

Why Greatness Can't Be Planned

Chapter 1

Think of a room as all the possibilities that there is for our pursuit. It is our "search space".

- ↳ Of course majority of those possibilities are useless & don't lead anywhere
- ↳ Very few will be useful & we call them "stepping stones", which are critical achievements that reveal a lot of what we are looking for & can be used as basis for what would come next
- ↳ handful would be great masterpieces that would lead to major inventions & discoveries such as car & planes.

Ex First computers were made of tube vacuums BUT tube vacuums were never invented for that purpose

- o They were just stepping stones
- ↳ More importantly, ambitious goals are deceptive coz they distract us from their own stepping stones. If we follow, for example, ambitious goal such as computer we would never be able to figure it out

o Let the exploration / creation process along with the gradients guide us to masterpieces with some stepping stones along the way

- ↳ How does branching out to adjacent fields & making cns relate to this

Chapter 2

- Be open & flexible when new opportunities show up. what you have chosen as a pursuit may be only a stepping stone towards something completely different. You just pick it up when you feel it right \Rightarrow Important to keep moving & opportunities will find you.

Chapter 4

Objective fn. are wrong compass that would most of the times lead to deception coz stepping stones would mostly score low as they typically don't look anything like final ambitious objectives, but nonetheless they are critical steps towards end goal

\hookrightarrow Ex If goal is to be millionaire.

Taking unpaid internship is not a good decision to become rich yet it is a stepping stone to acquire skills & network that would lead to another possibility

\hookrightarrow When we are crossing lake using the stepping stones & experiencing fog, we have no idea which one is in the right direction \Rightarrow Try & follow gradient & make ourselves open to any possibility that would lead us to get to ~~a~~ stepping stones in the right direction

• We have no idea which ones are "actual" stepping stone to get to ~~next step~~ other side

Chapter 5

Novelty / interestingness is the compass we should follow to uncover future stepping stones. Instead of comparing where we are with an objective destination we just compare our current state with the past. This is not deceptive coz we already know the past & we can see if current path led to something novel.

We just need to be open-minded & follow our gut-feeling of what looks interesting & branch out from there & be willing to abandon path if experiments were not useful.

Remember that serendipity favors the prepared minds \Rightarrow you always invest in your knowledge & experiment w/o any destination in mind, & it is a matter of time before you uncover stepping stones along the way

- Objective-based search:

\hookrightarrow You always converge into the objective path using errors from past & follow gradient \rightarrow very less paths are explored coz they may look unpromising even though they may lead to huge stepping stones later

\hookrightarrow Progress is always from bad to good based on gradient

\hookrightarrow Once you achieve goals you stay in this state

- Novelty-based search:

- ↳ Explore much more paths as long as they are novel \Rightarrow divergent to check out new possibilities coz we are only concerned whether new state is novel - NOT how close to objective
- ↳ Once you explore a state, it loses its novelty over time
- ↳ As we explore, we are constrained by our environment \rightarrow Defines search space of what is possible
- ↳ Along the way, we collect information incrementally about all previous behaviors
- ↳ We typically move from simple to complex behaviors as we're exhausting simple paths & we need to be clever - & use insights from previous experience

Questions: how do we measure novelty?

↳ Is it binary or continuous

↳ Is it just merely if it is new / happened before & its frequency

↳ Looks like it is faster & solve harder problems than objective-based search but of course fails at some complex problems

Chapter 6

Novelty search is not a soln_n to every problem coz as No free lunch theorem states: No algorithm achieves best result(s) across all domains/problem types.

⇒ We aren't guaranteed that novelty search will eventually get us where we want to go such as becoming rich.

However, when we don't know what we're looking for, we can adopt the concept of "treasure hunt". In other words, we look to collect as many stepping stones (treasure) along the way, which would open tons of possibilities w/o necessarily knowing grant ambitious goal.

Note that using a combination of objective-based search & novelty search & keep few paths active to try when things don't work isn't a great idea when we don't know what we're looking for & when stepping stones may look bad especially if objective/corn pass is wrong.

Chapter 7

The main point is that when people are measured / incentivized to improve a metric, the metric becomes the target even though it was created to be an indicator of where we are.

↳ Also, metrics deceive such as GDP. Ex
You can have high GDP in the short-run but still the economy is not healthy & will be a disaster in the long-run.

∴ Sometimes you need to go down to go up

Chapter 8

If we only fund research based on objectives & what would this do for the field → ideas will converge to few paths & nobody will try to explore the unknowns & extend human knowledge.

↳ The critical aspect of innovation is the accumulation of knowledge along the way from exploring ^{the} stepping stones. Together, it will form a revolution (innovation)

Chapter 8

To apply novelty-based search at the personal level, we need to use clues other than novelty such as ① potential of stepping stones that would lead to another great stepping stone & unlock more stepping stones (it is possible for a stepping stone to be dead-end & NOT lead anywhere)

② Interestingness is the most important clue & it is subjective to the person's instinct, knowledge, & experiences \Rightarrow It is subjective & hard to argue why a given idea is interesting \Rightarrow Use your gut feelings & instinct as clues to what to explore next given what you have available at your disposal.

o Given current technology, innovations, & resources + what interests you + potential of ideas \rightarrow pursue/explore new ideas & see where it takes you.

You will for sure accumulate info. along the way & more often than not arrive at a great stepping stone that would unlock new/great innovation/stepping stone

o Decide where to go based on where you are is often better than based on where you want to be as we have control to transform present into the future NOT transforming future to present.

\Rightarrow When there is no destination \rightarrow No right path & multiple paths can still lead to great places