

Value-Based Prioritization*

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Abstract

A method is proposed to use value theory to quantitatively prioritize potential actions to accomplish a goal. This method is applied to the example of choosing meaningful work using an example value system based on the desire to reduce suffering.

1 Introduction

Why should a particular goal be pursued (“Why”)? Given a goal, what actions should be pursued to best accomplish said goal (“What”)? Given an action, how should said action be pursued (“How”)?

This article proposes that value theory usually best scopes “Why” and “What” and the scientific method usually best answers “How”. A method called Value-Based Prioritization is developed to answer the “What” question:

Why: *Value Theory*
↓
What: **Value-Based Prioritization** (1)
↓
How: *Scientific Method*

2 Why a Goal?

“Why a Goal?” is usually best scoped using value systems because they are evaluative by nature¹³. Evaluating different value systems

is left as an (lifelong) exercise for the readerⁱ.

3 What Actions?

“What Actions?” is usually best scoped by prioritizing actions because actions usually have differing effect sizes and time is limited. It follows from the value system used to answer “Why” that the same value system is used primarily to evaluate the priority of each action.

This article proposes a method called Value-Based Prioritization which builds a quantitative prioritization model based on predicted effect sizes. Raw prioritization scores are further scaled by contextual factors such as implementation time, cost, risk, and other judgments.

4 How to do an Action?

Given answers to “Why?” and “What?”, how to implement actions is usually best answered with the scientific method¹: observations are

ⁱExample value systems include intuitionism⁸, consequentialism¹⁴, evolutionary biology⁶, religion⁷, epicureanism¹⁰, stoicism³, political liberalism¹⁶, anarcho-capitalism⁹, communitarianism⁴, objectivism², etc.

*<https://github.com/freeradical13/ValueBasedPrioritization>

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made and rational thought is used to generate hypotheses, hypotheses are tested with experiments, and successful experiments lead to theories and results.

5 Value-Based Prioritization

A **value system** V (2) generates a **goal** $G(t)$ (3) (for some future time t) and a set of **mutually exclusive potential future actions** $A(t)$:

$$A(t) = \{A_1(t), \dots, A_N(t)\}, \quad (4)$$

$$N > 1$$

An action's **estimated relative accomplishment amount** $B(A(t))$ is an action's expected *relative* (i.e. with respect to other actions) contribution towards accomplishing $G(t)$:

$$B(A(t)) = \mathbb{R}, \quad (5)$$

$$0 \leq \mathbb{R} \leq 1$$

Thus, $G(t)$ is fully accomplished if all actions are accomplished:

$$G(t) = \sum_{i=1}^N B(A_i(t)) = 1 \quad (6)$$

A **value-based prioritization score** $C(A(t))$ is the result of the product of a set of **value-based prioritization scale functions** $S = \{S_1, \dots, S_N\}$ (7) multiplied by (5):

$$C(A(t)) = B(A(t)) \cdot \prod_{j=1}^N S_j(A(t)), \quad (8)$$

$$0 \leq S_j(B(A(t))) \leq 1$$

Example scale functions include implementation time, cost, risk, and other judgments. Ideally, scale functions should be defined before running the model to reduce bias. The set S always includes the element $S_1(A(t)) = 1$. Note that $\sum_{i=1}^N C(A_i(t)) \neq G$ if any $S_j(A_i(t)) < 1$.

A **value-based prioritization** $Z(t)$ is a sequence of actions ordered by prioritization score (8) in descending order:

$$Z(t) = (A_1(t), \dots, A_N(t)), \quad (9)$$

$$C(A_1(t)) \geq \dots \geq C(A_N(t))$$

The first k actions in $Z(t)$ should be executed in descending priority/proportion where k (10) is chosen based on factors such as available concurrency, time, resources, etc.

6 Modeled Value-Based Prioritization

Historical data may be used to predict actions' estimated relative accomplishment amounts (5) at a future time t_F (11) (e.g. the average time actions will take to ramp up implementation).

If each action has historical data $D(A)$ (12):

$$D(A) = ((t_1, D(A, t_1)), \dots, (t_N, D(A, t_N))) \quad (12)$$

Then, a set of **comparable prediction models** $R(D(A))$ (13) is applied to each $D(A)$ (e.g. linear regression with different degrees):

$$R(D(A)) = \{R_1(D(A)), \dots, R_N(D(A))\} \quad (13)$$

The models are compared using **model selection** ^{17,18} $L(R(D(A)))$ (14) (e.g. adjusted r^2 , AIC, ANOVA, cross-validation, etc.).

The **best fitting model** $M(R(D(A)))$ is selected for each action.

Next, the model $M(R(D(A)))$ is used to predict each $B(A(t_F))$.

Finally, **modeled value-based prioritization** $Z(t_F)$ (15) is simply (9) with t_F .

7 Choosing Meaningful Work

The following example applies modeled value based prioritization (15) to the goal of choos-

ing meaningful work. Every aspect is an example and should be reconsidered.

First, outline the parameters:

- (2) V = a value system which answers “Why work?” with “To reduce suffering” which is defined as maximal human suffering: deathⁱⁱ. Alternatives include disease burden (e.g. Quality-Adjusted Life Years [QALYs/DALYs]¹⁵), non-human suffering, pre-birth suffering, etc.
- (3) $G(t)$ = eliminate human death.
- (4) $A(t)$ = the set of actions which would eliminate human death.
- (10) $k = 2$ for a single person, weighted heavily on the first item with the second item being a hedge or volunteer activity.
- (11) $t_F = 5$ years; an average amount of time under normal conditions to integrate into a new career to work on some subset of $A(t)$ (including learning, certification, building experience, networking, etc.).
- (12) $D(A)$ = time-series data on human death by underlying cause.
- (13) $R(D(A))$ = linear regression with one, two, and three degrees.
- (14) $L(R(D(A)))$ = adjusted r^2 .

$A(t)$ is the set of 176 actions which would eliminate the 176 major groups (ICD-10 sub-chapters¹²) of underlying causes of death in the United States^{5,iii}:

ⁱⁱThe term suffering is ambiguous because some consider that there is no suffering after death; however, the intent is to encapsulate something like the potential of life.

ⁱⁱⁱGroup Results By “Year” And By “ICD Sub-Chapter”; Check “Export Results”; Uncheck “Show Totals”

$$A(t) = \{ \begin{aligned} &A_1(t) = \text{Eliminate: Malignant neoplasms,} \\ &A_2(t) = \text{Eliminate: Ischaemic heart diseases,} \\ &\quad \dots \\ &A_{176}(t) = \text{Eliminate: Other disorders of ear} \\ &\quad \end{aligned} \}$$

Review the list of actions and hypothesize scale functions. Examples:

- $S_1(A(t)) = 1$: Required scale function.
- $S_2(A(t))$: Likelihood of Success. If primarily political then 0.1, else 1.
- $S_3(A(t)) = \text{ScaleAge}(A(t))$: Scale towards younger people as they have more to lose.

$$\text{ScaleAge}(A(t)) = \left(1 - \frac{\text{AvgAge}(A(t))}{\text{MaxAge}}\right)$$

Create a table listing all actions as rows and all scale functions as columns, and fill any non-1 values. For example:

Action	S_1	...	S_N
A_1	0.1		
A_2			0.25
...			
A_N	0.99		0.9

Table 1: Example scale function table

$D(A)$ for each action is the time-series data of number of deaths per year. For example, for $A_1(t)$:

Year	Deaths
1999	549838
...	...
2017	599108

Table 2: Deaths per year for $A_1(t)$: Malignant neoplasms

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