

# Theoretical Analysis of Credit Assignment in Youth Hair Loss

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## Abstract

*Youth Hair Loss* has already been a booming social phenomenon, which could cause incredible influence both physically and mentally in the whole life. There are a variety of reasons to the modern youth hair loss problem, e.g. genetic genes, high pressure, bad work-and-rest habit and even daily diet. Besides, each young guy is faced with different situation, so they should find out what the **True** factor is among such probable causes. However, although modern medicine has reached a relative high level nowadays, the answer to the problem above and a practical and effective cure still can hardly be obtained to prevent hair loss and even worse situation, i.e. bald heads. In this paper, we are aiming at finding the true causes and practical cures for youth hair loss and rescuing the hair-losing youths from such a catastrophe. We theoretically analyze the severe youth hair loss problem in a new view through analogizing with the *Credit Assignment*. We first model the growth and loss of hair and then the cause-and-effect of hair loss. Our work makes a good beginning in this domain and deserves more and further researching.

## 1 Introduction

The hair loss is a natural biological phenomenon in human growth, which is common and a signal of aging. It has become an increasing problem in recent years since more and more youths realise that they are suffered from hair loss in different degrees. It is superising but undeniable that the hair loss happens earlier than the previous generations. Moreover, contrary to traditional cases, young girls also find their hair lines rise out of control. The youth hair loss is no more a biological human phenomenon but a severe social problem now.

Youths suffer from hair loss both physically and mentally. The main problem is that the hair loss results in fewer hair on the head, leading to physical changes on appearances of youths indirectly. Then, the mental issues come, i.e. youths are unsatisfied with their looking, self-contemptuous and scared, keep away from social activities, cannot date a boy or girl, cannot focus on studying and working, and even



Figure 1: A 23-year-old youth in 2018.

lose the confidence and hope of life. Figure 1 shows an example of a 23-year-old youth in 2018, as you can see from his face, hair loss is exactly a **DOOOOOOOM**.

When you go to google and try to find some help for youth hair loss, you can only find that hair loss may be caused by a variety of reasons, e.g. genetic genes, high pressure, bad work-and-rest habit and even daily diet. The problem is which one is the true factor that causes your hair loss? No answer. The doctors always recommend you to eat properly, keep a balance between work and rest, stay in good mood and throw away your pressure, which are all useless words and provides no practical help. To this end, we are aiming at figuring out the true causes and then the practical cure to hair loss, condition on each guy's specific conditions.

Credit assignment is a classic problem between multi-causes and single-effect. For example, Jack takes pills of kind A,B,C for a week and recovers from a cold. Which pills really do the contribution? Another example is, in multiagent reinforcement learning literature, agents pick actions and share the same reward. We want to figure out how each agent contributes to the group reward so that agents can be trained with concrete and accurate reward signals. In youth hair loss problem, the problem is caused by a variety of factors and we want to know how each factor influences our hair, which is of importance for further research.

In Section 2, we provide a model for the growth and loss of hair. In Section 3, we theoretically analyze the youth hair loss in a view of credit assignment. Lastly the conclusion and future work are given in Section 4.

## 2 Hair Growth and Loss Model

Before we dive in the key credit assignment in youth hair loss problem, in this section we model the natural growth and loss of hair regardless of peripheric factors. Note that we model the hair quantity instead of the hair length. The overall update function of hair quantity against timeslot  $t$  can be formulated as follows:

$$Q_{t+1} = Q_t + q_t^+ - q_t^- \quad (1)$$

where  $Q_t$  denotes the quantity of hair at time  $t$  and  $q_t^+$  ( $q_t^-$ ) is for the quantity of hair growth (loss). We ignore the first part for the quantity of hair growth  $q_t^+$ , as it can be fit by traditional growth curves like a sigmoid function and others. The second part for the quantity of hair loss  $q_t^-$  is the focus of our research.

To model the  $q_t^-$  in a proper way, we hypothesize that it is related with some factors,  $\{m_1, m_2, \dots, m_n\}$ . Thereby, we model the  $q_t^-$  to be:

$$q_t^- = \phi(m_1, m_2, \dots, m_n) + c_t \quad (2)$$

where  $\phi(m_1, m_2, \dots, m_i)$  represents the hair loss function<sup>1</sup> related to factors  $m_i$  with  $i \in \{1, 2, \dots, n\}$ . Besides, we use  $c_t$  denotes the hair loss constants due to daily random events, e.g. the hair blown away by evil wind and the hair friction during sleep, which can be easily modeled by a Gaussian distribution. For the factors  $\{m_1, m_2, \dots, m_n\}$ , we separate them into three kinds — the intrinsic factors, behavior factors and the peripheral factors.

First, the intrinsic factors are the ones related to individual characteristics, e.g. gene and fate. This part contributes differently for each person but cannot be changed by ourselves. It is decided when everyone is born and no natural and realistic approaches are available to modify the fate. If unfortunately you are the one that **cursed** by hair loss god as shown in Figure 2, the following content of this paper means nothing to you and the only recommendation we can provide is to follow the law below:

**Law 1** *If a man is cursed by hair loss god, the only thing that makes sense is to enjoy the every moment and to terminate the life before bald.*

Second, the behavior factors denote the individual behaviors that may influence the hair loss, e.g. work-and-rest habit, diet preference and inner peace. The last part is the peripheral factors which means the outer environments, e.g. geographical location, climates and social environment. This two parts are the things we can control and change to rescue the hair loss crisis.

In following sections, we try to provide a theoretical approach to figure out how these complex factors result in the hair loss with a view of credit assignment.

<sup>1</sup>The concrete formalization of  $\phi(m_1, m_2, \dots, m_i)$  is not the point of this paper and we remain wide space for further research.

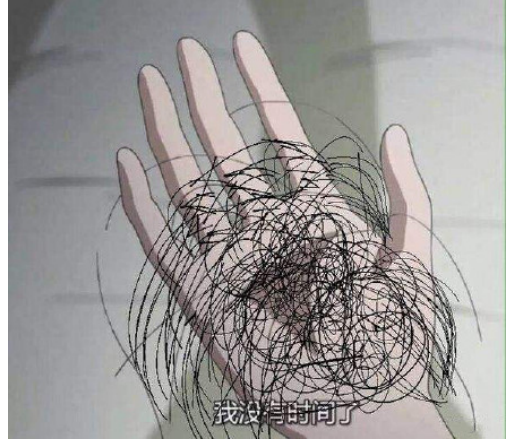


Figure 2: The curse from the hair loss god.

## 3 Credit Assignment in Youth Hair Loss

This section is omitted due to **hair limitation**. We will clearly demonstrate this part if we have sufficient hair in the future. (It is quite late now and time to sleep. My fragile hair will shed more heavily if I keep staying up late.)

## 4 Conclusion and Future Work

In this paper, we provide a theoretical approach in analyzing the youth hair loss. The practical results are not guaranteed and we are not responsible for it. The youth hair loss problem is going to become worse in the future and is ought to be highlighted by the top youth scientists in the world. Our work makes a good beginning in studying the youth hair loss problem with a novelty view and we hope more further research can be made in this domain. Wide space are remained for talented researchers to explore and please free honored because we are doing the sacred job to develop a darker and hairy future.

Of course, for the youth researchers that have just realized their cursed fate a few minutes ago, no hesitate to leave such business alone and do whatever you want in your limited time.

**FinalTruth 1** *Life is short and the end is **BALD**.*

## Acknowledgments

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