

Posts published on February 18, 2024, from unmeshmali.com. Printed on February 18, 2024 using [Print My Blog](#)

## Week 10, 2021

March 11, 2021

Categories: Weekly Notes

### Work

Working on multiple things like always. I have a couple technical projects in hand that involve Python and Java programming. I also learned Docker to be able to deploy those projects. On the client-facing side, delivered on some data and Tableau dashboard requests. Spent a lot of time with the QA team to test out new deliverables. Not the best but a fun week at work.

### Books

GOLD IN THE WATER | P.H. Mullen

Spent just over 3 hours in total reading time and about 50 odd pages of the book. The story is at the point where the swimmers have just come back after winning a relay at the Pan Pacific championship tournament. While their individual performances showed them that they weren't unassailable, their combined victory in the relay gave them a ray of hope to win the Olympics of 2000. This is all happening in the winter of 1999 and now all athletes have come back to the Santa Clara Swim Club to train harder for the main event next year.

Kurt Grote (one of the 3 athletes anticipated to win gold in the Olympics) is now biking around 1000 miles a month in the mountains next to the Stanford University campus to supplement his arduous swim training. Personally, I am averaging 20 miles a week. I can't imagine biking 250 miles a week. But I digress. Looking forward to the athletes' grueling training phase that the author appropriately titled "Darkness".

## Fitness

**Gym** : San Francisco has made good progress in keeping the number of COVID-19 infections down. And the vaccine supply is rising steadily thanks to the Johnson and Johnson vaccine that was approved recently by the FDA. As a result of the above, SF has opened indoor gyms and dinning at 10% capacity. I have joined the gym near my house. They have a swimming pool – 25 yards in length and 3 lanes. I am eagerly waiting for them to open the pool. With my book reading this week, I am already in the grove to go swimming. Apart from that, the equipments are not bad. They have a variety of them. As you enter the gym they take your temperature and hand you a sanitizer spray bottle that you carry with you to all equipments. And of course masks are mandatory. I have been there twice this week. I usually bike to the gym which is a good warmup routine. It takes me around 7 minutes. Yesterday it was raining in SF and it felt amazing to ride my bike in the rain while coming home from the gym.

**Biking** : This week I rode 27.98 miles (~45 km) with an elevation gain of 1066 ft. Hope to beat this record next week. Would love to explore other parts of San Francisco on the bike.

# Week 11, 2021

March 22, 2021

Categories: Weekly Notes

## Work

“Faster along, further together” – The quote sums up this week at work. Working with QA engineers to test the integration, configurations, and algorithm for a project that was worked on by many developers at different times, tested by different QA engineers and approved by another product person. The software development process can’t get more complicated than that now, can it? I can’t appreciate enough the tools in Atlassian product suite. Did you know that Atlassian is an Australian company? One of the very few tech companies in Australia that has had a major impact on the world especially the silicon valley ecosystem. It’s a fascinating story (Listed to the [podcast](#) if interested). Also spent some time on websites of electric utilities to provide some market research support to the sales staff. A decent week.

## Side Project

I am volunteering with Professors from University of San Francisco (my Alma Mater) to work on a project that involves predicting the progression (direction and speed) of wild fires once they have been ignited. The project is part of the MAGIX lab at USF where they work on solving complex societal problems using Machine Learning and Deep Learning and publish papers. Our project involves using deep learning to do the prediction. More details on the project can be found in the [projects](#) section. Spent just over 3 hours this week on the project mostly researching.

## Books

### **Gold in the Water | P.H. Mullen**

Finished the last 150 pages of the book over this week. A wonderful read. It’s a fascinating insight into the world of Santa Clara Swim Club that has produced numerous world records in swimming and won medals in the Olympics. I

would never have imagined the city of Santa Clara to have such a rich history. It always seemed so lifeless to me when compared to San Francisco. I have a new respect for the city now. Some day I hope to swim in the SCSC's swimming pool where many Olympians trained. Water is around 780 times denser than air and hence is merciless to inefficiency. Looking forward to getting into a pool to improve my strokes and speed.

### **Deep Learning with PyTorch | *Eli Stevens, Thomas Viehmann, Luca Antiga***

Started learning PyTorch to be able to use the library for my Fire Progression side project. What better way to learn something than read books about it, right? The goal is to understand as much as possible to be able to write a deep neural net model from scratch. This is an intense book. Takes up a lot of mental energy. I have found myself reading, re-reading, and absorbing 1 page of this book for a couple hours. I am targeting up to 50 pages per week. This week I am short of the target by 15 pages. Next week is going to be super busy.

### **Practical Programming for Strength Training | *Mark Rippetoe and Andy Baker***

Now that I have started going to the gym, I thought I might as well get some cheap training from books to make those gym sessions more effective and avoid injuries. Though this book is aimed at training weight lifters, I am hoping some of that knowledge rubs off and helps me in my amateur fitness regime. Looking forward.

## **Fitness**

**Gym:** Spent around 3 and half hours on functional strength training at the gym. Mostly equipments for leg muscles and some free weights.

**Biking:** I set a personal record of 30 miles a week in the last 10 weeks. As the knee feels better and gets used to this kind of mileage on the bike, I'll start commuting again. Can't wait for the over 50 miles weeks to begin.

# Week 12, 2021

March 29, 2021

Categories: Weekly Notes

This was a tough week. I felt a general lack of motivation in all aspects of life. There was enormous mental friction in doing even the simplest of tasks like laundry. I am not sure why. But just the realization that there is a mental blockage reduced its potential and I was able to control some of it.

## Work

The week was all about troubleshooting with remote diagnostics, asset monitoring and product documentation. Also spent time on delivering performance and testing reports to customers. A week of less programming and statistical analysis and more client-facing work.

I am a huge electric vehicle nerd and thus my YouTube feed is full of EV news. Some EV range testers ran the Tesla Model 3, Mustang Mach-e, and the VW ID.4 beyond their 0% State of Charge. They found that the Tesla drove 22 miles after reaching 0% whereas the Mach-e only did 6 miles. I just thought that was super interesting. Battery pack manufacturers usually leave some room at the bottom SOC to protect the batteries. SOC estimation is an interesting problem. Some battery manufacturers map it to the cell voltage (since there is a linear relationship between the battery voltage and its SOC). I wonder what Tesla does.

## Side Project

Virtually met with one of the professors to resolve a problem with my Google Earth Engine code. Right now I am tasked at creating a pipeline to provide the right type of data to the neural network that is also currently in the works by another project mate. We got 180 fires and after a lot of pre-processing we are very close to exporting rasters (images) of the fires from Google Earth Engine.

## Books

A weird week with reading. I was jumping between reading about Weight Lifting, Deep Learning, and Philosophy.

### **Practical Programming for Strength Training | *Mark Rippetoe and Andy Baker***

I read only around 30 kindle pages of this book. One important concept that I grabbed is the distinction between a novice, intermediate, and advanced trainees and how their bodies respond to weight training. The book talks in depth about the Stress > Recovery > Adaptation cycle of each of these stages in a trainee's life. It gets a little boring most times.

### **Deep Learning with PyTorch | *Eli Stevens, Luca Antiga, and Thomas Viehman***

So far I am on page 113 of this 500 page PDF book. So far the book talked about Tensor object which is the fundamental tool in the PyTorch library. The book explains how the library uses storage on the CPU or GPU. It introduces the concepts of size, offsets, and stride. Also learned about PyTorch's interoperability with NumPy. This week's target was to get to 150. A lot of pages short.

### **Meditations | *Marcus Aurelius***

Just stared with this book. Barely 20 pages in. Nothing to share about it yet.

## Fitness

**Gym:** 4 days in the gym and spent just over 3 hours in strength training. Mostly leg workouts. I have been measuring my heart rate and I am steadily working on keeping the average heart rate during training as high as possible. Also, my gym is opening the swimming pool next week. Looking forward to some great cardio. I am hoping to spend more than 5 hours with strength training next week. Let's see how it goes.

**Bike:** I biked around 27 miles this week. A little short of last week's total miles. Hoping to maintain this mileage next week as well.

# Week 13, 2021

April 5, 2021

Categories: Weekly Notes

## Work

This week I learned that as a data analyst/scientist, it is better to be doubtful and right than be confident and wrong. It saves a lot of time of other teams/employees when you don't submit confident and wrong assignments forward. Performed some exploratory analysis along with asset monitoring and providing research support for writing business proposals. A busy week at work.

## Books

### **Practical Programming for Strength Training | *Mark Rippetoe and Andy Baker***

This book got really interesting and useful this week. I am at about 130 pages out of 400. After introduction to the human anatomy, chemistry in the muscles and hormonal changes that come with weight training, the authors dived into types of exercises to train with. They also talk about number of reps and sets and the time gap between them. Before reading this book, I was heavily reliant on training individual muscle groups using sophisticated equipments in the gym. Now I know that only a few exercises, like Bench Press, Deadlift, Chin ups, Pull ups, Squats, Power Clean, are sufficient to build proper functional strength. Only that I should increase the intensity of those exercises as I go along my training. Looking forward to more wonderful reading.

### **Deep Learning with PyTorch | *Eli Stevens, Luca Antiga, and Thomas Viehman***

This week I read about 20 pages of this book. I am at page 133. I am making very slow progress with this book. The target I set for each week was 50 pages and ideally I should have been at page 200 by now. Despite the slow progress, I learned wonderful things in the 20 pages that I read. My reading was mostly about preparing tensors for different types of data, from Images,

time series data, to text representation. I need some hands-on practice to cement all that knowledge.

## Fitness

**Gym:** Spent just over 3 and half hours in strength training at the gym. I introduced bench press in my workout routine. It felt very effective.

**Swim:** The gym that I go to opened the swimming pool for everyone. Luckily, there aren't many people swimming at any time of the day. At least for now. I went for a swim once. Given that it had been over two years since I last stepped in a swimming pool, I was really bad at swimming. I couldn't even cross one 25-yard lap without taking a break. This week I swam once. I have a steep learning curve ahead of me.

**Bike:** A terrible week for biking. I barely touched 10 miles. And all the biking I did in this week was to and from the gym. With this abysmal performance, I have broken a wonderful biking streak. I better make the next week record breaking to make a great comeback.

# Week 14, 2021

April 12, 2021

Categories: Weekly Notes

## Work

Sunverge is slowly and safely opening its SF office to employees. This week I went into the office first 3 days of the week. I ended up getting more work done but also more tired at the end of the day than when I am working from home. I guess I got used to working from home. I hope I adapt fast to working from office everyday. Spent some time of the week helping the customer support team with troubleshooting. Other time I was either working with the sales staff with proposals or revisiting already signed customer deliverables.

## Books

### **Practical Programming for Strength Training | *Mark Rippetoe and Andy Baker***

At page 154 out of 400 pages. Didn't get to read as much this week. Just over an hour of reading split between 2 weekdays. The book is now going deeper into each of the training phases. I am reading about novice trainees. I belong to this category. It feels wonderful to read about stuff and go to the gym and execute on it.

### **Deep Learning with PyTorch | *Eli Stevens, Luca Antiga, and Thomas Viehman***

At page 162 out of 500 pages. Read only about 30 pages of this book. Based on my 50 pages/week target, I should have been at page 250. 90 pages short of target meaning 2 weeks behind schedule. Anyway, the book is getting interesting and intense at the same time. The last 30 pages I read talked about splitting the data into training and validation sets. It also introduced deep learning related jargons like Epochs, Hyper-parameters, Parameters, Optimizers, Learning rate etc. The book is structured such that it starts with assuming that the reader has only the basic understanding of algebra and then builds everything on top of it. I absolutely love that structure. I am sure I'll have to revisit these chapters to practice so that

I can actually use it to solve problems but for now it is beautifully building my knowledge of deep learning and PyTorch's place in it.

## Fitness

The week was not ideal fitness-wise. If only I had more than 24 hours in a day to hit all my targets.

**Gym:** This week I got a chance to only spend one session each for lower and upper body. Thanks to the exercises, routines, and techniques taught in the book that I am reading that my body was able to maximize the effects from each workout session.

**Swimming:** I went for a swim just once this week. However, I spent a lot more time in the pool as compared to last week. And when I say more time, I don't mean waiting at the end of the pool length for rest. I swam a total distance of 350 yards which is 0.3km or 0.2 miles. It is shamefully low. But given that I am a beginner in the pool area, I'll let it slide.

**Bike:** I am definitely not a beginner on the bike track but I only rode 8 miles on my beautiful road bike. That's just hurtful performance. Hope the next week is much better than the last 2 weeks.

# Week 15, 2021

April 20, 2021

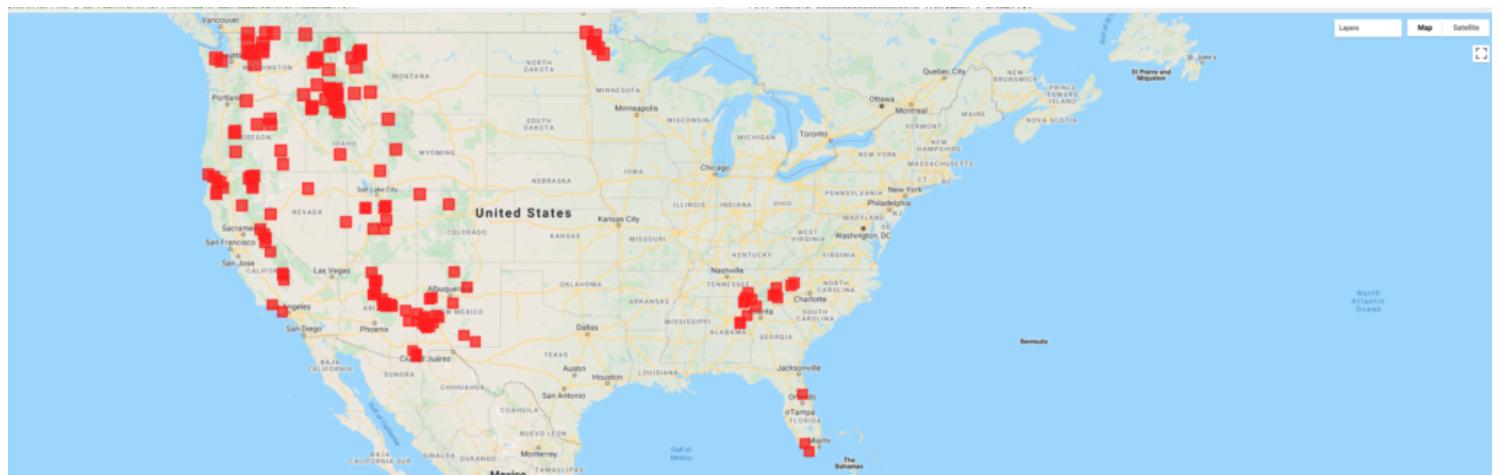
Categories: Weekly Notes

## Work

A wonderful week at work. I started working on a Demand Response project. The US electric utilities use OpenADR protocol for Demand Response. Any company offering grid services must follow the OpenADR standard. Getting good hands-on experience with it. I have learned a lot this week which I can't share here. I also spent some time networking with people outside the company. Attended the Clean Energy Leadership Institute's (CELI) webinar and got a chance to hear some cool people talk.

## Side Project

Got a chance this week to work on the *Fire Progression Prediction* project. I am still working on creating a pipeline for the fire data. At this point, we have around 183 unique fires in the United States over the last 10 years. The figure below shows the location of each of the fires. You might notice that each fire is a box. That box is part of the pre-processing. To feed data into the Neural Network, each input must be standardized. Each box in our project has the same size such that even the largest fire is contained within that box. Given that I am new to Google Earth Engine, this was a tough task to do but Professors at USF helped immensely. Next week hoping to finish the pre-processing completely and move on to working on the Neural Network.



## Books

**Practical Programming for Strength Training** | *Mark Rippetoe and Andy Baker*

I am on Page 203 out of 400. The book is now diving deep into each of the trainee groups. I finished with Novice training and now I am reading about training methods for overweight trainees. It is not super interesting at this point given that it is becoming irrelevant to me. But I'll push through it and hopefully learn some other stuff as well.

**Deep Learning with PyTorch** | *Eli Stevens, Luca Antiga, and Thomas Viehman*

I am on page 192 out of 500. I wish I could have read more but laziness gets in the way. I am working on increasing mental endurance but that might take a while. Anyway, I am thoroughly enjoying the book.

## Fitness

**Gym:** I started off the week with utmost commitment. Went for functional strength training at the gym. Using the techniques I learned in the book, I have now designed a workout routine in the gym. However, my knee gave up on Wednesday. That sucked. Mentally, I am always there. I am at the gym following my routine, focussing on my technique etc. but this week I realized I still have considerable physical limitations. I just need more patience to get through this.

**Swimming:** I dived into the pool once this week. I swam for about 400 yards. It's not much but It's the longest I have swum in the last 1 year. So I'll register that as a win.

**Biking:** Rode just over 25 miles this week. Not good by any means but a decent comeback from the last 2 bad performing weeks.

# Week 16, 2021

April 26, 2021

Categories: Weekly Notes

## Work

Work was decent this week. Nothing creative. I provided some data analysis to make/change certain decisions for our software. One good thing was that I am getting involved in software project management. It is new to me and I'm excited to learn all about it. Looking forward to a productive and creative next week.

## Books

**Practical Programming for Strength Training** | *Mark Rippetoe and Andy Baker*

Making super slow progress with this book. On Page 220 out of 400. This week the book talked about the Texas Method where you start the week with high intensity weight lifting, the next session is high volume with slightly lower intensity, and the last workout session of the week is low intensity and low volume. Good technique to know. I have also heard Joe Rogan talk about the Texas method on his podcast. Would love to try it out. I just wish I would have read a lot more of this book.

**Deep Learning with PyTorch** | *Eli Stevens, Luca Antiga, and Thomas Viehman*

I read only a few pages of this book this week. This week was busy with work and side projects that were mentally taxing and this book just would have been too much mental work.

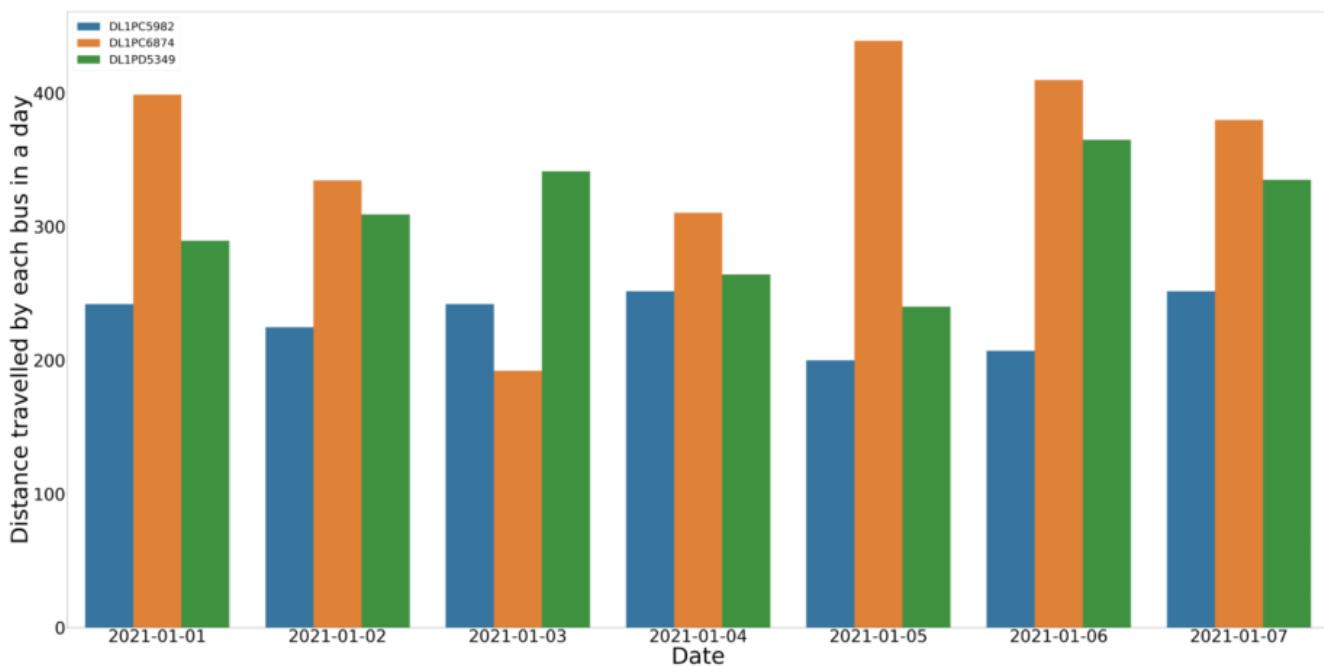
## Fitness

3 sessions in the gym this week. Nothing interesting to share. Muscle and body building is a mind-numbingly slow process. Strength training is going to be a long game. Biking performance was poor. Barely touched 8 miles. I'll start biking to work next week. That will improve my biking game. I didn't go swimming this week.

## Miscellaneous

The reason for my poor fitness performance this week was that I got the COVID vaccine shot. The arm was sore and heavy for over 36 hours and hence couldn't go swimming or biking on my scheduled days.

Also, I had a technical assessment from Council on Energy, Environment, and Water. I applied for an intern position in their Sustainable Mobility team. They gave me a huge dataset of buses running in and around Delhi and a few questions to answer. It was challenging but I really enjoyed the assessment. Here's a screenshot of one of the graphs that they asked me to plot. It shows the distance travelled each day by 3 randomly selected buses. The Orange bus is traveling a lot more distance than the Blue or Green one. Hence Orange would probably be the last bus to go electric.



# Week 17, 2021

May 3, 2021

Categories: Weekly Notes

## Work

This week was off to a great start. I was given a documentation assignment. While completing the assignment, I learned all I can about a Smart Home management protocol called Echonet Lite. It was fun to read about it. Got involved in a couple more interesting projects in the company.

## Books

**Practical Programming for Strength Training | *Mark Rippetoe and Andy Baker***

I finished this book over this week. Read close to 200 pages. The book mostly talks about different training methods adopted by different trainers all over the world in the last century. These include the Texas Method, Dynamic Effort Method, The Split Routine among others. I don't know which one I'll end up adopting in my training routine. I like the Texas method the best so far. Splitting the week between 3 training days. One day is high intensity day, next is high volume day, and the last is light day with low volume and low intensity. I'll use this technique for the next few months.

**Deep Learning with PyTorch | *Eli Stevens, Luca Antiga, and Thomas Viehman***

Read around 20 pages of this book. The book is now walking me through image classification using deep learning. Interesting stuff.

## Fitness

**Gym:** Thanks to the strength training book that I am reading, I started logging my training. Weights, sets, and repetitions etc. Now I eagerly look forward to my training days. I missed one workout day this week.

Week 1

04/25/21

	Squats	Press	D.L.	Leg Press	Pushups
Sunday (4/25)	Warmup	EX2x10 BX1x10	BX3x10	EBX1x10 10x1x10	
	Work	20x1x5 40x1x5 50x2x5	EBX2x5 10x2x5 20x1x1	SDx1x5 100x2x5	
Friday (4/30)	Squats	Inclined Press	Bench Press	SL Press	Chin Assists
	Warmup	EX3x10 EBX3x10	EBx1x10 10x2x8	EX3x10 10x3x10	70x1x10 70x1x8
Work	10x3x10 20x2x10	20x3x8 30x3x5	20x2x8 30x3x5 40x3x5		10x1x6 60x2x5

### Training Logs Week 1 (Week 17 of the year)

**Biking:** A splendid week for biking. I have set a personal record of over 30 miles during the week in the last 7 months. The injury was an impediment to biking for so long. The great Roman emperor *Marcus Aurelius* said "*What stands in the way, becomes the way*". Biking is now an integral part of my life. When I rode back from work on Thursday, the shattered window glasses on the streets of San Francisco cause a flat tire. Without that, I could have crosses 50 miles this week. This time I bought a tube to replace if it happens again. Always learning something new.

**Swimming:** No swimming this week.

# Week 18, 2021

May 16, 2021

Categories: Weekly Notes

Came down with the flu this week. Couldn't get a lot of work/reading/exercise done. I don't know why I am even writing this blog with nothing to show for the week.

*Be-dili kya yunhi din guzar jayenge  
Sirf zinda rahe hum to mar jaenge*

Jaun Eliya

Apart from the unproductive week, I have two major news to share. I have been selected for the Research intern position at **Council on Energy, Environment, and Water** which is going to be remote. And I am starting my **Machine Learning Bootcamp** at FourthBrain next week. I fear that I might have taken up too much work but I am more afraid to let go of these amazing opportunities coming my way. Also, I believe that each of these tasks will enhance the other and I might even succeed with flying colors. I'll be going into work full time starting May 15th, 2021, so I don't have to worry about these side projects affecting my full-time job. I can leave work at work.

I am also taking inspiration from Elon Musk. If he can run 2 multi-billion dollar companies simultaneously, I should be able to handle couple projects. I just hope that I give my best to each of these tasks for the next 3-4 months. I am sure meditation is going to help me in a big way. I will try to make it a habit to meditate everyday to help me get through the busy weeks ahead.

# Week 19, 2021

May 20, 2021

Categories: Weekly Notes



## Work

Worked with OpenADR implementation and the problems associated with it. Worked with QA engineers to recreate and solve some of these problems. A lot of collaboration this week. I enjoyed it. Also, we commissioned a new client, so fulfilling all data requests and building dashboards on Tableau to view day-to-day operations. These dashboards also help us troubleshoot in near real time. Attending meetings with the client to answer their questions and note their concerns. A fun week work. Now that most of our employees are coming to office, a lot of interesting conversations keep me entertained throughout the work day.



## Machine Learning Bootcamp

Began this bootcamp with a 6 hour live online session on Saturday. Many interesting people are part of this bootcamp. Learning/coding together is a lot more engaging and rewarding. I missed that. We have started out the course with univariate and multivariate regressions. Mostly working on COVID-19 data around the world. The new thing I learned this week was Variance Inflation Factor (VIF) that is used to find co-linearity between features. Cool stuff. Check this out: <https://github.com/unmeshmali25/COVID19-Prediction-Chicago-Hands-on-Regression>



## CEEW – Sustainable Mobility Research Assistant

Just went through the HR induction. Also got an overview of some of the projects that CEEW is working on. Will talk about them in the following weeks.

## **Books**

I haven't been able to read anything this week. One of the sacrifices that I am making for career growth. There's just isn't enough time or energy. Once I settle into these jobs, I might be able to read.

## **Fitness**

**Gym:** Haven't been to the gym in last 2 weeks. I feel horrible.

**Biking:** 23 miles on the bike this week. Thanks to commuting to work.

# Week 20, 2021

May 25, 2021

Categories: Weekly Notes



## Work

Work was slow this week. I worked on and finished only one analytical project. Rest of the tasks were reading, working with others with troubleshooting, and brainstorming a control logic to minimize green house gas emissions for a group of houses. I wish I was doing more analytically technical tasks but it is what it is.



## Machine Learning Bootcamp

This bootcamp got very busy super fast. Currently studying linear regression with all its nuances. Uni-variate regression, multi-variate regression, using gradient descent to converge a model. Also completed 3 projects in the last week. Covid-19 infections predictions for Chicago, Covid-19 international cases and tests analysis and prediction, housing prices prediction using gradient descent. Here's the link to my Github profile where I have uploaded the projects. <https://github.com/unmeshmali25>



## CEEW – Sustainable Mobility Research Assistant

I started helping out CEEW with a hackathon type competition. The project is to make rapid assessment of bus stops in terms of accessibility and safety. So, looking at things like private cars parked in front of the bus stop, benches to sit on, curbs around the bus stop, lights etc. The project is on a very tight schedule. We have just over a month to deliver on this project. I started working on collecting data. Chasing 2 options right now. 1) Get locations of all the bus stops in an Indian city and programmatically download Google Street View Images at those locations. 2) Use web scrapping to download images that show up in google image search after typing in "bus

stops in India" keyword. I have executed on the latter option. Next week, we'll have to focus on using pre-trained models to run on our test images. Given that we don't have a lot of time, going with pre-trained neural network models is our best bet.

## Books

Couldn't read anything this week 😞

## Fitness

**Gym:** Went to 3 weight lifting sessions in this week. Since I missed last 2 weeks of weight lifting because of the flu and the second Pfizer shot, I realized I had regressed a lot in weight lifting. It is going to take committed couple weeks to get that strength back.

**Biking:** I rode to work 2 times this week so I registered decent miles-just over 30 miles. However, one day while returning from work, San Francisco was experiencing unprecedented wind speeds of over 35 miles/hour. Also, on my way back home from work, I have to ride through a considerable elevation gain. So on that high wind day, I decided to put my bike on the bus and get back home. It was a good decision.



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News // Bay Area & State

## Winds howl across SF Bay Area: When will they stop?



Amy Graff, SFGATE

May 19, 2021 | Updated: May 19, 2021 9:21 p.m.



# Week 21, 2021

June 1, 2021

Categories: Weekly Notes



## Work

I spent around 40% of the time in troubleshooting a bug in production. Another 30% in project management for the new contract. The remaining time was spent in creating database metrics mapping to clients internal measurement points. This task was challenging in that it required me to look at tiny details and make my way through incomplete and incoherent documents. No analytics or optimization at all this week.



## Machine Learning Bootcamp

This week I learned and applied concepts of Support Vector Machines for an image recognition project. Another project was to perform Credit Assessment for a bank to predict how likely a candidate is to receive loan from the bank.

The image recognition problem introduced me to the concept of Principal Component Analysis for feature selection and making pipelines to pre-process data. We also used GridSearchCV to find the best possible combinations of hyper-parameters like Gamma, C etc.

And the Bank Credit Assessment had over 35 features including age, education, sex, duration, balance, etc. There were a lot of features and we used Pearson Correlation, and P-value to get rid of highly correlated features. p-value kept 17 features out of 37. Then we introduced Lasso Regressor which brought down the features to 2. And then Random Forest Classifier algorithm from sklearn package did the rest.



## CEEW – Sustainable Mobility Research Assistant

We decided to go with Object Detection pre-trained model to rank the bus stops based on accessibility and security. The YOLO model (You Only Look Once) from Tensorflow supposedly works best however, recent upgrades to other

dependent packages like numpy and Keras have rendered the model unworkable. I felt frustration after upgrading and downgrading many packages but I still failed. I tried to find other pre-trained models but I was advised against it by the project lead. I hope the following week brings great news.

## Books

No reading at all this week 😞

## Fitness

**Biking:** Decent miles covered this week. I approached close to 30 miles. Thanks to commute once again.

**Gym:** I went to the gym only once this week. I feel horrible. I lack the discipline to make each hour count every single day. I had a lot of time to squeeze in a workout but I didn't go. I found excuses like I went to the gym yesterday, or I biked 15 miles yesterday, or the left knee needs some rest. I wish to conquer these mind games. I hope I do. At least for the next week.

# Week 22, 2021

June 13, 2021

Categories: Weekly Notes

*Those who do not know how to fight worry  
die young*

Dale Carnegie



I was focused on two things at work this week. First, problem-solving – triaging bugs, recreating them in demo environments, and passing onto software developers to fix those bugs in production. Second, I am supporting sales team of the company. We recently signed one of our biggest projects in terms of number of battery systems installed. The plan is to now use this approved project as a fulcrum to land more projects from utilities in the US and beyond. It's a new area for me. It's interesting.



## Machine Learning Bootcamp

**Tesla Car Sales Prediction:** The task was to use sales data for Quarter 1 and 2 from Tesla, and predict the sales of the given models for the next 2 quarters. We had data for 2019. We trained the model on Q1 and Q2 sales, and tested the model on Q3 and Q4. This was a test to compare different regression models. We tried Gradient Descent, Normal Equations, Generalized Linear Models (non-linear regression), and Random Forest Regression. We compared the results based on RMSE and R2 scores. Random Forest Regressor with 100 estimators gave us the best results out of all.

**Walmart Labs Funnel Analysis** – The task was to classify purchasing customers vs non-purchasing customers on their e-commerce store. Given were 15 features which included number of sessions, number of carts, max price of cart, time of day, day of week etc. After some pre-processing, like one-hot encoding all the categorical features, we dropped features with high correlation. We tried feature selection with p-value as well. We then used Random Forest to get feature rails/importances for each feature. Afterwards we ran the processed data through multiple classification algorithms – logistic regression, SVM, Neural networks etc. The comparison of each of these models using the **confusion matrix** was really cool. Using metrics like Accuracy, Precision, Recall, F1-score gave us a complete picture of the performance of the models.



## CEEW – Sustainable Mobility Research Assistant

This week at CEEW, we reached a milestone in trying to build a Rapid Bus Shelter Assessment model. The code we have built so far – segments objects from an image – people, bus, car, animals, motorcycles etc. This is actually done by the pre-trained YOLO model. Much thanks to Tensorflow and whoever trained the model. Our code now takes this segmented image and applied certain “rules” to classify the image as Accessible/Inaccessible or Safe/Unsafe. The results are pretty cool given that we have less than 2 weeks to finish this.

**Dashboard** : The next task for this project is building a web app for this service. I am using Dash/Plotly packages from Python to achieve this. Let's see how this implementation goes.

## Books

No reading at all this week 😕

## Fitness

**Biking:** Decent miles covered this week. I approached close to 30 miles. Thanks to commuting.

**Gym:** I went to the gym only once this week. I feel horrible. Same as last week.

# Week 24, 2021

June 21, 2021

Categories: Weekly Notes

*The punches you miss are the ones that wear you out.*

Boxing trainer Angelo Dundee

I quit the Fire Progression Prediction project this week ! I wasn't making any progress on that project. The last update I have on the project is from Week 16. I was carrying that burden in my head without any action on it. It became an energy sink. Quitting that project meant letting go of a lot of future possibilities, burning bridges with professors, etc. It was a hard decision to make. But now that I have done it, it is time to focus my energy on the task at hand. Enough time to cry at night eh?



## Work

Work has been slow. Given that we are a small startup with a skeleton crew, any and every problem that arises affects the development of more advanced features in the product. This week and the last, I spent majority of my time understanding the different problems we are facing in our product and then communicating those problems with other teams in the company. My boss is really good at troubleshooting. The other day we spent 4 hours on a google meets call to discuss a problem that one of our clients had raised. What makes him good at troubleshooting is his stubbornness with the problem. He falls in love with the problem and is not satisfied until he has exhausted all his options of understanding the problem. And even after that, he'll discuss it with me or someone else for perspectives to address the gaps in his understanding of the problem. It is a pleasure watching him troubleshoot.



## Machine Learning Bootcamp

This bootcamp is packed with information. I missed blogging last week. 2 weeks of content in this bootcamp was more machine learning than I have learned till now. Having said that, I am really enjoying studying machine learning. We finished 4 assignments in the last 2 weeks. I won't list and describe them here. I'll just leave my GitHub link here :

<https://github.com/unmeshmali25?tab=overview&from=2021-06-01&to=2021-06-21>

I am also enjoying the community that we have built at the Bootcamp. People from all over the world speaking to and working with each other.

One thing I want to take time to learn is eloquence. Communicating technical or non-technical concepts or ideas to others is an art that is essential in life. I will try to search for tools and opportunities including my full-time job to improve my communication skills.



## CEEW – Sustainable Mobility Research Assistant

There was a certain amount of goal shifting that happened at the internship in the last 2 weeks. At this point, we have a pre-trained model, which we use to apply certain rules and generate a set of labels for every image. The tricky part now is the dashboard. I have used Dash in the past to host web apps. The visualization was using plotly. But now that I have spent some time on it again, I have realized that very small amount of knowledge and experience is transferred to solve this new problem. The deadline is end of next week. I just hope I get to spend more time to figure out this problem.

## Books

### Genentech: The Beginnings of Biotech | Sally Smith Hughes

One advantage of quitting the Fire Progression project was that I picked up this book. Very soon I will be completing 4 years in San Francisco. Apart from being a fantastic tourist destination, boasting a staggering amount of wealth, and enjoying one of the most pleasant climates around the world, San Francisco is also the hub of biotechnology in the world. The main reason for that is a company called Genentech. This was the first company that developed Insulin and commercialized it. Saving numerous lives.

I am on page 30 of this book and I have learned that the 2 co-founders were from Standford University and University of California in San Francisco. I have been to UCSF more than once but never knew why it was so rich. Now I know. More interesting reading to follow.

## Fitness

**Gym:** Gym was decent in the last 2 weeks. I was going in regularly. When I say regularly, I mean 2-3 times a week. Ideally, I want to hit the gym at least 4 times, with at least one Yoga session for flexibility.

**Biking:** Closing in on 30 miles per week average. I am commuting to work twice a week. Planning to step it up to 3 times now. If that happens, I will average 40-50 miles every week. That would be ideal.

# Week 29, 2021

July 26, 2021

Categories: Weekly Notes

"But man is not made for defeat," he said. "A man can be destroyed but not defeated."

– Ernest Hemingway

The last three to four weeks have been defeating. Sorry to start this blog on a sad note but it's true. I have bitten off more than I can chew but I have to finish all the things that I have started.



## Work

Sunverge opened its office a while ago. I have to go into the office everyday and I choose to bike to work. The commute is 15 miles round trip. It's a lot of fun to bike to work but I am too tired at the end of the day for any productive hours. A lot of interesting things happening at work most of which I obviously can't share here. One thing I can talk about is that we hired another employee to help with business side of things. Last week I was tasked with helping him through everything. It was a new experience for me.



## Machine Learning Bootcamp

There's a blast of information coming at me faster than I can absorb it all. It is overwhelming and unsatisfying. Don't get me wrong, I am thrilled to be learning all ML/AI stuff and getting hands on experience with it but I just wish I had more time to sit with it and enjoy. I am playing catchup with all the modules and assignments. I submitted the mid-term exam today and I feel

like I couldn't have done worse on the test.

One good news is that we have started out Capstone project on a good note. It's a partner project meaning that I have teamed up with a guy from Rome, Italy to work on the project. We have picked an industry-sponsored project of Financial Fraud detection from Ibotta. For ethical reasons, we are using another old anonymized dataset to build and deploy our model. The partner project is a good practice in collaboration and communication.



## CEEW – Sustainable Mobility Research Assistant

Till yesterday, I thought I made good progress and came very close to finishing the CEEW project but the web app completely broke as I was deploying it in production. This is how the dashboard is supposed to look like. It works fine on my local system but I came across a host of problems while deploying it on Heroku. I spent 7-hours on Saturday trying to debug this issue after a 6-hour long live bootcamp session. But I failed.

### CEEW - Rapid Bus Shelter Assessment

Upload file/files for assessment of safety and accessibility

Drag and drop or click to select a file to upload.

Names of bus shelters uploaded (Click on image link to download)

- IMG-7855.JPG
- animals1.jpeg
- animals4.jpeg
- IMG\_8419.JPG
- animals2.jpeg
- animals3.jpeg

Press to generate labels

Summary Table

	Label	Count
Unsafe Bus Shelters		4
Safe Bus Shelters		2
Accessible Bus Shelters		6
Inaccessible Bus Shelters		0

Bus Shelter Name	Safety Label	Accessibility Label
animals4.jpeg	Unsafe	Accessible
IMG-7855.JPG	Safe	Accessible
IMG_8419.JPG	Safe	Accessible
animals3.jpeg	Unsafe	Accessible
animals1.jpeg	Unsafe	Accessible
animals2.jpeg	Unsafe	Accessible

## Books

Genentech: The Beginnings of Biotech | Sally Smith Hughes

I barely read 10-30 pages of this book in the last 3-4 weeks.

## **Fitness**

I haven't been focusing much on fitness and that includes nutrition. All the things I am involved in leave me tired and after that I don't want to go to the gym and struggle or restrict unhealthy eating habits. It's obviously affecting my health. I have been convincing myself that age is on my side and these bad eating habits (or lack of weight lifting) will not punish me in the short run. I know I am wrong in assuming so. I hope that I am able to focus more on fitness next week.

# Week 31, 2021

August 9, 2021

Categories: Weekly Notes



## Work

The last two weeks have been productive at work. Just usual stuff. Putting out fires, making progress with ongoing projects and sprints, asset monitoring and management, and closely working with customers to answer questions with data and solve their issues if any. I have learned to be flexible at this company and I am not overly concerned about what I do day to day.



## Machine Learning Bootcamp

Decent week at the Bootcamp. In the last 2 weeks, we focussed on GAN models – Generative Adversarial Networks and Time series and Sequence modeling. One application of cycleGAN that we explored in our live session assignment is Uber's use of the model to generate nighttime and extreme weather event images to train their autonomous driving models. In Sequence modeling, we explored RNN modes to predict outcomes of online browsing sessions for Cosmetics company. Pretty cool stuff –

[https://github.com/unmeshmali25/Sequence-Modelling-Cosmetics-Dataset/blob/main/Sequence\\_Learning\\_on\\_Cosmetics\\_Data\\_4B\\_v1\\_Unmesh.ipynb](https://github.com/unmeshmali25/Sequence-Modelling-Cosmetics-Dataset/blob/main/Sequence_Learning_on_Cosmetics_Data_4B_v1_Unmesh.ipynb)



## CEEW – Sustainable Mobility Research Assistant

I managed to solve the deployment problem with the web app to rank bus shelters in India using Computer Vision. The problem of deployment failure with `PythonAnywhere`, `DigitalOcean`, and `AWS ElasticBeanstalk` was memory limit. The virtual environment containing the web app, required dependencies, and the trained ML model sat at `1.4GB` of space. Each of the above mentioned FREE third party hosting services allow for not more than `512MB`. And, `Heroku` no longer supports `Python-3.7.6` which is required (strictly) to run the `ImageAI` python package. That sucked.

The solution I came up with is more of a hack than a scalable solution. I deployed the model on my local machine as a `WSGI server` using the `gunicorn` python package and exposed my IP address over the internet using secure HTTPS URL. I used a third party tunneling service called `gw.run`. The last remaining task in this project is to transfer the app, model, and dependencies to a windows computer of my project supervisor. He has a good GPU on his laptop and we might be able to speed up the processing. Right now, our model takes about 5 seconds to process 1 image. I assume the city of Delhi has around 2000 bus shelters or more. That's 3 hours to rank all the bus shelters in Delhi. Now Imagine that the state or central government install cameras on each of these bus shelters, those cameras will be feeding video and images of bus shelters all day long. With that kind of infrastructure, our model would be very inefficient.

After completion of the project last week, I expressed my enthusiasm to work on other ongoing projects at CEEW and they sent me a list of projects to choose from. Next week, I will spend some time on preliminary research to choose a project. `Enabling multi-modal freight logistics in India` sounds like an awesome project. Another interesting project is `Addressing fuel tax revenue loss with high EV penetration`. Exciting times ahead with CEEW.

## Books

**Genentech: The Beginnings of Biotech | Sally Smith Hughes**

I finished this book over the weekend. What an amazing experience it was to live the story of Genentech and the rest of the Biotech industry. I vaguely remembered studying biology in school but I never understood what Biotech meant. Hell, I didn't even know that it is a scientific field that one could actually pursue outside academics. Thanks to the book, that perception has changed. I still have plethora of questions about the science and its production scaling but at least I have a rough mental model to put the right questions in the right place.

Genentech was the first company (or a R&D facility) sponsored by large private pharmaceutical corporations to synthesize genes (think DNA) that if inserted into the right bacteria enables the bacteria to produce proteins (think Hormones) that can be used by humans. Insulin and Human Growth

Hormones were the breakthrough products of Genetech that made the founders – Ron Swanson and Herbert Boyer et.al. rich beyond their wildest expectations. One amazing personal connection – During the research and development of Human Growth Hormone – Genetech recruited a scientist from UCSF. That scientist had to steal (or take what was his- long story) a DNA sample from UCSF by walking into the UCSF lab at mid night. A decade later, lawsuits against UCSF (along with this little maneuver) cost Genetech \$150 million in fines to UCSF and \$50 million dollars towards a R&D building at UCSF's mission bay campus in San Francisco. This building is right across the street from where I have been going for Physiotherapy for close to a year now !!!

## Fitness

Really bad weeks for fitness 😞 Been to the gym maybe only 3 times. I have been biking, playing Frisbee and Volleyball though. Need to concentrate more on fitness going forward.

# Week 33, 2021

August 23, 2021

Categories: Weekly Notes



## Work

This was a slow week at Sunverge Energy. I was working from home on Wednesday and Friday. Well, not exactly home. I was in San Rafael supporting a medical treatment of my roommate. Working from San Rafael was a pleasant experience. I got to take calls and do work from the clinic's waiting room half the time and from a Starbucks for the other half. Latte, Almond croissant, and data analysis.

For the next week, I need to complete a task related to openADR. And I am also going to make a case to my boss to allow me to contribute to software development. The probability of me getting to work with software development is low but it is worth a try.



## Machine Learning Bootcamp

The week was all about deploying ML models. We deployed ML models on AWS Elastic Beanstalk using the CLI. There were multiple assignments on PySpark, Dash which I thought were pretty cool. All about parallel computation. We signed up for the community edition of Databricks which allowed the use of 1 cluster. Databricks is a one-stop shop for all data needs. We used it individually which defeats the purpose since it allows for collaboration.

**About the capstone project:** Me and Tiziano have completed the model testing and tuning phase. If you don't know, we are trying to identify fraudulent activity from a bank's transaction database. We researched our way into using **Unsupervised Anomaly Detection**. The challenge with anomaly detection is that you cannot measure the performance of the model. There are no metrics. I see it more of a helper function. It can give you a lot interesting pattern in your data but then you have to meet the model in the middle and take the investigation further. That's exactly what we are thinking of doing now – just identify *interesting* patterns in the data and investigate further with a

different model. My task for the next week is to complete the flask app and deploy it on AWS EB. Looking forward.



## CEEW – Sustainable Mobility Research Assistant

Great news to share – I got a 3-months extension on my internship. I did a decent job with the last assignment that I got. I don't have the next project yet. Abhinav (my manager at CEEW) gave me a list of project to do which I listed in the last blog (Week 31) but I found out later that they are all policy projects. I am thinking a lot of internet research and document writing with these projects which I am not looking forward to. I think I am going to skip on all of those and find a project with data analysis or machine learning. Fingers crossed. Let's see how this internship shapes my career going forward.

## Books

**Ghost in the Wires: My Adventures as the World's Most Wanted Hacker | Kevin Mitnick**

I started this book last week. I took a sudden interest in cybersecurity after I deployed the CEEW app on my local machine and exposed it over the internet. My friend – Aditya who is completing his PhD in AI and cybersecurity advised me against exposing my local machine. But I did it anyway. After that, I thought it'll be cool to find out what could have gone wrong with my little experiment. Hence my sudden interest in cybersecurity. This book is the autobiography of *Kevin Mitnick* who is a renowned hacker turned cybersecurity consultant. So far it is full of cunning tactics to hack telephone lines (1970s :P). It is clear that he is addicted to hacking and finds very difficult to stay away from the adventure. Harder the hacking the more he gets kick out of it once he solves it. What I am learning from the book is Kevin's social engineering skills and his tenacity with a problem. I hope these skills rub off on me minus the hacking addiction.

## Fitness

**Bike:** I got decent miles on my bike this week. Well, not my bike but Sarvesh's. My bike had a flat tire which I didn't have time to fix during the work week. I got the bike fixed on Friday evening (yeah this is what on do on Friday nights lol) and I also got a spare tube so I can fix the next flat at home. San Francisco is getting worse in terms of shattered glass pieces on bike tracks and even footpaths.

**Gym:** I didn't lift a lot of weights last week. Perhaps 2 times in the gym with very light workouts. That is disappointing. I need to put in more hours and more pounds if I need my knee to heal early.

**Sports:** The reason for lack of weight lifting is sports. I played Gully-cricket on Saturday for over 2 hours and I played Volleyball for over 2 hours on Sunday. Group sports is a lot of fun. But it would be wise for me to lift weights first and play in the remaining time and with leftover energy.

# Week 47, 2021

December 1, 2021

Categories: Weekly Notes

*I hate writing, I love having written*

– Dorothy Parker

I am writing a weekly blog after a very long break. 14 weeks long. Many things happened and this blog would be paraphrasing the last 14 weeks.

## Work:

Work has been moving slow. Since September, we have had 2 software releases of our product. I have been involved in developing algorithms for some of the features. One example is an algorithm for operating a group of battery systems (with or without solar) as a virtual power plant through openADR. I can't be transparent about the rest of the work on this blog. My work mostly involves identifying and fixing bugs using data, communicating results with clients or answering their questions and concerns with eloquent visualizations.

## Side Hustles:

I graduated from the Machine Learning Bootcamp at FourthBrain. Me and Tiziano got awarded the best capstone project award (we developed and deployed a web app for the use of the fraud investigations team at Ibotta to identify and bar fraudulent accounts from their app). The bootcamp covered everything under the umbrella of Machine Learning and Artificial Intelligence. Thanks to it, I now have a clear insight on the technical feasibility of machine learning models and where we cannot stretch ML models too far. From my

experience so far in the energy industry, the only area I believe sophisticated ML can provide a good value proposition is in energy trading. For the majority of the applications that drive value, a simple arithmetic formula can do the job and any subsequently complicated ML models are past the point of diminishing returns. Even outside the energy industry, it's not as good as it seems. Most of the financial industry uses very basic ML like linear regression which is nothing but  $y = mx + c$ .

The places where ML and AI really practically shine today have no positive impact on humankind according to me. To give you an example, Facebook (now Meta) uses ML for attention harvesting to sell more ads. Google does the same. These companies have taken this technology too far. Fire was a great technology when invented. You can use fire either to cook your food or burn down your house. ML and AI applications are approaching the burning down phase.

My other side hustle with CEEW didn't progress fast in the past 3 months. We completed the Bus Shelter Assessment web app and presented it in the competition. The organization was placed 5th nationally. The person who I was reporting to is leaving CEEW soon and hence we haven't been able to start a new project. I am staying put for now. If any interesting project comes up, I'll resume working there. If not, I'll look to volunteer or intern with another Indian company. My goal is to spend 2-6 hours a week growing my professional network in India and hopefully make a good name for myself while helping companies achieve what they want. "Doing well by doing good"

## Books

These past 14 weeks were great for reading. I finished the following books

*Ghost in the Wires: My Adventures as the World's Most Wanted Hacker* | *Kevin Mitnick*

*Internet of Money* | *Andreas Antonopoulos*

*The psychology of Money* | *Morgan Housel*

*The Innovator's Hypothesis- How cheap experiments are worth more than good ideas* | *Michael Shrage*

I am currently reading the biography of Benjamin Franklin written by Walter Isaacson. I am 10% in and thoroughly enjoying the book. I hope some of his characteristics rub off on me and help me rise above myself.

## Fitness

My focus on exercising was dwindling until this month. Thanks to my apple watch, I have been recording each of my workouts. I looked at the data and realized I am falling behind in all aspects – Cycling, Strength training, Yoga. That accountability gave me some motivation and I have been able to pick up exercising – mostly cycling. This week was Thanksgiving break. Me and 2 other friends took advantage of the holidays and biked over 50 miles on the mountains in the North bay. We started from my place and came back from the Pantol car park which is just 2 miles short of the peak of Mt. Tamalpais. I was supremely exhausted but I had 2 days to recover from it. That bike ride gave a boost of self confidence to get over the laziness mentality. I hope only sky's the limit for fitness for the months to follow.

# Week 1437/4000

April 11, 2022

Categories: Weekly Notes

Changing the format of the title for these weekly blogs. I came across an article written by the author of “Four Thousand Weeks : Time Management for Mortals” and the author talks about looking at your life as a series of 4000 weeks. This perspective makes me realize that life has an expiry date and all life decisions must be viewed through this lens. I thought it was a powerful thought experiment and I’ll try to inculcate this thinking.

## Work



I started working at Rivian as an Algorithms Engineer in their energy and charging team. Now, I have moved from creating algorithms for stationary battery storage solutions to stationary + mobile battery storage solutions. If you think about it, at Sunverge I was writing code to optimize a battery with 13-15 kWh of energy capacity. At Rivian, along with a similar stationary battery size, I get to optimize a 135 kWh of battery capacity through the electric vehicle.

Another way to look at this is – an average American household energy consumption is anywhere between 20 – 70 kWh per day. Now imagine a future where everyone is driving an electric car, the household consumption increases to 150 – 200 kWh. Optimizing the consumption of such large amounts of energy would have a lot more impact than just stationary storage. I am very excited to contribute to this wonderful future.

It has been 6 weeks since my first day at Rivian and I have already started working on core algorithms. The team is great. I am working remotely full-time now.

I do miss biking to work everyday at Sunverge. In absence of that and increased workload, my physical exercises have sharply declined.

## Side hustles

I have started learning cloud technologies specifically AWS. I began with a course on AWS IoT. At Rivian, we have some interesting AWS IoT projects going on. It would be great if I can get some hands-on experience with those projects. Also, there are amazing folks with extensive cloud technologies knowledge and experience. It would be cool to learn from them.

## Books

### **Life after Google | George Gilder**

This book has been a drag. It's been over 6 weeks that I am reading this book and I am only half way through. It isn't very interesting and I have to work extra hard to get myself to sit with it. And I feel bad when I leave book unfinished. I hope I can take some time out next week to finish this book off and start a new one that's more rewarding.

## Fitness

Fitness has been dwindling. Let's look at some data here. The last weekly blog I wrote was in December 2021.

December 2021	13 hours ; 4847 calories
January 2022	24 hours 22 minutes ; 13015 calories
February 2022	14 hours 7 minutes ; 7388 calories
March 2022	17 hours 44 minutes ; 11471 calories
April 2022 (so far)	3 hours 52 minutes ; 2257 calories

My performance hasn't been too bad thanks to the game of volleyball. However, in terms of strength training it hasn't been fruitful. I need to pick up some pace for this month of April. Ideally, I would like to set a new record for 2022 in this month. That would mean beating the January's best of 24 hours and 22 minutes. To be able to get there, I'll need to average at least 1 hour of exercise every single day for the rest of the month. This is going to be interesting.