

Markov Models for Ruining your Weekend: A Comparative Study

Dr. Stanely Yelnets III¹

¹ Department of Human Misery, Cranberry-Lemon University, Pittsburgh, PA, USA

Abstract

American's capability to ruin their own weekends has been struggling over the last two decades. Through changing demographics, young and middle aged Americans have been shifting to ways of life where weekends are so enjoyable that many do not prefer to work 50-60 hour weeks at the office [1]. The record number of young professionals failing to come to the office more exhausted and stressed out keeps growing. If nothing changes, the antacid market will fail by the year 2026! This paper provides three novel Markov models which have the potential to ruin your weekend leaving you more exhausted and stressed out than when it began on Friday afternoon. These models will be evaluated through Physical Exhaustion in Inverse-Sabbath units, Chores Avoided, and Existential Dread in Sunday Scaries.

Keywords: Markov Models, State Transition, Weekend, Household Chores

1. Introduction

The demographics of America are changing. Less people are moving to the suburbs with toilsome lawns and endless home repairs. While many millennials are currently attempting to flock back to the suburbs to recapture their idyllic 90's childhood, they are becoming priced out by low supply and forced back into apartments and condos in gentrified neighborhoods where they belong. Living in well maintained rental properties, these millennials are spending their weekends unperturbed by endless suburban household chores.

Previously thought impossible, it is now shown in simulation and practice to ruin your own weekend with only a handful of small chores. With a correct state transition Markov Model to dictate weekend activities, it is possible to induce the right amount of existential dread and exhaustion into a rental property dweller within three days each week.

2. Background

Markov models are statistical models used to forecast and predict stochastic systems with multiple states. They can even be used with hidden states, or to dictate decision processes. Each state is defined as well as a state transition probability. There can even be reward functions assigned to the states, actions, and state transitions. This makes it the perfect method for dictating activities and states of actions

throughout an unplanned weekend of relaxing and accomplishing chores.

States can be defined from anything to whether or not you're lying in bed overthinking something you said to a coworker, trying to catch up on cleaning your apartment, meal prepping, or just binging a show on Netflix. The probability of transitioning between these states, such as the likeliness or transitioning from the apartment gym to the shower is often much higher than other state transitions into the shower.

Applying markov models in a way to ruin a weekend can be trivial. For maximal discomfort, it's best to make your weekend as stochastically random as possible moving from one state-activity to another dictated by a system optimized to keep you from focusing on one particular task at a time. Such multitasking is well known to ruin your day and productivity [2].

Compared to the old methods of ruining your weekend with lawn work spending hours in the hot sun to make unwanted small talk with neighbors doing the same thing, the Markov model planning process has promise to even outperform the old ways.

3. Model Development

Because the goal is to only relax long enough to stress out about what you should be doing or haven't done yet, state transitions will be highly rewarded in these Markov models.

Ideally when personally implementing the models into weekend activities, it is a good idea to incorporate hidden markov states to dictate the state transitions such as distracting phone notifications and home background noise so that you do not focus on one activity at a time. For example, you can tell yourself, "I'll work on doing X chore after I finish this Netflix episode then I'll watch another when I'm done." [3]

With a highly stochastic process dictating your only time off in between vacations, you'll never be able to relax or feel accomplished from finishing chores, perfectly ruining your weekend.

For the Markov models, nine states were chosen to be a mixture of chores and relaxing activities; Bed, Couch, Kitchen, Laundry, Cleaning, Working out, Going Outside, Shower, and finally checking work emails because you have a sneaking suspicion that something important might have happened on a Saturday afternoon. These are only example states and you could add others such as reading that book your friend keeps wanting to talk to you about, or taking online classes to get an MBA over four years, or writing in your diary.

In reality, these states' ability to affect your inability to focus on one thing at a time can be augmented by additional hidden markov states such as whether or not you're texting a needy friend or trying to listen to a podcast while completing a task. Unfortunately for this paper, these hidden markov states were unsupported by our simulator [4].

3.1 Linear Model

The first model is the linear model. It consists of transitioning from one task to another and never returning to a previous state until a full cycle is complete. The state transition diagram can be seen in Figure 1. Similar to the list of states used in this paper, the linear model can incorporate more or less states for personal use.

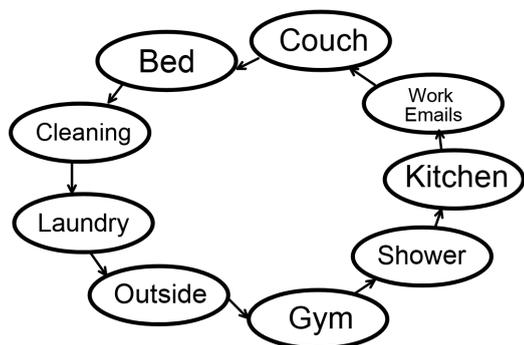


Figure 1: the Linear Model

The key feature to the linear model is that it never lets you focus on one task at a time before transitioning to another

state. By the time the cycle is complete and you relax on the couch a transition to bed for a nap is short lived as you have too much to do and begin another cycle. The aim of this cycle is to force the subject into exhaustion so that there is not enough time to catch up on sleep or downtime with so many things to accomplish and therefore maximizing anxiety.

3.2 Chaos Model

The next model, inspired by P90X's muscle confusion, is the chaos model. In this Markov process, you can transition from any state to another. This model, like the linear model, aims at keeping the mind from focusing on one task at a time by creating non-zero state transition probabilities in between every state. The state transition diagram can be seen in figure 2.

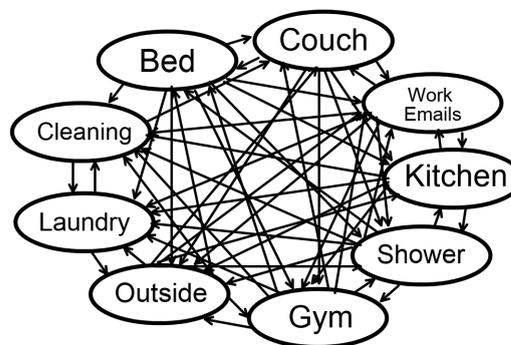


Figure 2: The Chaos model

The chaos model attempts to keep the subject from developing any habitual cues which could allow the activities from creating comfortable traditions. The one downside of the chaos model is that if a subject is completing multiple chores at a time that do not require much thought, there is a chance that the flexible state transition probabilities cued by hidden states allows for the possibility of a subject completing a task and feeling accomplished.

3.3 Relaxation Sink Node Model

Finally, the most counterintuitively designed model is the Relaxation Sink Node model. Using the states involved in this study, this model only allows household chore tasks to transition into and out of the bed or couch state. The state transition diagram for this can be seen in figure 3.

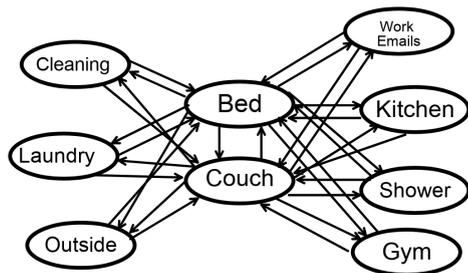


Figure 3: The Relaxation Sink Node Model

While in theory, this model could appear to be an effective means for a relaxing weekend where tasks are also accomplished. According to the simulation, is the easiest way to do neither unless the subject is really experienced in the art of power napping [5]. Due to the highly rewarded state transitions into and out of the chore states, there is not enough time to sit through more than one episode of a netflix series or take more than a thirty minute nap without spending half of your time on the phone scrolling through twitter. Correspondingly, tasks take exponentially longer as the subject will stop at every convenient opportunity to sit down but never long enough to relax. This model appeared to be the best at avoiding any outdoors activities or showering for the entire weekend making it the most promising for ruining a normal weekend.

4. Results

In order to evaluate the different Markov models, each stochastic method was applied to a variety of personality types in Sims 4. Each Sim was scripted to randomly follow each model over one thousand Monte Carlo simulations spanning three months of game play each and their emotional and physical well being for each model. The state of their houses' disrepair and 'shame factor' was also accounted for in the chore avoidance metric.

4.1 Physical Exhaustion

Physical exhaustion was easily measured through each Sims 4 character's physical exhaustion delta between Friday afternoon and Monday morning. The exhaustion was then adjusted by how many Old Testament Sabbath laws were broken and normalized into NEIS's (Normalized Estimated Inverse Sabbath's) [6]. The results can be seen in Figure 4.

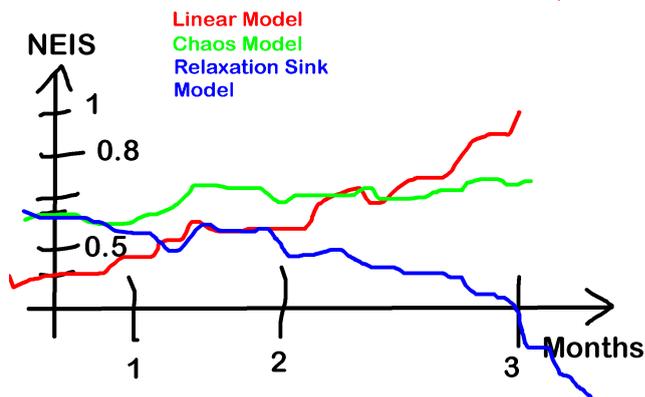


Figure 4: Markov Model Physical Exhaustion Inverse in NEIS

Predictably the linear model increased the NEIS the most and continued to climb over the entire three month simulation period. The Chaos model maintained a steady, yet noisy average over the entire simulation and the Sink node slowly decreased physical exhaustion. It appears that Sims who were utilizing the Couch-Bed sink node method began to have trouble transitioning out of the relaxation states and staying in more productive weekend states making them extremely Sabbath friendly.

4.2 Work not Accomplished

Chores avoided were measured by the amount of dishes which piled up by the end of the weekend, dirty laundry, decrease in strength stats, spousal arguments, and amount of take out ordered in the following week due to a low amount of meal prep. These metrics were simplified using Principal Component Analysis (PCA) to reduce the dimensionality of the data [7]. Results can be seen in Figure 5.

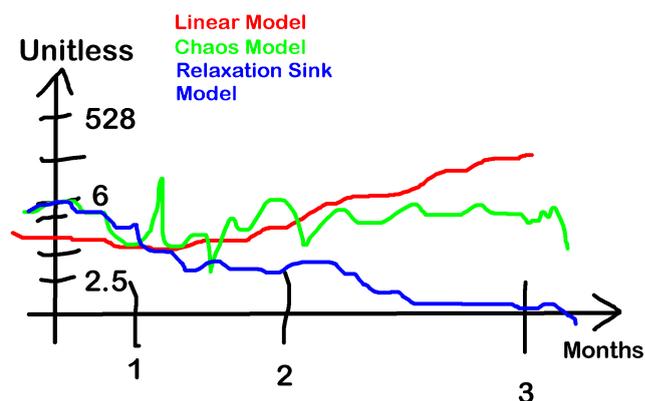


Figure 5: Work Accomplished in some Unitless metric blindly Dimension reduced with PCA

One predictable problem did appear, most Sims characters began to develop habits while using the linear model and became more productive. The chaos method excelled at failing productiveness across the board but was not as significantly terrible for the Sims as the Sink Node model. For the same reason the NEIS decreased for the Sims characters, they became much more unproductive over time due to a lack of will and generic motivation.

4.3 Existential Dread

Typically in most Monte-Carlo Sims 4 experiments, existential dread was difficult to study [4]. After some cursory analysis and literature review, the Sunday Scary metric appeared to be the best way to measure Weekend induced existential dread. In order to study Sunday Scaries, each Sims character's ability to fall asleep on Sunday night was measured as an indication of anxiety for the fast approaching work week using the Sims 4 Sleep quality plugin DLC. The results of the Sunday Scary metric can be seen in Figure 6.

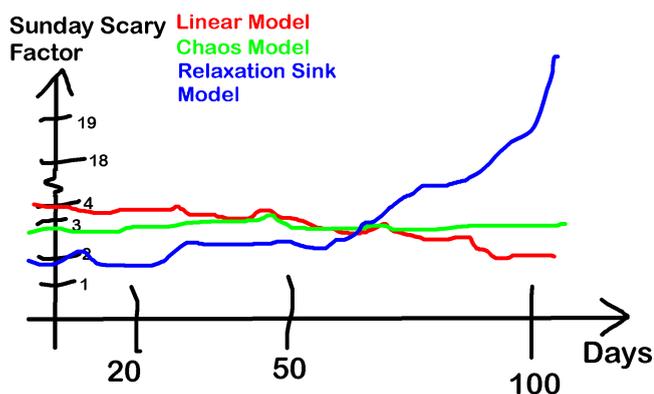


Figure 6: Model Effectiveness in Sunday Scaries

The Linear and Chaos methods maintained a predictable amount of Sunday Scaries. The Sink Node Approach however showed a steady increase in Sunday Scaries over the three month simulations on average. As conclusive as it seems, it does appear from further analysis that this metric was inversely correlated with NEIS and with the Chore avoidance metric as is shown from what appears to be a slight decrease in Sunday scaries with the Linear method. A decrease in chore accomplishment tended to correlate with an increase in anxiety as predicted by the classical Inverse Garbage Time Paradox [8].

5. Conclusion

Because of the inherent correlations between each metric, it appears to be inconclusive which Markov model is the

most effective at ruining your weekend the most given each fundamental metric. The accuracy of the Sims 4 human modeling software is clear, if you would like to be more exhausted during the work week, use the linear approach. There is absolutely no need to even consider a real human trial before jumping to a conclusion. If more existential dread is required, the Relaxation Sink Node model is the best and the Chaos model will balance between all metrics.

Regardless of each Markov model, millennials do not need to get into weekend landscaping and endless housework to feel tired every Sunday night. With enough smarts and random Stochastic processes, they can efficiently become Zombies on Monday mornings from a minimum household chores if properly mismanaged.

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