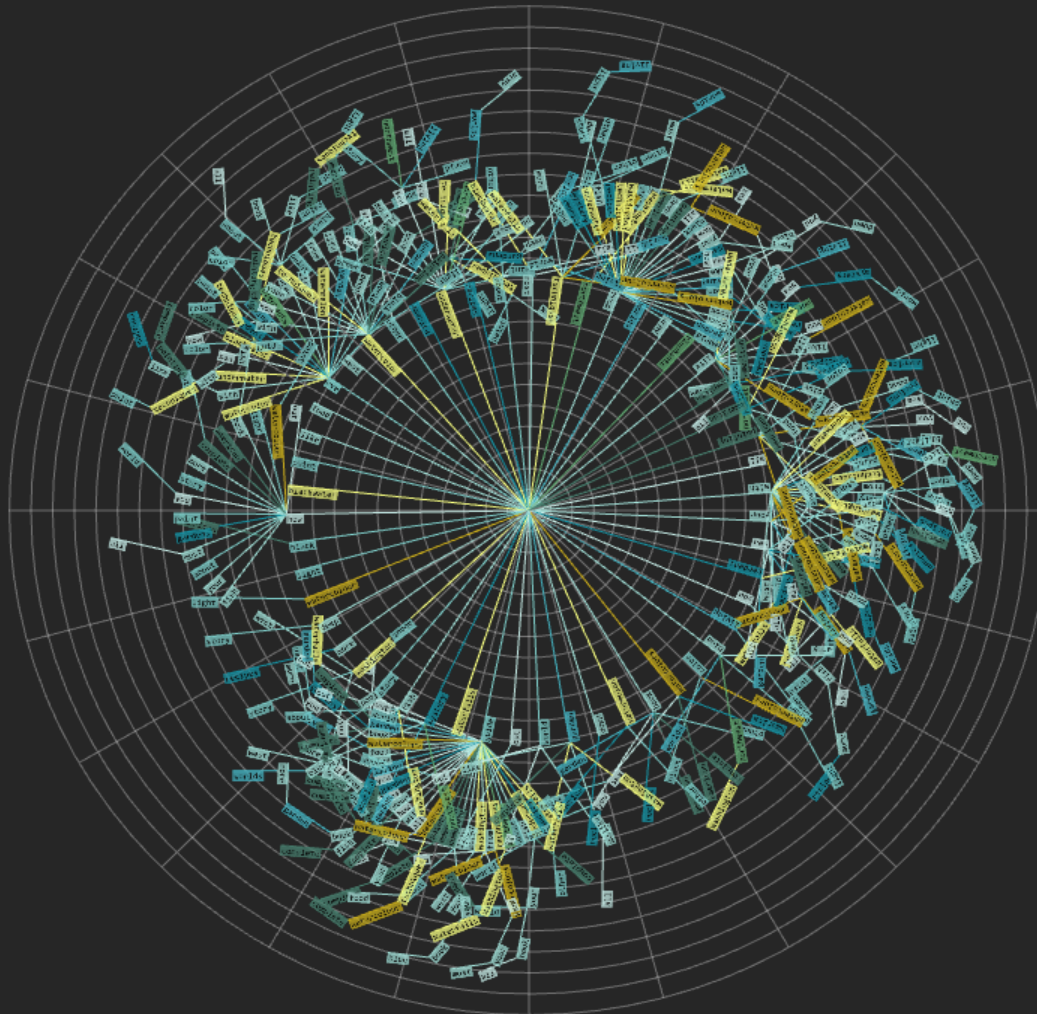
# Associative Relationships

- Association rule learning (Dependency modeling)
- Searches for relationships between variables. For example, a supermarket might gather data on customer purchasing habits - which products are frequently bought together.
- **FP-Growth Algorithm:** Frequency-Pattern uses recursive-built tree structure to show paired occurrences



# Associative (FPTree Algorithm)

INFORMATION



# Associative (FP Tree Algorithm)

PRESS '1 - 9' FOR DISPLAY MODES

- 0: RESET
- 1: OVERVIEW
- 2: EXPANDED VIEW
- 3: FP TREE 1
- 4: PYRAMID OVERLAY
- 5: FP TREE 2
- 6: PYRAMIDS
- 7: SIDE VIEW
- 8: RANDOM VIEW
- 9: TOGGLE ROTATION

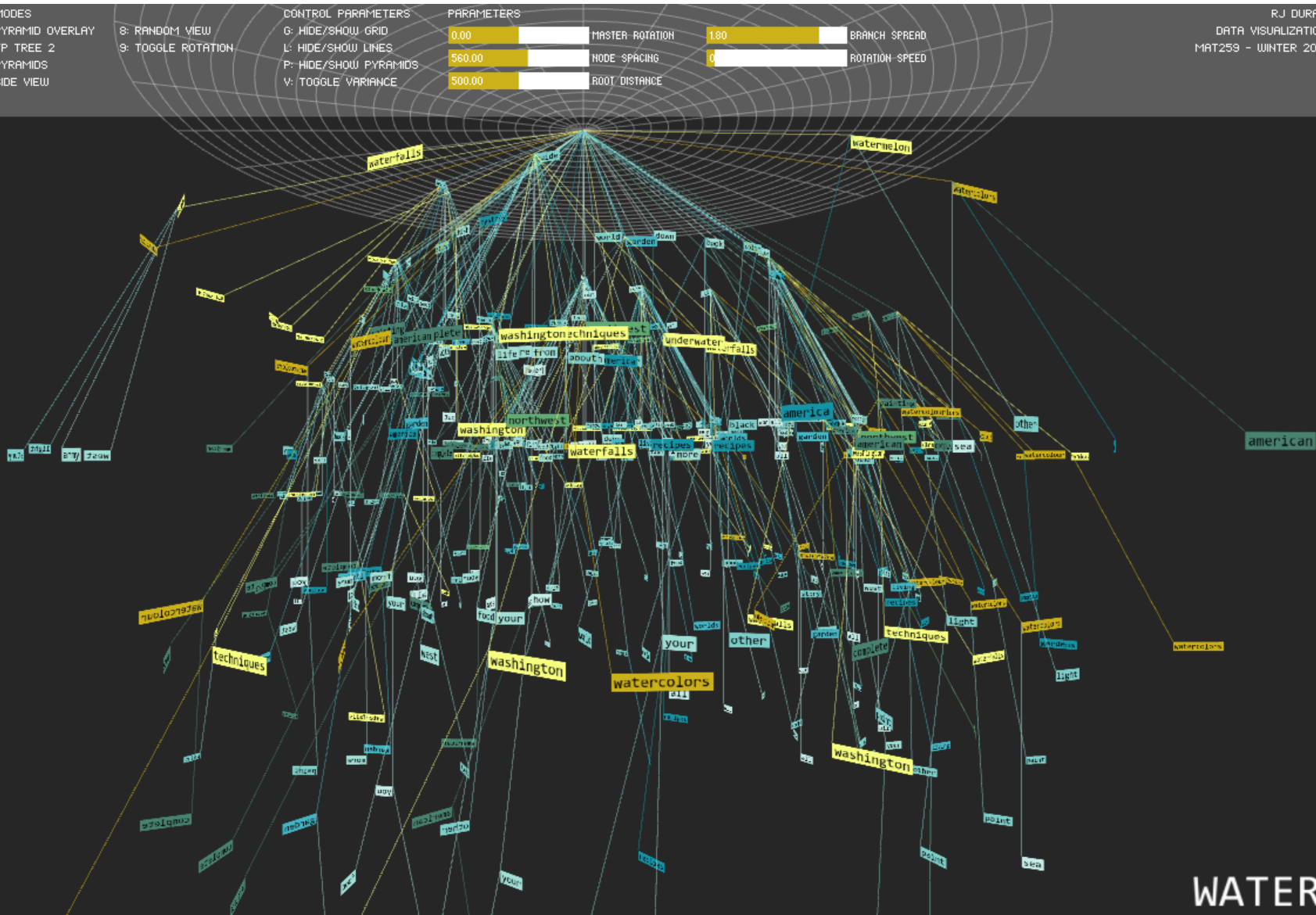
CONTROL PARAMETERS

- G: HIDE/SHOW GRID
- L: HIDE/SHOW LINES
- P: HIDE/SHOW PYRAMIDS
- V: TOGGLE VARIANCE

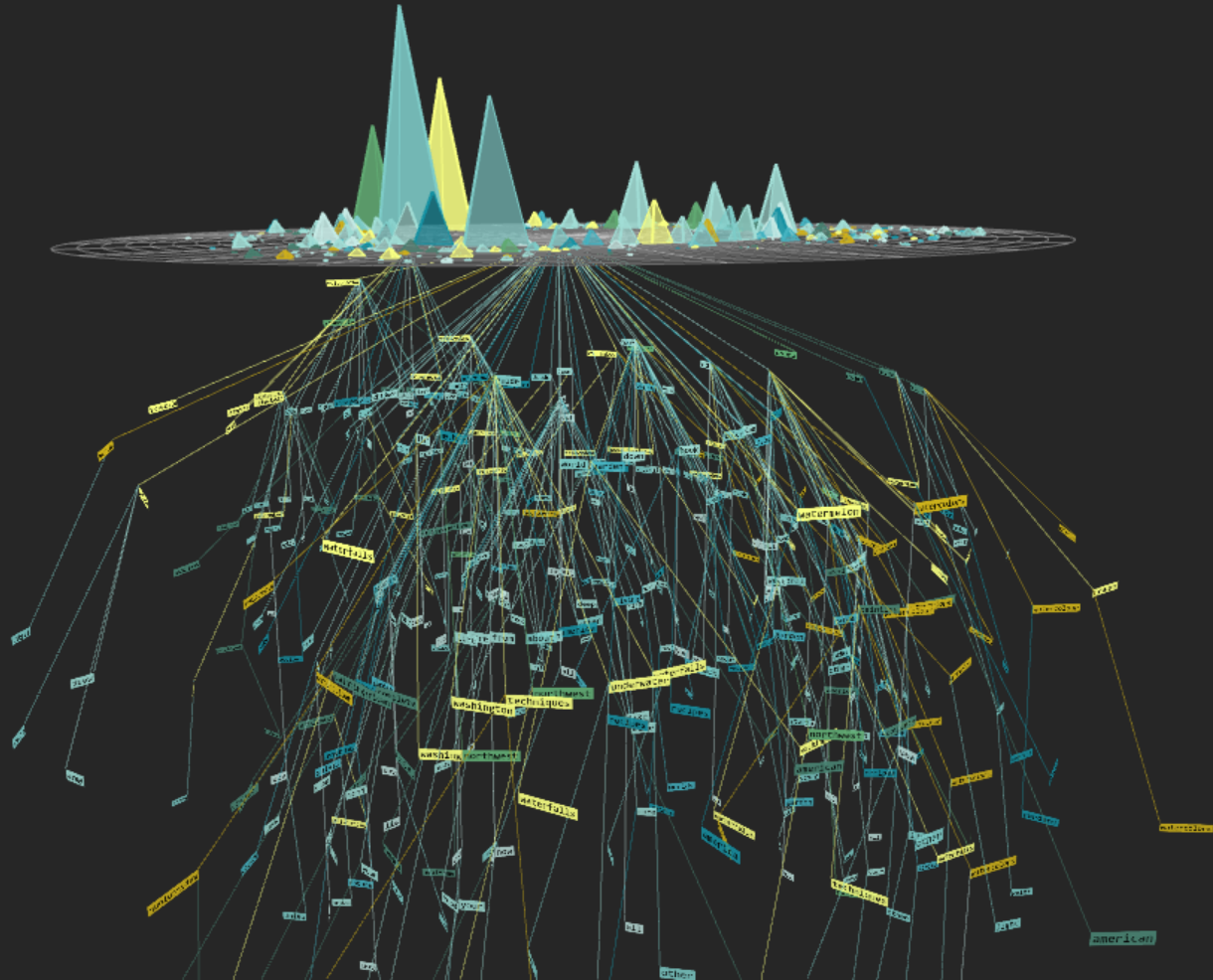
PARAMETERS

0.00	MASTER ROTATION	1.80	BRANCH SPREAD
560.00	NODE SPACING	0	ROTATION SPEED
500.00	ROOT DISTANCE		

INFORMATION



# Associative (FPTree Algorithm)

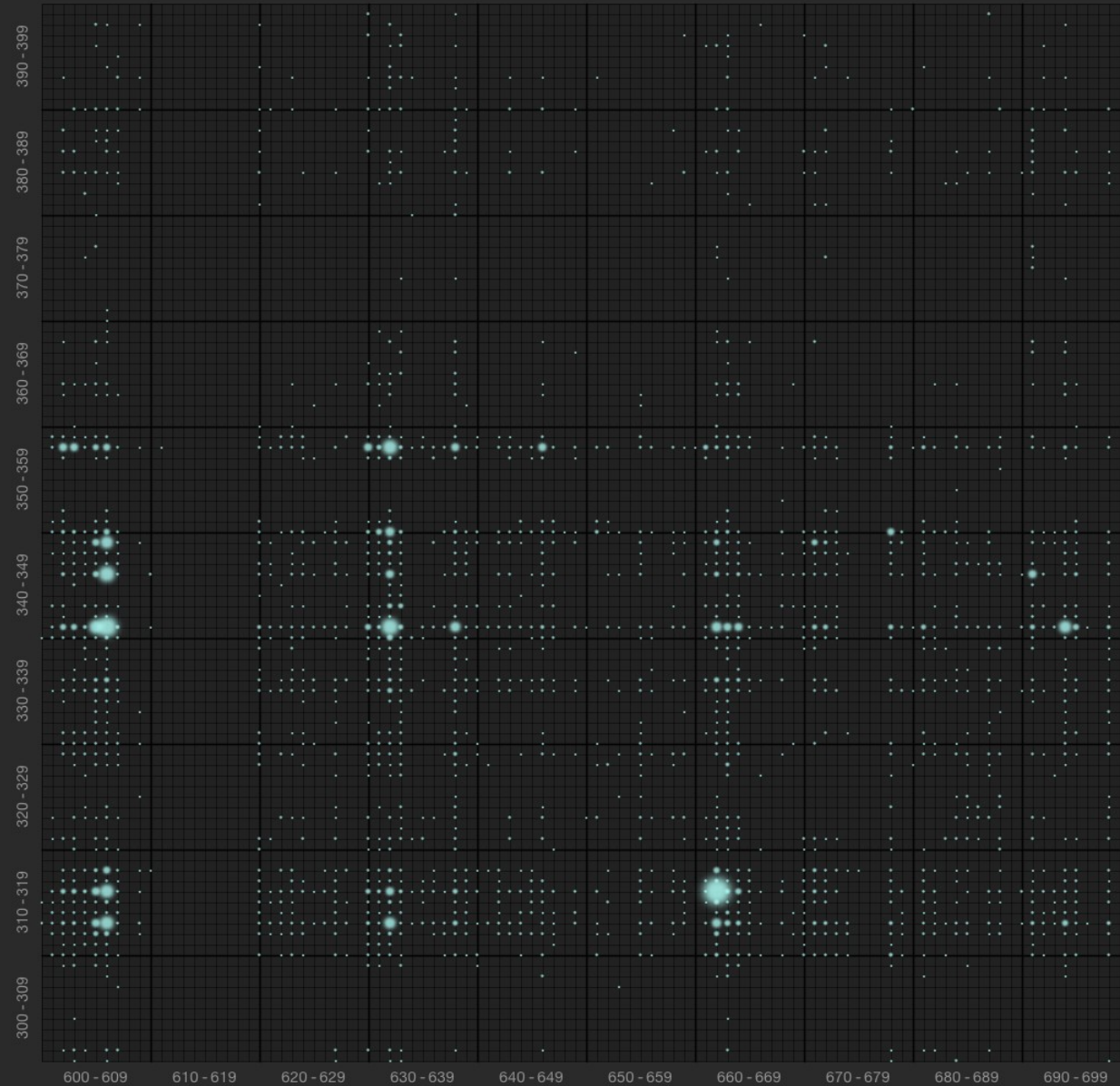


## Correlate data with another

JSON: Language independent format to transmit data

Projects correlate APIs from :

- NY Times
- Instagram
- iTunes & Apple
- Twitter
- Google Books



## Frequently Borrowed Together

use the radio buttons to zoom

- 000 - 099 Computer science, information & general works
- 100 - 199 Philosophy and psychology
- 200 - 299 Religion
- 300 - 399 Social sciences
- 400 - 499 Language
- 500 - 599 Science
- 600 - 699 Technology
- 700 - 799 Arts & recreation
- 800 - 899 Literature
- 900 - 999 History & geography

- 300 - 309 Social sciences, sociology & anthropology
- 310 - 319 Statistics
- 320 - 329 Political science
- 330 - 339 Economics
- 340 - 349 Law
- 350 - 359 Public administration & military science
- 360 - 369 Social problems & social services
- 370 - 379 Education
- 380 - 389 Commerce, communications, & transportation
- 390 - 399 Customs, etiquette, & folklore
  
- 600 - 609 Technology
- 610 - 619 Medicine & health
- 620 - 629 Engineering
- 630 - 639 Agriculture
- 640 - 649 Home & family management
- 650 - 659 Management & public relations
- 660 - 669 Chemical engineering
- 670 - 679 Manufacturing
- 680 - 689 Manufacture for specific uses
- 690 - 699 Construction of buildings

# STAR WARS NEBULA

Using Data of Checkout Times and Duration Times of the Former 6 in This Movie Series in Seattle Public Library

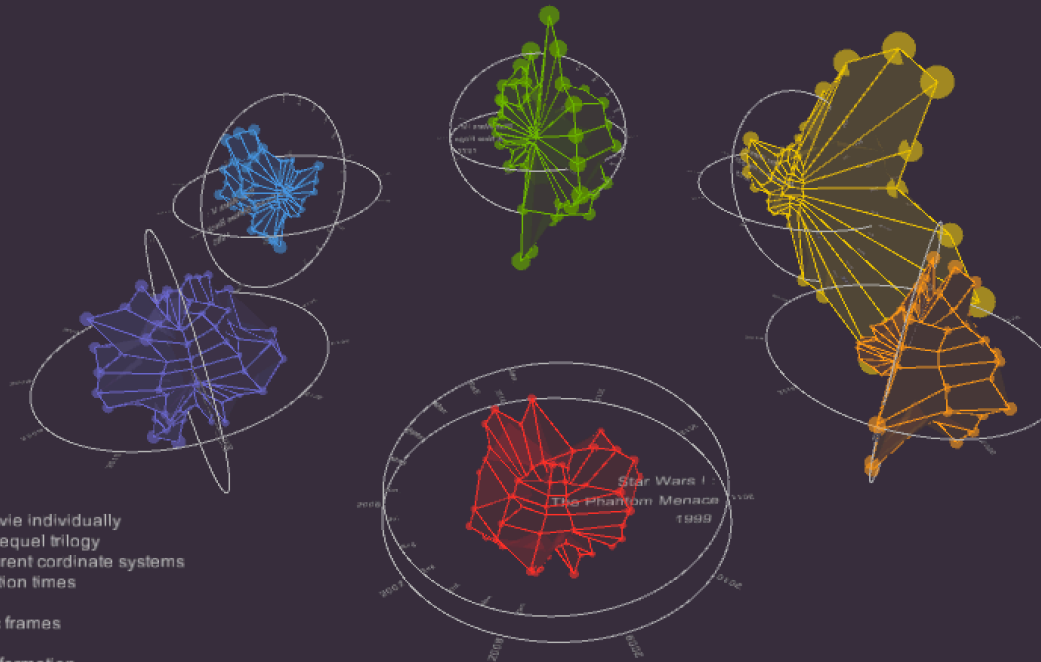
Year	Month
2006	January
2007	February
2008	March
2009	April
2010	May
2011	June
2012	July
2013	August
2014	September
2015	October
	November
	December

## Reset

Years  
Months  
All

## Keyboard Control

Press 1 / 2 / 3 / 4 / 5 / 6 to check movie individually  
 Press 7 / 8 to check the original / prequel trilogy  
 Press 9 / 0 to check all in one / different coordinate systems  
 Press D to show / hide dots of duration times  
 Press S to show / hide the solids  
 Press N to show / hide the chromatic frames  
 Press F to show / hide grey frames  
 Press T to show / hide the verbal information  
 Press L to show / hide the coordinate axis and labels

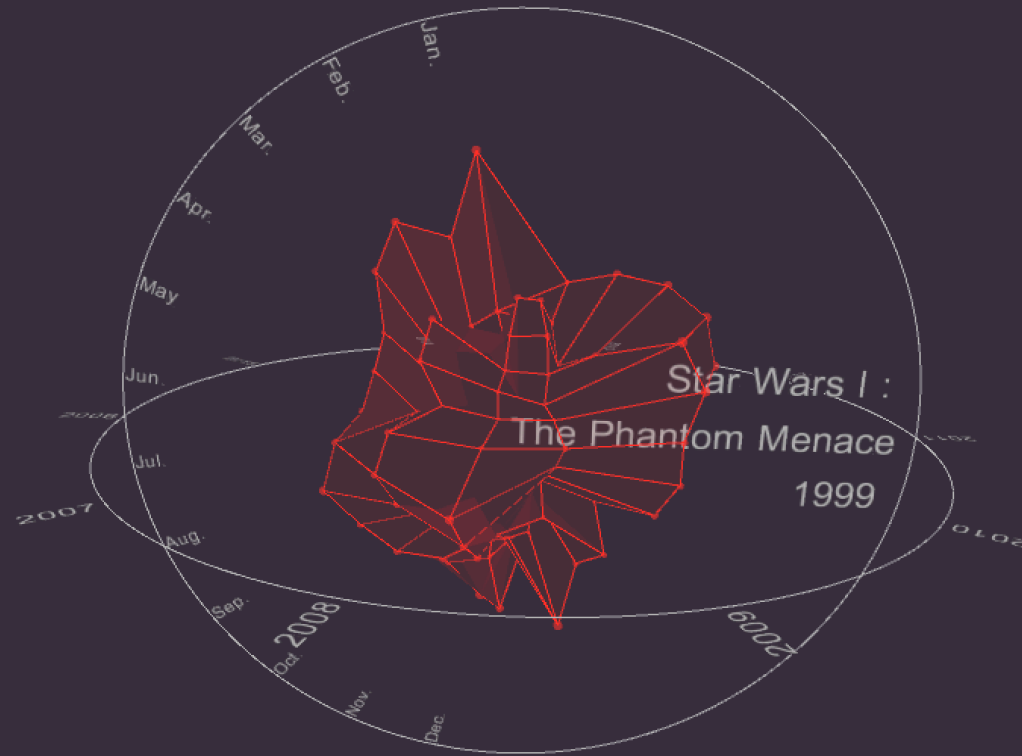


Junxiang Yao  
MAT259 PROJ 2  
3D Interaction & Change Over Time

The radius of the circular coordinate axis is 200 checkout times.

Duration time scaling:





# STAR WARS NEBULA

Using Data of Checkout Times and Duration Times of the Former 6 in This Movie Series in Seattle Public Library

Year	Month
2006	January
2007	February
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	November
	December

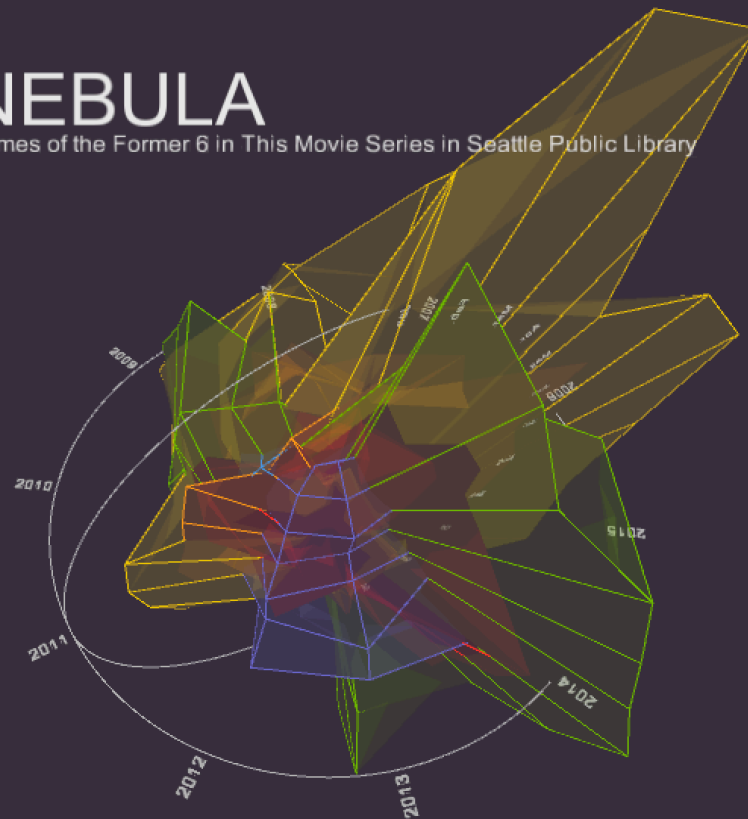
## Reset

Years  
Months  
All

Star Wars IV (1977)	Star Wars I (1999)
Star Wars V (1980)	Star Wars II (2002)
Star Wars VI (1983)	Star Wars III (2005)

## Keyboard Control

Press 1 / 2 / 3 / 4 / 5 / 6 to check movie individually  
 Press 7 / 8 to check the original / prequel trilogy  
 Press 9 / 0 to check all in one / different coordinate systems  
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 MAT259 PROJ 2  
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The radius of the circular coordinate axis is 200 checkout times.

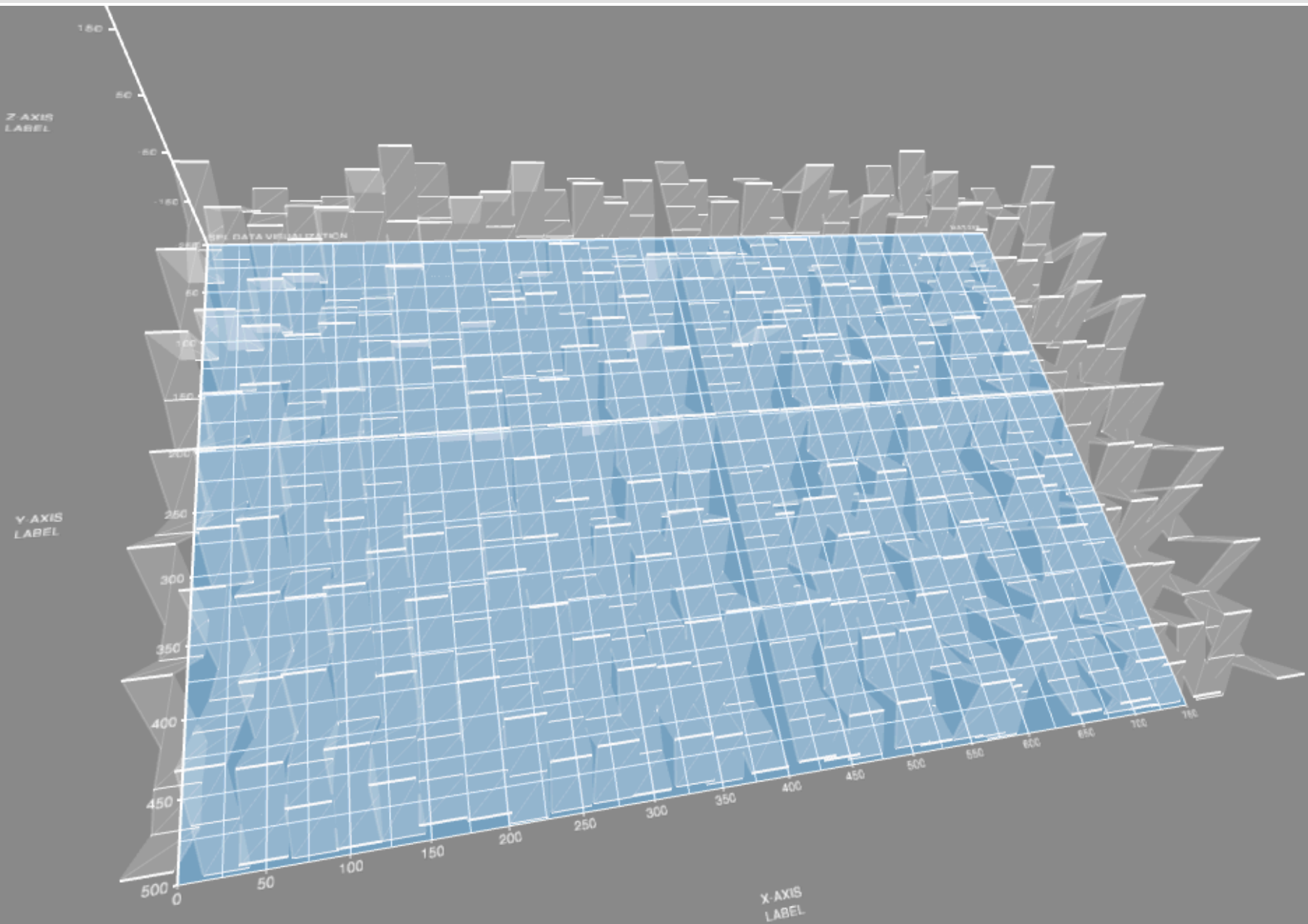
Duration time scaling:

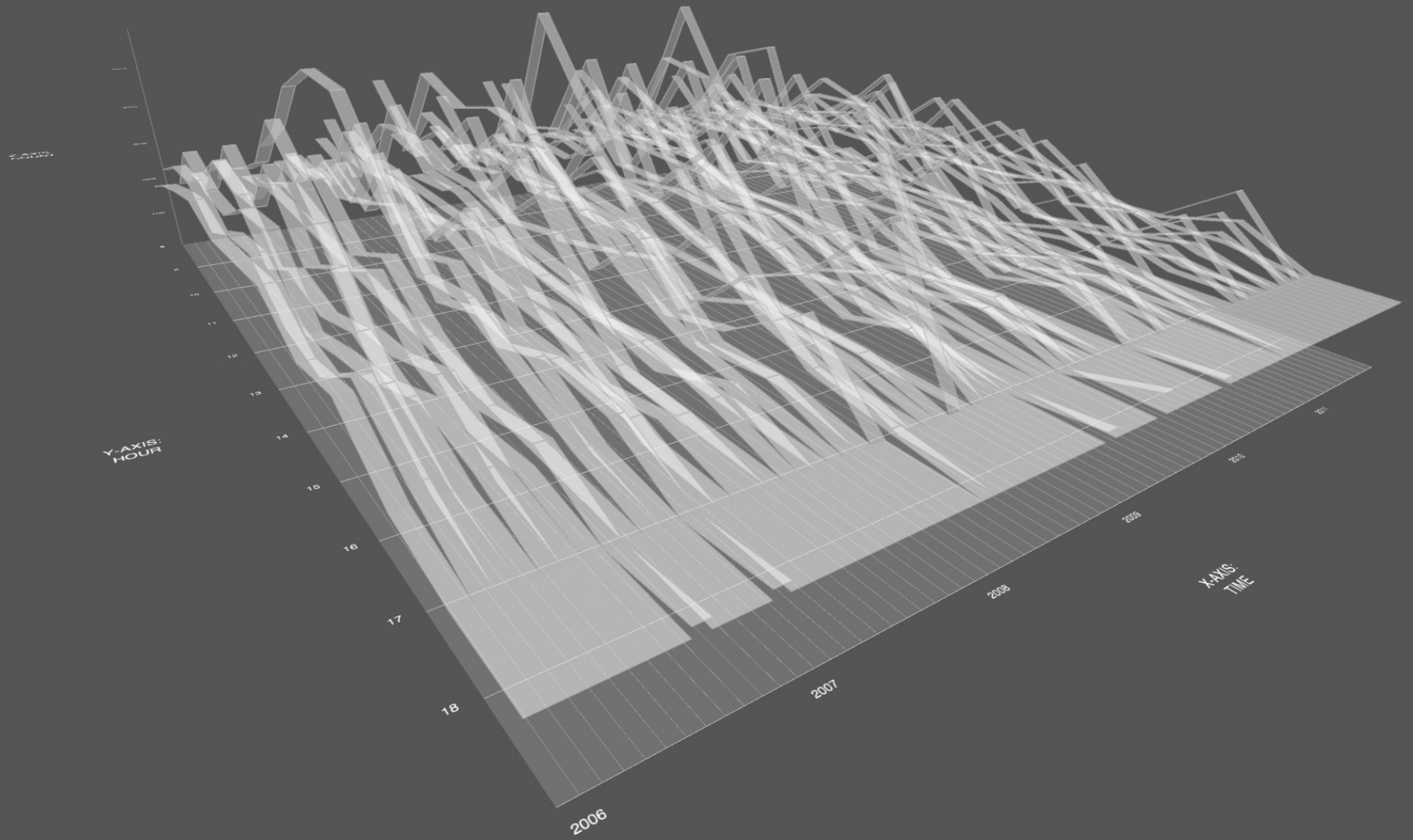




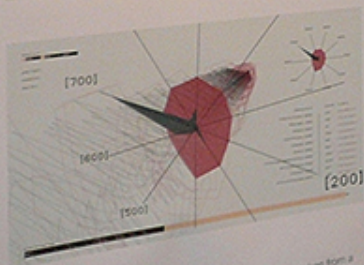
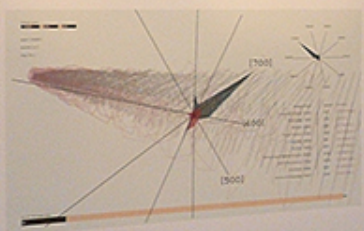


# M259 Visualizing Information





## Anis Haron



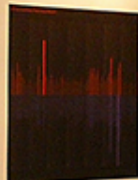
**MAT 259 Visualizing Information**  
Visualization of transactions from the Seattle Public Library, taken from a dataset of over 66 million entries collected since 2005.  
<http://www.mat.ucsb.edu/~ggregoire/teaching/m205course/vis/2012.html>

## RJ Duran



**MAT 259 Visualizing Information**  
Visualization of transactions from the Seattle Public Library, taken from a dataset of over 66 million entries collected since 2005.  
<http://www.mat.ucsb.edu/~ggregoire/teaching/m205course/vis/2012.html>

## Yoon Chung Han



**MAT 259 Visualizing Information**  
Visualization of transactions from the Seattle Public Library, taken from a dataset of over 66 million entries collected since 2005.  
<http://www.mat.ucsb.edu/~ggregoire/teaching/m205course/vis/2012.html>

## Qian Lin



**MAT 259 Visualizing Information**  
Visualization of transactions from the Seattle Public Library, taken from a dataset of over 66 million entries collected since 2005.  
<http://www.mat.ucsb.edu/~ggregoire/teaching/m205course/vis/2012.html>

## AIQ Chaitin



**MAT 259 Visualizing Information**  
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<http://www.mat.ucsb.edu/~ggregoire/teaching/m205course/vis/2012.html>

# Integrate Your Expertise

**Computer Science:** Integrate complex algorithms to visualization

**Statistics:** Implement statistical probability problems to data analysis and visualization

**Sound/Signal processing:** Consider data as signal and explore translation between sonic, signal and visual patterns

**Social Science:** Identify cultural patterns, changes, transformations

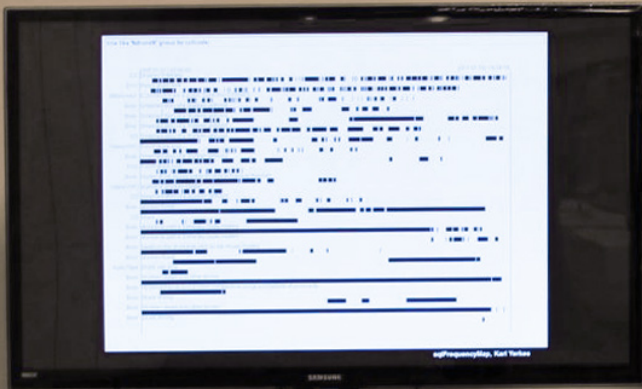
**Geography:** Explore spatial mapping

**Cinematic/Literary:** Explore data pattern as narrative development

# Your Contribution

*Data is not content. What **you do with it is the content!***

- You choose what to feature from the dataset based on your interests
- You introduce data processing methods
- You select algorithms to implement
- You make design decisions
- You determine “look and feel” which also shapes the overall content



VISWEEK 2012, Seattle

## **Copyright & Research Use of Seattle Library Data**

You can use the Seattle data for research and publication.

You can circulate your visualization but because of proprietary reasons you cannot circulate the data itself.

If you publish a paper, make sure to credit the course and the project.

Also sign the intellectual property agreement form at the course website