Partial Order, Simple Order, and Natural Progression

By

Marvin Barsky

Introduction

Given the collection of activity matrices obtained from the mold M that we have been calling Pop(u), and given an arbitrary vector V. Then, for any finite number of them, Ai, I=1,2,....k, Ai^nV can be lined up in a simple order, for n large enough. ie. There will be a best, a second best, and so on. The proof comes from theorem 5 in the paper, "The Mathematics of Continuously Changing Objects".The order comes about from the matrices principal eigenvalues which are simply ordered in the same order as the matrices.

In this paper we prove, given the collection of all positive vectors whose sum adds to the same number and given any activity matrix A, then for any finite number of them, Vi, I=1,2,...k, A^nVi, can be lined up in a simple order. We then study all such vectors which amounts to the study of the distributions [Vi] of this collection.

Since algorithm 3, in [5], requires the Mas of the original vector and only the distribution of the final vector, and since the personality traits are left untouched, we are able to form the Mas of the same distribution for a great variety of personalities including extreme ones.

Suppose we have two vectors X an Y where X=[X] and Y=[Y]. Then X and Y are noncomparable since they each have the sum of 1. However, given any activity matrix A, then A^nX and A^nY will be comparable for n large enough. In other words, one will be better than the other.In general we have the following theorem:

Theorem1 Given any finite collection of positive vectors each of whose sum adds to the same number. Then applying A^n to each of them will result in their now being in a simple order for n large enough.

Proof. The proof comes from an extension of the Perron-Frobenius theorem:

Given any nonzero vector V, then A^nV tends to the principal eigenvector of A. This means that for some positive number c, then A^nV tends to c[A] or -c[A]. Since X-Y is a nonzero vector, either $A^n(X-Y)>0$ or $A^n(X-Y)<0$. If it is $>o$ then $A^nY<A^nX$. If <0, then$A^nX<A^nY$.

We shall give two examples of how this theorem can be used in real life situations. The first example not only uses theorem 1 but also develops the pace of the matrix yielding more accurate results.

The second example not only uses theorem 1, but also developes the natural progression(see[5]) to such an extent that six more measurable activities are added to the ten listed in [4] and [5].

Example 1

The entity is an apartment building. The framework will consist of n units, n-2 are apartments. The first unit will be the exterior of the building. The last unit will be the interior of the building. U is the cost of maintenance over a given time period.

As the building ages, the cost of maintenance will only increase. Therefore it is analogous to a company in a growth period, as discussed in the paper, “A Matrix Method For Decision Making And Forecasting”.The only difference is that the more money spent on maintenance, the worse it is for the owner or owners.

In that paper, five vectors were needed to give rise to a unique activity matrix.Here they represent the continued aging of the building governed by its increasing maintenance costs:

The vector P gives us the initial conditions. It also sets the stage for the other four vectors on how the aging will proceed ; the vector AP represents the estimated cost in each unit for next time period ; the vector W represents the least amount that can be paid then without violating any of the building codes; the vector B, the most that can be expected in the next period ; and finally, the vector G, the goal, the maximal amount that can be paid for any time period for the life of the building.

We thus have W<P<AP<B<G. Giving numerical values to each vector that most closely matches what to expect from the building, we have:

W(10 6 4 5 3)<P(14 8 5 7 4)<AP(15 10 4 8 6)<B (30 15 12 11 9) <G(55 22 20 18). In standard form, we subtract each coordinate from the corresponding G coordinate, obtaining
G=0<B(20 10 10 9 21)<AP(35 15 15 12 31)<P(36 17 17 13 35)< W(40 19 18 15 38). We first use B and W in standard form to form our local model.

ai=bi/wi yielding ai=.5 a2=.5263 a3=.5556 a4=.6 a5=.6923.

ki=ai/(4+ai) so that k1=.1111 k2=.1163 k3=.1220 k4=.1304 k5=.1445.

si=ki/(1-ki) obtaining s1=.125 s2=.1316 s3=.1261 s4=.15 s5=.173

W1/w2=2.1053 w1/w3=2.2222 w1/w4-2.6667 w1/w5=3.0768

W2/w3=1.05 w2/w4=1.2667 w2/w5=1.4615

W3/w4=1.2 w3/w5=1.1538

W4/w5=1,1538

From the formula for the local model, given in the paper,"The Mathematics of Continuously Changing Objects", p. 38, we get

$$M=\begin{bmatrix} 1 & .2632 & .2778 & .3333 & .3846 \\ .1316 & 1 & .1389 & .1667 & .1923 \\ .1261 & .1195 & 1 & .1513 & .1746 \\ .0573 & .1184 & .125 & 1 & .1731 \\ .0562 & .1188 & .1249 & .1996 & 1 \end{bmatrix}$$

In order to solve for the l's, we have the formula:
$l_i=(y_i-x_i)/(w_i k_i s-x_i)$, where $s=\sum x_i/w_i$, Thus
$l_1=.06297$ $l_2=.28584$ $l_3=.28317$ $l_4=.24123$ $l_5=.28336$
Finally, since $u_i=l_i(1-k_i)$ we get
$u_1=.056$ $u_2=.2526$ $u_3=.2486$ $u_4=.2098$ $u_5=.2490$
and $u=.17899$, giving us the pace.
This gives rise to the unique matrix

$$B=\begin{bmatrix} .9440 & .01474 & .01556 & .01867 & .007633 \\ .01579 & .7474 & .03509 & .04211 & .01662 \\ .01554 & .03272 & .7514 & .04144 & .01636 \\ .01179 & .02484 & .02623 & .7902 & .01242 \\ .03269 & .06882 & .07263 & .08725 & .7510 \end{bmatrix}$$

We can check for mistakes by showing that BP=AP.
The principal eigenvector of B is (.9814 .1475 .1466 .1317 .3082) Therefore [B}=[.5547 .089 .0885 .0817 .1861]. Ultimately, about 55,5% of maintenance costs will be for the exterior of the building, while about 18.5% for the interior. The three apartments take up a little less than 10%.

Suppose there is aboard of directors that controls how much to use for maintenance in each unit. They have no control over the apartments When something needs to be fixed, a plumber or electrician has to be called right away. The board can only estimate the cost and make sure there is enough. They do have control over the exterior and interior of The building.

Suppose some members of the board want to divide the amounts as X(270 215 230 185 100). Their reasoning is that by putting most money into the interior, they will attract more people to buy apartments when others move out. Another group want to divide it as Y(100 215 230 185 270). Their reasoning is that for the safety of the residents, it is more important to put most money toward the exterior of the building.By theorem1, we know that one of these choices will eventually lead to spending less money on maintenance in each unit year after year from then on. Now,

B'100(X-Y)=(1.295 .2076 .2067 .1905 .4344)>0. Therefore B^100X>B'^100Y and so option X leads to less cost of maintenance.

Once we have this unique matrix whose pace is u=.17899, we can change it to any pace u*, 0<u*<1by multiplying each ui by u*/u and then using M (see [1],p 23). There is excellent reason to let u*=.01. we know that for u=.01, the corresponding vector B is pacewise equivalent to exp(B). Therefore we can use fractional powers if needed. Furthermore, the aging of a building is similar to the aging of a person. They both require maintenance that increases as they age. It models quite well by letting each application take 18 days in a 360 day year (se [4],p 8).

The u*I values for u*=.01 are

u*1=.003129 u*2=.01411 u*3=.01389 u*4=.01172 u*5=.01391,and the matrix is:

B*=

.99687	8.2355E^-4	8.6917E^-4	.001043	4.1178E^-4
8.8188E^-4	.98589	.001960 .	002352	9.2844E^-4
8.6813E^-4	.001828	.98611.	.002315	9.0980E^-4
6.5866E^-4	.001388	.001465	.98828	6.9382E^-4
.001826	.003845	.004058	.00487	.98609

Applying B* to. each vector gives us

B*X=(269.8 213.2 228.0 183.7 101.8)

B*Y=(100.4 213.2 228.0 183.7 269.1)

Notice that the sum of the X coodinates is 996.5 while the sum of the Y coordinates is 994.4. We see that with even after one application of B*, X costs less in maintenance totally than does Y. It will stay that way for all powers of B*, but only after167 applications of B* will it be better in all units, ie.

B*^167X>B*^167Y. If the time interval is one year then will take 8.2 years.

The Natural Progression

The natural progression at any stage depends on algorithms 2 and 3 given in [5],appendices 2 and 3. Algorithm 2 depends on the Mas of the original vector and the Mas of the final vector at that stage. Algorithm 3 depends on the Mas of the original vector and only on the distribution of the final vector, not its Mas. This makes an enormous difference.We will examine this algorithm in much more detail.

First of all, algorithm 3 can be extended one more step. When we interchange Re and M fixing P and I, if E has a percent over 1m, we can interchange Re and Ax fixing Ar and E. P will be almost always under Im even in extreme cases.The fact that it leaves the four personality traits, Ex,Sl,Se, and C untouched, allows us to consider all kinds of personalities with the same distribution.

In paper [4], the Mas of the ideal distribution of the normal person was first given.It was then matched up to a matrix N with equal main diagonal elements where [N] came within 1m of the Mas distribution.Using algorithm 3 we can get more accurate results using the same personality traits. We start with the ideal distribution for N:

[N]=[.3755.2547 .1958 .1740]

	Mas N	Mas N(alg3)
M	1	1
W	6.7	6.6959
Ex	.6	,6
Sl	7	7
L	2.9	2.9125
Re	.48	.48
Se	.42	.42
Ax	2.1	2.0774
Ar	1.15	1.1642
C	1.65	1.65
P	.3755	.3755
I	.2544	.2547
E	.1963	.1958
S	.1738	.1740

We will use the new Mas of the normal matrix N and change the personality traits in an extreme way. Whenever there is a change in traits, we add the original traits, subtract the new traits and add what we get to W. We regard the Mas we get as the beginning Mas of a vector Q.

	N	Q	6.269	1.632	3.7029	.8.	.07.	N'
M	1	1				1.8		1.8
W	6.6959	-.8841	5.3849					5.3849
Ex	.6	.6						.6
SI	.7	7						7
L	2.9125	2.9125			-.7904			-.7904
Re	.48	.48				-.3	-.39	-.39
Se	.42	8						8
Ax	2.0774	2.0774	-4.1916	-.2.5596			-2.4896	-2.4896
Ar	1.1642	1.1642		-.4678	3.2351			3.2351
C	1.65	1.65						1.65
P	.3755	.2239	.3754	.3754	.3654	.3754	.3754	.3751
I	.2547	.2390	.2259	.1953	.2547	.2547	.2547	.2547
E	.1958	.2906	.1652	.1958	.1927	.1944	.1958	.1958

We do not have to include the S coordinate since the sum always adds to 1. We do have to explain the negative numbers in the amount of time given to a particular mac since there is no such thing in the real world. However there certainly are negative activities and we can let the negative sign go with them.The personality traits have positive numbers and remain fixed throughout the algorithm 3 process. Only the 6 other macs need to be explained.

The first such mac M represents getting ready to meet the day by getting out of bed cleaning ,dressing eating, etc.

-M represents refusing to get out of bed ,refusing to wash or dress or eat. There are times when it happens to all of us but certainly not part of an ideal Mas.

Since W represents work that is necessary, -W means refusing to do the necessary work.Either one refuses to go to work or take care of necessary chores, or somebody else must take care of them.

L represents relaxing, reading fiction, watching thrilling, action packed fantasies, the enjoyment coming because they are not real. Therefore -L is taking these fantasies as real and instead of relaxing with them, they become threatening. These people believe in conspiracy theories, believe in absurd notions and get no relaxation.

-R is the negation of what all religions teach: instead of peace, conflict. lack of empathy, no faith, etc.

Ax represents one's negative emotions. They all give us grief of some sort. -Ax gives us pleasure, but not in a good way but rather a perverse pleasure in watching ourselves or others suffer.One can only imagine the emotions of a person involved 8 hours a day with sex.

Finally there is Ar. It's most basic meaning is clear logical thought.Thus -Ar represents illogic, making no sense, confused, irrational.

We can now question what the numerical values of the negative numbers represent. If we add the positive numbers from these 6 macs plus the 4 personality traits, we get a number that is more than 24. What this means then is that the positive time from each such mac.is only the apparent time spent, not the actual time. Those negative macs interfere with the positive ones making the actual time less than what it appears to be.

If x=total time of the positive macs out of the 6, and y=the total positive time of the negative macs, then if m is the apparent time of a positive mac, $m/x(x-y)=m-my/x$.is the real time spent.

What all this shows is how little we know of a person by just knowing his distribution at any given time.

Example 2

Whenever there is a group of people that are committed toward achieving certain goals,.e.g. a company, an enterprise, a political party, a profession, a gang, etc, we shall refer to it as a business. They hire people(let them join) with the understanding that these people will be useful in the business's progression toward its goals.

The employer is the person who decides whether the perspective employee is suitable for the job. He may ask for references, interviews, records, etc. to learn as much as he can about the person. At best, the most he can learn is the person's present distribution. He will not be able to find out about his present Mas since many of the measurable activities are none of his business. Seeing to what extreme one can go and still have a seemingly normal distribution, the employer must use his experience,intuition, and hope that the person's Mas is somewhat acceptable. If one of those people has an Se=8h as per the example, chances are that his sexual harassment may hurt the business profoundly.

Furthermore, if the person has a fully developed ID matrix, then his allegiance to the business is compromised by his attempt to move toward his ideal distribution. Fortunately for the business, most young people's ID matrix is just being formed and many have no idea what really interests them. They look to friends, jobs, love affairs, social media to point them in the right direction.

Let us suppose that a number of young people apply for an opening that has just come up. Since the employer can only estimate the person"s distribution, these four numbers can also be used as a measure of how far we are from achieving the goals of the business.

We know that all the applicants are noncomparable. However , if we assume that the business is governed by an activity matrix B, then by theorem1, eventually one of them will be better for the company than any of the others.

Since the percents in the distribution are now viewed as numbers progressing toward the goals of the business, we need to interpret them from the business point of view.

P: instead of physical time, it is the amount of money the person can make for the business.

I: instead of intellectual time, it is the amount of influence he can have with the business's customers.

E: instead of time spent on emotions, it is the ability to passionately defend the positions of the business..

S: instead of spirituality, it is amount of loyalty there is for the business. Thus the goals of the person working in the business are:money, influence, defense, and loyalty.

In order to decide which person should be chosen, 4 matrices will be selected which focuses on money, influence, defense, and loyalty respectively. They are:

A(.1.6.3.45), B(.6.1.3.45), C(.6.3.1.45), D(.6.3 .45.1)

The .1 in the various dimensions gives us the maximum time allowed by the activity matrix while keeping the other dimensions no more than average.

Definition A variational change in a positive vector V(x1x2x3x4) is a vector where dimensions xi and xj are replaced xi-c, xj+c, where c<xi,xj.

Notice that a transposition is a variational change.Also both vectors have the same sum. Suppose we have two vectors representing two candidates, V(38 27 24 16) and W(37 28 24 16). This is a variational change of the first two dimensions. Let us see which one will eventually be better.

V-W=(1 -1 0 0). Now A^1000(V-W)>0. Thus A^1000W<A^1000V.
On the other hand B^1ooo(V-W)<0 and B^1000V<B^1000W.

We see that the business which concentrates on a particular dimension will take the smaller number, ie. the number closest to the origin.The same is true for the other two matrices. However, the smaller the number, the less percent of time is used in that dimension. Thus:

The more time you spend in a dimension, the less chance you have of being selected by a business that regards that dimension as most important.

Such a business wants someone with the least amount of time spent in that dimension so that he can be molded in that dimension to the type of person that the business feels can do the best job for them.

When the business is powerful, eg. A corporation, a profession, a political party, etc., the ID matrix of the person is much less influential(its u value is less than that of the business) and for most people this is the case. Only a few courageous individuals will have a u value that matches or exceeds that of such a business.