

Demystifying the Mystery of Matching Algorithms Oct 15-16, 2020

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Algorithms everywhere!









Algorithms everywhere!







Feb 16, 2012, 11:02am EST

How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did



Kashmir Hill Former Staff

Welcome to The Not-So Private Parts where technology & privacy collide

C This article is more than 8 years old.

- Every time you go shopping, you share intimate details about your
- consumption patterns with retailers.
 And many of those retailers are
-





What is an algorithm?

Dictionary	
Search for a word	
al·go·rithm /ˈalgə_riTHəm/	
<i>noun</i> a process or set of rules to be followed in calculations or other problem-solv a computer. "a basic algorithm for division"	ving operations, especi
If <condition> Then</condition>	[
If <condition> Then <do this=""></do></condition>	
If <condition> Then <do this=""> Elseif <condition> Then <do this=""></do></condition></do></condition>	
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<pre>If <condition> Then</condition></pre>	E Ga I



What is an algorithm?

Clinical Decision Support Systems (CDSS)₁ are a form of algorithm that uses multiple pieces of information that help doctors make decisions about patient care.

Key here is that the decision is made by a person, but logically chosen options are presented by the algorithm



1 - Lamanna, C., & Byrne, L. (2018). Should artificial intelligence augment medical decision making? The case for an autonomy algorithm. AMA journal of ethics, 20(9), 902-910.

Garbage in, garbage out

- Algorithms make logical decisions based on the information they have available
- They also have no feelings related to morals and ethics
- Great care must be given to the the data that algorithms use to make sure that bias is not introduced into the system

Algorithms are NOT biased.

Data that drive algorithms contain bias.

How to use for Job Matching?

Start with basics - If/Then Statements

At the most basic, an if/then is a valid matching algorithm

Person 1 Skills

Technology Skills Accounting Software Office Suite Software Point of Sale Software

- Spreadsheet Software
- Database User Interface And Query Software

Knowledge

Customer and Personal Service English Language Food Production Mathematics

Skills

Active Listening Service Orientation Social Perceptiveness Speaking Coordination



Technology Skills

- Accounting Software
- ✓ Office Suite Software ✓ Point of Sale Software
- ✓ Spreadsheet Software

Knowledge

- Customer and Personal Service
- English Language Sales and Marketing

Skills

- Active Listening Service Orientation
- ✓ Speaking
- Social Perceptiveness
- ✓ Coordination
- Monitoring
- Reading Comprehension



Technology Skills

Knowledge

Skills

✓ Food Production

English Language

Active Listening

Speaking

Service Orientation

Social Perceptiveness

Time Management

Sales Marketing

- Database User Interface And Query Software
- ✓ Operating System Software

✓ Customer and Personal Service

Public Safety and Security

Point of Sale Software



Technology Skills

- ✓ Database User Interface And Query Software
- ✓ Office Suite Software **Operating System Software**
- ✓ Point of Sale Software
- ✓ Spreadsheet Software

Knowledge

- ✓ Customer and Personal Service
- ✓ Food Production
- Sales Marketing
- English Language
- Mathematics

Skills

- Active Listening
- ✓ Speaking
- Service Orientation
- Social Perceptiveness
- Coordination

Start with basics - Flowcharts

Slightly more complex, a logic-based flowchart can be used



More complex algorithmic job matching



Career interest survey data	Behavioral Survey Data	Skills inventory or resume parsed data	Personality inventory data		
0.47	0.33	0.51	0.45	Dietetic Technicians	
-0.76	0.33	0.42	-0.68	First Line Supervisors of Retail Sales Workers	
-0.03	0.33	0.33	0.00	Home Health Aides	
-0.24	0.47	0.37	-0.18	Nursing Assistants	
0.47	0.48	0.23	0.35	Critical Care Nurses	
-0.19	0.23	0.24	-0.17	Electricians	
.5	.75	1	.5		
.75	.75	.75	1		
1	1	.5	.75		

.8

.45

.1

.4

.6

.15

More complex algorithmic job matching



Match Score	Career interest survey data	Behavioral Survey Data	Skills inventory or resume parsed data	Personality inventory data	
95	0.40	0.38	0.23	0.43	Dietetic Technicians
10	-0.26	0.33	0.49	-0.26	First Line Supervisors of Retail Sales Workers
35	-0.03	0.33	0.35	0.00	Home Health Aides
32	-0.28	0.20	0.37	-0.08	Nursing Assistants
88	0.46	0.28	0.20	0.35	Critical Care Nurses
18	-0.09	0.20	0.24	-0.06	Electricians



More complex algorithmic job matching



Match Score	Career interest survey data	Behavioral Survey Data	Skills inventory or resume parsed data	Personality inventory data		
95	0.16	0.14	0.23	0.17	Dietetic Technicians	
10	-0.27	0.14	0.19	-0.26	First Line Supervisors of Retail Sales Workers	
35	-0.01	0.14	0.15	0.00	Home Health Aides	
32	-0.08	0.20	0.17	-0.07	Nursing Assistants	
88	0.16	0.20	0.10	0.13	Critical Care Nurses	
18	-0.07	0.10	0.11	-0.06	Electricians	

Any Job	.4	.6	.8	.4
Better Job	.45	.45	.45	.6
Career Job	.2	.2	.1	.15
Mean	.35	.42	.45	.38

Key Questions to Ask

- Is the solutions complexity level appropriate the answer the questions my users seek to get answers for?
- Do I know/trust the data source(s) the solution draws upon?
- Are the options available to users sufficient to answer the questions they're seeking to answer?
- Are there other kinds of data (e.g. salary, educational opportunities, etc.) that a user might want and is the system able to use those data?

Occupation Finder



Final Thoughts

- Algorithms can be as simple or as complex as you can imagine
- They also have no feelings related to morals and ethics
 Remember, GIGO
- Algorithms help people make decisions, but shouldn't be making them on their own
- What we see in movies and entertainment can be real

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Or schedule a meeting at https://calendly.com/drhawthorne