Data Taxonomy

ID 413: Information Graphics and Data Visualization Spring 2016

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- Classification of data with implications on the mathematical operations we can perform on them and how to structure them
- 4. Good data models result in good mental models, leading to better understanding and reasoning

Data Semantics refers to the real-world meaning of the data.

Focuses on organizing data that reflects the basic meaning, rather than solely or primarily on the relationships and attributes of the data.

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Data Type refers to the interpretation of an item in terms of scales of its measurement (attributes)

Data Types

Data Types

→ Items → Attributes → Links → Positions → Grids

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2	3	10/14/06	5-Low	Large Box	0.8	10/21/06		
3	6	2/21/08	4-Not Specified	Small Pack	0.55	2/22/08		
4	32	7/16/07	2-High	Small Pack	0.79	7/17/07		
5	32	7/16/07	2-High	Jumbo Box	0.72	7/17/07		
6	32	7/16/07	2-High	Medium Box	0.6	7/18/07		
7	32	7/16/07	2-High	Medium Box	0.65	7/18/07		
8	35	10/23/07	4-Not Specified	Wrap Bag	0.52	10/24/07		
9	35	10/23/07	4-Not Specified	Small Box	0.58	10/25/07		
10	36	11/3/07	1-Urgent	Small Box	0.55	11/3/07		
11	65	3/18/07	1-Urgent	Small Pack	0.49	3/19/07		
12	66	1/20/05	5-Low	Wrap Bag	0.56	1/20/05		
13	69	6/4/05	4-Not Specified	Small Pack	0.44	6/6/05		
14	69	6/4/05	4-Not Specified	Wrap Bag	0.6	6/6/05		
15	70	12/18/06	5-Low	Small Box	0.59	12/23/06		
16	70	12/18/06	5-Low	Wrap Bag	0.82	12/23/06		
17	96	4/17/05	2-High	Small Box	0.55	4/19/05		
18	97	1/29/06	3-Medium	Small Box	0.38	1/30/06		
19	129	11/19/08	5-Low	Small Box	0.37	11/28/08		
20	130	5/8/08	2-High	Small Box	0.37	5/9/08		
21	130	5/8/08	2-High	Medium Box	0.38	5/10/08		
22	130	5/8/08	2-High	Small Box	0.6	5/11/08		
23	132	6/11/06	3-Medium	Medium Box	0.6	6/12/06		
24	132	6/11/06	3-Medium	Jumbo Box	0.69	6/14/06		
25	134	5/1/08	4-Not Specified	Large Box	0.82	5/3/08		
26	135	10/21/07	4-Not Specified	Small Pack	0.64	10/23/07		
27	166	9/12/07	2-High	Small Box	0.55	9/14/07		
28	193	8/8/06	1-Urgent	Medium Box	0.57	8/10/06		
29	194	4/5/08	3-Medium	Wrap Bag	0.42	4/7/08		

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29	194	4/5/08	3-Medium	Wrap Bag	0.42	4/7/08			
-			and the second sec						

Attribute Types

\circ Nominal

\circ Ordinal

o Interval

\circ Ratio

Attribute Types

\circ Nominal

- o Ordinal
- Quantitative
 Interval
 Ratio

N – Nominal/Categorical (labels) apples, oranges, ...

O – Ordinal movie rating: 1 star to 5 stars

Q – Interval (location of zero arbitrary) Jan 20, 2016; location: (LAT 47 LONG 122) a geometric point cannot compare directly, only differences (i.e. intervals) may be compared

Q – Ratio (zero fixed)

length, mass, ... counts and amounts

				Sł	neets Charts Sm	artArt Graphics WordAr		
0	A	В	C	S	Т	U		
1	Order ID	Order Date	Order Priority	Product Container	Product Base Margin	Ship Date		
2	3	10/14/06	5-Low	Large Box	0.8	10/21/06		
3	6	2/21/08	4-Not Specified	Small Pack	0.55	2/22/08		
4	32	7/16/07	2-High	Small Pack	0.79	7/17/07		
5	32	7/16/07	2-High	Jumbo Box	0.72	7/17/07		
6	32	7/16/07	2-High	Medium Box	0.6	7/18/07		
7	32	7/16/07	2-High	Medium Box	0.65	7/18/07		
8	35	10/23/07	4-Not Specified	Wrap Bag	0.52	10/24/07		
9	35	10/23/07	4-Not Specified	Small Box	0.58	10/25/07		
10	36	11/3/07	1-Urgent	Small Box	0.55	11/3/07		
11	65	3/18/07	1-Urgent	Small Pack	0.49	3/19/07		
12	66	1/20/05	5-Low	Wrap Bag	0.56	1/20/05		
13	69	6/4/05	4-Not Specified	Small Pack	0.44	6/6/05		
14	69	6/4/05	4-Not Specified	Wrap Bag	0.6	6/6/05		
15	70	12/18/06	5-Low	Small Box	0.59	12/23/06		
16	70	12/18/06	5-Low	Wrap Bag	0.82	12/23/06		
17	96	4/17/05	2-High	Small Box	0.55	4/19/05		
18	97	1/29/06	3-Medium	Small Box	0.38	1/30/06		
19	129	11/19/08	5-Low	Small Box	0.37	11/28/08		
20	130	5/8/08	2-High	Small Box	0.37	5/9/08		
21	130	5/8/08	2-High	Medium Box	0.38	5/10/08		
22	130	5/8/08	2-High	Small Box	0.6	5/11/08		
23	132	6/11/06	3-Medium	Medium Box	0.6	6/12/06		
24	132	6/11/06	3-Medium	Jumbo Box	0.69	6/14/06		
25	134	5/1/08	4-Not Specified	Large Box	0.82	5/3/08		
26	135	10/21/07	4-Not Specified	Small Pack	0.64	10/23/07		
27	166	9/12/07	2-High	Small Box	0.55	9/14/07		
28	193	8/8/06	1-Urgent	Medium Box	0.57	8/10/06		
29	194	4/5/08	3-Medium	Wrap Bag	0.42	4/7/08		
-			The old the t					

				Sh	eets Charts Sm	artArt Graphics WordAr		
0	A	В	C	S	Т	U		
1	Order ID	Order Date	Order Priority	Product Container	Product Base Margin	Ship Date		
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3	6	2/21/08	4-Not Specified	Small Pack	0.55	2/22/08		
4	32	7/16/07	2-High	Small Pack	0.79	7/17/07		
5	32	7/16/07	2-High	Jumbo Box	0.72	7/17/07		
6	32	7/16/07	2-High	Medium Box	0.6	7/18/07		
7	32	7/16/07	2-High	Medium Box	0.65	7/18/07		
8	35	10/23/07	4-Not Specified	Wrap Bag	0.52	10/24/07		
9	35	10/23/07	4-Not Specified	Small Box	0.58	10/25/07		
10	36	11/3/07	1-Urgent	Small Box	0.55	11/3/07		
11	65	3/18/07	1-Urgent	Small Pack	0.49	3/19/07		
12	66	1/20/05	5-Low	Wrap Bag	0.56	1/20/05		
13	69	6/4/05	4-Not Specified	Small Pack	0.44	6/6/05		
14	69	6/4/05	4-Not Specified	Wrap Bag	0.6	6/6/05		
15	70	12/18/06	5-Low	Small Box	0.59	12/23/06		
16	70	12/18/06	5-Low	Wrap Bag	0.82	12/23/06		
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24	132	6/11/06	3-Medium	Jumbo Box	0.69	6/14/06		
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29	194	4/5/08	3-Medium	Wrap Bag	0.42	4/7/08		

	Sheets Charts SmartArt Graphics WordA						
0	Α	В	C	S	Т	U	
1	Order ID	Order Date	Order Priority	Product Container	Product Base Margin	Ship Date	
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3	6	2/21/08	4-Not Specified	Small Pack	0.55	2/22/08	
4	32	7/16/07	2-High	Small Pack	0.79	7/17/07	
5	32	7/16/07	2-High	Jumbo Box	0.72	7/17/07	
6	32	7/16/07	2-High	Medium Box	0.6	7/18/07	
7	32	7/16/07	2-High	Medium Box	0.65	7/18/07	
8	35	10/23/07	4-Not Specified	Wrap Bag	0.52	10/24/07	
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16	70	12/18/06	5-Low	Wrap Bag	0.82	12/23/06	
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23	132	6/11/06	3-Medium	Medium Box	0.6	6/12/06	
24	132	6/11/06	3-Medium	Jumbo Box	0.69	6/14/06	
25	134	5/1/08	4-Not Specified	Large Box	0.82	5/3/08	
26	135	10/21/07	4-Not Specified	Small Pack	0.64	10/23/07	
27	166	9/12/07	2-High	Small Box	0.55	9/14/07	
28	193	8/8/06	1-Urgent	Medium Box	0.57	8/10/06	
29	194	4/5/08	3-Medium	Wrap Bag	0.42	4/7/08	

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0	Α	В	C	S	Т	U		
1	Order ID	Order Date	Order Priority	Product Container	Product Base Margin	Ship Date		
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3	6	2/21/08	4-Not Specified	Small Pack	0.55	2/22/08		
4	32	7/16/07	2-High	Small Pack	0.79	7/17/07		
5	32	7/16/07	2-High	Jumbo Box	0.72	7/17/07		
6	32	7/16/07	2-High	Medium Box	0.6	7/18/07		
7	32	7/16/07	2-High	Medium Box	0.65	7/18/07		
8	35	10/23/07	4-Not Specified	Wrap Bag	0.52	10/24/07		
9	35	10/23/07	4-Not Specified	Small Box	0.58	10/25/07		
10	36	11/3/07	1-Urgent	Small Box	0.55	11/3/07		
11	65	3/18/07	1-Urgent	Small Pack	0.49	3/19/07		
12	66	1/20/05	5-Low	Wrap Bag	0.56	1/20/05		
13	69	6/4/05	4-Not Specified	Small Pack	0.44	6/6/05		
14	60	6/4/05	4-Not Specified	Wrop Bag	0.6	6/6/05		
N	ominal 12/18/06		5-Low Ordi	II Box	Ouanti	tative 3/06		
		12/18/06	5-Low	p Bag	quanti	3/06		
17	96	4/17/05	2-High	Small Box	0.55	4/19/05		
18	97	1/29/06	3-Medium	Small Box	0.38	1/30/06		
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29	194	4/5/08	3-Medium	Wrap Bag	0.42	4/7/08		

Identify the data attributes



Identify the data attributes







For the popular cricket-playing nations, we took every batsmen that has scored at least 20 runs in their ODI career, and plotted their run rate for every single match. Size = Number of runs. Colour = strike rate 20 50 80 110 140

ODI Test Ind Pak	Aus SL WI	NZ Eng	SA Zi	m W	orld						
Search	Expand Collapse										
Sachin	Mohammad Azharuddin ^k	Mahendra S Dhoni		Ala D 、	Alaysinhji D Jadeja		Navjot S Sidhu		t u	Gautam Gambhir	
R Tendulkar		Krishnamacha Srikkanth	Ravishankar Suni J Shastri M Gava		unil avaska	Mohamma kar Kaif		mmad aif	d Virat Kohli		
	Yuvraj Singh		Vinod G Kamb	Mo Am	hinder Iarnath	Ma M Prat	noj ohaka	Ro G Sh	vhit arma I	lrfan ∢ Pathan	Nayan R Mongia
Sourav		Kapil Dev	anginuran	A B Ag	ijit Jarkar	Anil Kumble	Yash Shar	ipal ma	lavagal Srinath	Heman <u>o</u> K Badar] Yusuf li K Pathan
C Ganguiy		Dillin	S Laxma	in Dir Mo	nesh ngia	Robin Uthappa	Sadagops Ramesh Praveen	an Roger H Bin Sharma Madan Lai	M Woor ny V Rar Syed M H Kirmani	teri Su nan BJ Saba Karim I	nil Kiran S More
		B Vengsarkar	Rabindr	a Harb	hajan	Raman Lamba	Ashok Malhotra	Nichil Chopra	rtivardhan Sar Azad S D	heer Brijest ghe PRote	Espu K Velaka Verlaiset Pateruppel Re
Rahul	Virender		R Singr	Krist	nna K	Zaheer Khan	Chetan Sharma	Chandrakant S Pandit	Vilay Seniya Seniya Vilay Vilay Vilay	Raman Cadada R Rowar Cadada Nusil Jashad G Karik Jyub Ki	Jacob Cheandrait Gonan J Martin 9 Chaunan 9 Galador Agan Earolin Karsan Nano Rodal Enginar D Ghavit K Thary
Dravid	Sehwag	Suresh K Raina	Sanjay	D Ka	arthik	Ravindra A Jadeja R	Gundappa Viswana t	Praveen Kumar	Jakian Ra Naha Rashore R Bharduaj	blande Buda P anginus Banina Ban Sananah	An and a second
			∨ Manjreł	(ar San Mi	deep Patil	Pathiv A Patel	Ajay KSharma	Anshuman D Gaekvad	Bangar Rajash Lai K Chauhan Utnder Nannava S Khanna K Rasad	Miay Valendar St	Anne Cing on character and the series of the series the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the se

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	Α	В	С	D	E	F	G
1	S. No.	Roll No.	Name	Course	Dept.	Year	Туре
2	1	111030016	PRANAY JOSHI	B.Tech	EEE	3	Inst. Eelec
3	2	111030027	AJIT KUMAR	M.Tech	Aero	2	Minors
4	3	11D070038	HEMANT MEENA	Ph.D	Physics	4	Additional Course
5	4	11D070041	RAHUL JAIN	B.Tech	EEE	4	Inst. Eelec
6	5	11D170010	PATIL PIYUSH MUKUNDA	M.Tech	Aero	3	Minors
7	6	11D170012	PATOLE MAYURESH KIRAN	Ph.D	Physics	2	Additional Course
8	7	120040109	JITEN	B.Tech	EEE	4	Inst. Eelec
9	8	120050020	RANVEER AGGARWAL	M.Tech	Aero	4	Minors
10	9	120050049	YARAMALA KIRAN	Ph.D	Physics	3	Additional Course
11	10	120050053	CH S S SAI BHARGAV	B.Tech	EEE	2	Inst. Eelec
12	11	120050054	DHONDI PRANAY	M.Tech	Aero	4	Minors
13	12	120050057	MARAM SAI KRISHNA DEEPAK	Ph.D	Physics	4	Additional Course
14	13	120050067	MADUPU AKHIL SURYA VAMSHI	B.Tech	EEE	3	Inst. Eelec
15	14	120050068	MUDULKAR SAI KIRAN	M.Tech	Aero	2	Minors
16	15	120050078	VENKATA GANGADHAR KANCHU	Ph.D	Physics	4	Additional Course
17	16	120070006	BHALEKAR VAIBHAV MAHADEV	B.Tech	EEE	4	Inst. Eelec
18	17	120070027	ROHIT KUMAR	M.Tech	Aero	3	Minors
19	18	120100014	ASHRITH REDDY	Ph.D	Physics	2	Additional Course
20	19	120100020	HITESH SAHARE	B.Tech	EEE	4	Inst. Eelec
21	20	121030006	PRITAM SANKAR ROYCHAUDHURI	M.Tech	Aero	4	Minors
22	21	12D020007	MIHIR SUDHIR KULKARNI	Ph.D	Physics	3	Additional Course
23	22	12D070029	NIKLESH LALWANI	B.Tech	EEE	2	Inst. Eelec
24	23	12D070062	GOKUL M C	M.Tech	Aero	4	Minors
25	24	12D170005	SHENDE ABHISHEK AMBADAS	Ph.D	Physics	4	Additional Course
26	25	12D260002	YADAV SOMESH RAJPAL	B.Tech	EEE	3	Inst. Eelec
27	26	12D260004	RAMSAGAR MEENA	M.Tech	Aero	2	Minors
28	27	130020054	SHARAD YADAV	Ph.D	Physics	4	Additional Course
29	28	130040020	ROHAN JAIN	B.Tech	EEE	4	Inst. Eelec
30	29	130040085	CHINTAPALLI ABHISHEK	M.Tech	Aero	3	Minors
31	30	130040116	TANMAY PREMAN	Ph.D	Physics	2	Additional Course

➔ Data Types

→ Items → Attributes → Links → Positions → Grids

➔ Data and Dataset Types

Tables	Networks &	Fields	Geometry	Clusters,
	Trees			Sets, Lists
Items	Items (nodes)	Grids	Items	Items
Attributes	Links	Positions	Positions	
	Attributes	Attributes		

Tables	Networks & Trees	Fields	Geometry	Clusters, Sets, Lists
Items	Items (nodes)	Grids	Items	Items
Attributes	Links	Positions	Positions	
	Attributes	Attributes		



→ Multidimensional Table



CHINESE MALVANI

120 160

VEG. RICE

Veg. Fried Rice	
Veg. Schezwan Rice	
Veg. Hong-Kong Rice	
Mushroom Fried Rice	

NON -VEG RICE

VEG NOODLES

Veg.	Hakka Noodles
Veg.	Fried Noodles
Veg.	Schezwan Noodles
Veg.	Hon-Kong Noodles
Musł	nroom Noodles
Veg.	American Choupsey
Veq.	Triple Noodles

NON-VEG NOODLES

Chicken Hakka Noodles	120
Mix Hakka Noodles	140
Chicken Fried Noodles	130
Chicken Schezwan Noodles	130
Mix Schezwan Noodles	150
Chicken Hong-Kong Noodles	120
Chicken Mushroom Noodles	120
Chicken American Choupsey	120
Chicken Triple Noodles	160
Chicken Crispy Noodles	150



STARTER & CURRY

100	Chicken Sukka / Curry	120
110	Chicken Handi	180
100	Gawti Chicken Handi	150
120	Gawti Chcikenn Handi Full	420
	Mutton Sukka / Curry	180
	Mutton Handi	280
	Prawns Sukka / Curry	180
110	Prawns Handi	280
120	Pomfret Fry / Curry	280
120	Surmai Fry /Curry	160
80	Bombil Tawa / Curry	120
110	Banoda Tawa / Curry	140
110	Rawas Tawa / Curry	130
140	Tiger Prawns Tawa / Curry	Apc
120	Kolambi Bhat	140

PER KG MENU Ven

100	Veg.	
120	Veg. Biryani / Pulav	450
120	Green Peas Pulay	380
120	Jeera Rice / Steam Rice	280
120	Panner Birvani	450
120		100

Non-Veg

Chciken Biryani / Dum	600
Mutton Biryani / Dum	800
Prawns Biryani / Dum	800

200/-

GULMOHAR SPECIAL

Veg. Combo Veg. Soup, Veg. Lolly Pop, Veg. Fried Rice, Veg. Manchurian

Non. Veg. Combo Chi. Soup 250/-Chi. Lolly Pop Chi. Chilly Chi. Fried Rice

Tables	Networks & Trees	Fields	Geometry	Clusters, Sets, Lists
Items	Items (nodes)	Grids	Items	Items
Attributes	Links	Positions	Positions	
	Attributes	Attributes		



→ Multidimensional Table





















Fields differ from tables in a fundamental way because they represent continuous rather than discrete data.













Exercise

CHINESE MALVANI

VEG. RICE

Veg. Fried Rice Veg. Schezwan Rice Veg. Hong-Kong Rice Mushroom Fried Rice

NON -VEG RICE

Chicken Fried Rice Chicken Schezwan Rice Chicken Hong-Kong Rice Egg Fried Rice Mix Fried Rice Chicken Singapore Rice Prawns Fried Rice Combination Rice

VEG NOODLES

Veg.	Hakka Noodles
Veg.	Fried Noodles
Veg.	Schezwan Noodles
Veg.	Hon-Kong Noodles
Musl	hroom Noodles
Veg.	American Choupsey
Veg.	Triple Noodles

NON-VEG NOODLES

Chicken Hakka Noodles 120 Mix Hakka Noodles 140 **Chicken Fried Noodles** 130 Chicken Schezwan Noodles 130 Mix Schezwan Noodles 150 Chicken Hong-Kong Noodles 120 Chicken Mushroom Noodles 120 Chicken American Choupsey 120 **Chicken Triple Noodles** 160 **Chicken Crispy Noodles** 150



STARTER & CURRY

100	Chicken Sukka / Curry	120
110	Chicken Handi	180
100	Gawti Chicken Handi	150
120	Gawti Chcikenn Handi Full	420
	Mutton Sukka / Curry	180
	Mutton Handi	280
-	Prawns Sukka / Curry	180
110	Prawns Handi	280
120	Pomfret Fry / Curry	280
120	Surmai Fry /Curry	160
80	Bombil Tawa / Curry	120
110	Banoda Tawa / Curry	140
110	Rawas Tawa / Curry	130
140	Tiger Prawns Tawa / Curry	Apo
120	Kolambi Bhat	140

PER KG MENU

Veg.	
Veg. Biryani / Pulav	450
Green Peas Pulav	380
Jeera Rice / Steam Rice	280
Panner Biryani	450

Non-Veg

100

120

120

120

120 120

160

Chciken Biryani / Dum	600
Mutton Biryani / Dum	800
Prawns Biryani / Dum	800

200/-

GULMOHAR SPECIAL

Veg. Combo Veg. Soup, Veg. Lolly Pop, Veg. Fried Rice, Veg. Manchurian

Non. Veg. Combo Chi. Soup Chi. Lolly Pop Chi. Chilly Chi. Fried Rice

Exercise

