

Statistical Analysis Of Strategic Market Management Based On Radial Interpolation, Laplace's Rule Of Succession, Concept Learning, Artificial Neural Modelling, Exponential Growth Model And Positioning Strategy

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Abstract

Business strategy can be analyzed based on radial interpolation of contribution factor and arrival time of related past sequences in the present state as well as that of related sequences in the future state. Statistical modeling of the trend in perspective to one of the end products of the external analysis of the strategic market management can be ruled by Laplace's Rule of Succession. The customer-based methodology of classifying the competitors can be controlled by the concept learning approach and artificial neural modeling. The exponential growth model controls understanding of the competitors based upon success. In the competitor analysis of the image and positioning strategy

regarding the most significant factors, like the market impact and productivity, a future prediction concerning the competitor analysis is desirable.

Keywords: Radial Interpolation, Laplace's Rule of Succession, Concept Learning, Artificial Neural Modeling, Exponential Growth Model

INTRODUCTION

Statistical trend analysis in context to business gain forecasting plays a pivotal role. In case of a significant downward change in sales and profit, quantification of threat estimation measures how likely failure is at an instant timing t of a brand-new product that is already t time units old. Hence it is a conditional measure of failure. This is a probabilistic event. Critical estimation with error bounds suffices an idea of the reasons behind the event's occurrence. This needs an investigation of business gain in certain time intervals so that the actual failure rate can be observed and sensed accurately. It is preferable to keep the confidence interval as short as possible in order to get high accuracy in the gain estimate. This is a significant step in the external analysis of business strategy. The main objective is to find out the unknown parameters that contribute significantly towards the occurrence of the downward change in sales and profit. Radial Interpolation, Laplace's Rule of succession, concept learning, artificial neural modeling can be applied. Competitor analysis can also be realized using an exponential growth model and forecasting based on a positioning strategy.

Literature Review - A Marketing Research Perspective

As per (Alden, D.L. et al., 1999), the creators inspect the rise of brand situating techniques Concentration on outcomes supports the legitimacy of the new development and demonstrates that significant rates of notices utilize GCCP in stead of situating the brand as an individual from nearby customer culture or a particular unfamiliar shopper culture. Marketing managers (Ataman, M.B. et al.,2010) burn through billions of dollars yearly on their showcasing programs; however, a couple of concentrates deliberately survey the drawn-out impact of these projects over many brands and classifications. In addition, they are surviving exploration centers greatly around publicizing and advancements but not on items or conveyance. This study endeavors to address both the information and the demonstrating prerequisites. As per (Atuahene-Gima, K., et al., 2004), thoroughness has been perceived as a critical element of advertising procedure direction for quite some time. In any case, scarcely any examinations have inspected its precursors and the conditions under which it impacts execution. This study endeavors to more readily

comprehend advertising methodology by exploring project-level precursors and Marketing Strategy Comprehensiveness (MSC) results. As per (Balducci and Marinova, E.,2018), there exist three fundamental commitments to the writing by (1) offering a binding together definition and conceptualization of U.D. in advertising; (2) spanning disjoint writing with a getting sorted out the system that incorporates different subsets of U.D. pertinent for promoting the board through an integrative audit; and (3) distinguishing meaningful, computational, and hypothetical holes in the surviving writing and ways of utilizing interdisciplinary information to propel showcasing research by applying U.D. investigations to immature regions. As per (Baumgartner, H., et al., 2003), the authors explore the general and subarea impact of a thorough arrangement of advertising and promoting related diaries at three moments during 30 years utilizing a reference-based proportion of underlying impact. As per (Bharadwaj, S. G., et al., 2011), the study looks at the effect of brand quality on three parts of investor riches: stock returns, methodical danger, and quirky danger. The investigation discovers that brand quality improves investor abundance to the extent. Brand quality is more significant for firms confronting expanding rivalry (i.e., unforeseen abatements in industry fixation). In (Bolton, R. N., et al., 2004), most exploration in client resources, the board has zeroed in on explicit parts of the worth of the client to the organization. The reason for this article is to propose an incorporated system, called (Customer Asset Management of Services) CUSAMS, that empowers administration associations (1) to make a far-reaching evaluation of the worth of their client resources and (2) to comprehend the impact of showcasing instruments on them. In (Chandy, R. K., et al., 2000), a typical insight in the field of development is that vast, occupant firms seldom present extremist item advancements. Such firms will more often than not cement their market positions with moderately gradual advancements. They might even dismiss business people who foster extremist developments; however, they had enterprising roots. Thus, revolutionary developments will often come from tiny firms, the outcasts. This theory, which we term the "officeholder's revile," is usually acknowledged in scholarly and famous records of extremist advancement. (Choi, S. C., et al., 2006) researches the retailer's concern of situating her private mark against two public brands with respect to both item quality and item includes. (Dickson, P. R., et al., 2001) points out Dynamic strategic thinking understands the crucial elements, yet how profoundly do they ponder the transaction of such essentials, and how systems treat to use in such reasoning? In (Esper, T. L., et al., 2010), the procedure recognizes two necessary arrangements of cycles through which the firm makes an incentive for its clients by moving products and data through showcasing channels: request-centered and supply-centered cycles. By and large, firms have contributed assets to foster a center differential benefit in one or other of this areas-yet seldom in both-frequently coming about in crisscrosses between request (what clients

need) and supply (what is accessible in the commercial center). This paper proposes that effectively dealing with the production network to make client esteem requires broad joining between request-centered and supply-zeroed in processes in light of an underpinning of significant worth creation through intra-hierarchical information the board. As per (Fang, E. E., et al., 2016), sending off a forward leap and gradual new items is imperative to firm execution. The earlier examination has recorded a few inner selforganization and worldwide organization-level factors that influence advancements, yet this study goes above and beyond to uncover the cooperations of these elements as basic item send-off systems. In (Farjoun, M., 2002), the system field's center issues- the idea of the procedure, causal models relating technique to different builds, and models of vital administration and decision- have recently tended to by two key movements. The unthinking viewpoint in light of disciplinary-based hypotheses, the planning model, and a perspective on the system as an arranged stance has given a brought together view but a thin and progressively less relevant one. The approach of natural advancements that included methodology process research, developmental and process models, and intelligent and integrative perspectives, has given extravagance and congruity yet not a bound together viewpoint. As per (Frankwick, G. L., et al., 1994), the scientists and strategists can acquire exceptional experiences by looking at showcasing's an essential job from the perspectives of administrators working all through the hierarchical construction. In (Ghosh M. et al., 1999), the creators broaden exchange cost examination into GVA structure to address advertising technique choices, particularly procedures grounded in valuable connections. (Gonzalez, G. R., et al., 2014) incorporates relationship advertising and interpersonal organization viewpoints to create and test a model that joins objective deals execution with the instructive and helpful advantages that come from relationship managers' (R.M.s') social capital structure (business and thickness) and relations (formal and casual organizations). (Gooner, R. A., et al., 2011) points out whether retail category management is worth the effort (and does a category captain help or hinders). Marketing technique lies at the theoretical heart of the essential advertising field. Likewise, it is vital to showcase practice and the region inside which advertisers' problems arise. As per (Hauser, J. R., et al., 2008), shoppers are heterogeneous and expand utility if their situation in a multi attribute space can address items. Reaction capacities can sum up mindfulness publicizing and dissemination. As per (Harmeling, C. M. et al.,2015), trade occasions are key structure squares of business connections and fundamental for relationship improvement. Nonetheless, a few occasions add to gradual relationship advancement, as anticipated by life cycle speculations, while others flash "defining moments" with stunning effects. In (Homburg, C., Müller, et al., 2011) in the present social selling, a vital test for sales reps is deciding how much their client arranged practices drive deals execution. Hence, this study examines whether a salesman's client's

direction in deals experiences is ideal for execution and client mentalities. Utilizing triadic information from a cross-industry survey of 56 team leads, 195 agents, and 538 clients, the creators offer solid observational help for a curvilinear, modified U-formed impact of a salesman's client direction on deals execution. Interestingly, the impact of client direction on client mentalities is constantly certain. In (Homburg, C. et al., 2012), extensive execution estimation frameworks have gotten impressive promotion, such as the fair scorecard. In any case, under which conditions thoroughness as an exhibition estimation framework property is alluring and adds to firm execution is a subject of discussion in exploration and practice. The creators utilize dyadic field information from showcasing administrators and the board bookkeeping chiefs to resolve this issue and reach out to earlier work by creating and testing a more intricate, possibility-based model. The experimental outcomes affirm the created structure. In (Hutt, M. D., et al., 1988), an interaction point of view has been taken on in arising conceptualizations of key promoting, and little consideration has been given to handle issues in advertising methodology research. Utilizing an exploratory case research approach related to arranging the examination, the creators follow developing cycles in promoting procedure development and recognize key authoritative players. The idea of independent key conduct is investigated and connected to key showcasing processes in the firm. Critical administrative and examination suggestions are featured. As per (Kyriakopoulos, K. et al., 2004), marketing techniques can work on an association's present aptitude (doubledealing advertising system) and require improving new information and abilities (promoting investigation procedure). Research in procedure and hierarchical learning recommends using the two methodologies to consider adequacy in every space and lessen monetary execution. In (Lipsey, M. W. et al., 2001).what research designs and methodological elements qualify a review for meta-investigation, precluding it? What kinds of exploration reports are fitting for the meta-examination? What is the social and etymological scope of the investigations to be incorporated? By coordinating and deciphering the current strategic and measurable work into a viable aide, the writers address these inquiries to give per users a cutting-edge prologue to the different ways to deal with meta-investigation.

(Luo, X. etal., 2008) presents the idea of a stock worth hole the deficit of an association's genuine market esteem from its ideal market esteem, as estimated by a bestperforming benchmark. Utilizing a colossal scope, certifiable data set, the creators test the impacts of consumer loyalty and client objection on the stock worth hole of firms. The outcomes show that client grumbling has a more significant impact than consumer loyalty on the worth hole.

As per (Maltz E. et al., 2000), to work adequately, showcasing should work in amicability with other practical offices in a firm. This study centers around 7164 | Prasun Chakrabarti Statistical Analysis Of Strategic Market Management Based On Radial Interpolation, Laplace's Rule Of Succession, Concept Learning, Artificial Neural Modelling, Exponential Growth Model And Positioning Strategy advertising's collaborations with three capacities that assume a critical part in the accomplishment of showcasing objectives money, assembling, and R&D. As per (Menon, A. et al., 1999), a solid scholastic and expert premium are reviving in the marketing strategy-making (MSM) process and its impact on firm execution. In any case, there is a deficiency of exploration on process issues in showcasing methodology. As per (Mintzberg H., 1994), When key arranging showed up on the scene during the 1960s, corporate pioneers accepted it as "the one most effective way" to devise and carry out systems that would improve the seriousness of every specialty unit. Consistent with the logical administration spearheaded by Frederick Taylor, this one most ideal way included isolating thinking from doing and making another capacity staffed by subject matter experts: key organizers. As per (Mizik, N. et al., 2003), firms allot their restricted assets between two significant cycles of making esteem (i.e., developing, creating, and conveying items to the market) and appropriating esteem (i.e., extricating benefits in the commercial center). Albeit both worth creation and worth allocation are needed for accomplishing supported upper hand, a firm has critical scope in concluding the degree to which it stresses one over the other. How impact treats accentuation (i.e., esteem creation versus esteem assignment) have on a company's monetary exhibition? The creators address this issue by looking at the impact shifts in essential accentuation have on stock return.

As per (Montgomery, D. B., et al., 2005), a large part of the experimental examination on cutthroat responses depicts how or why opponents respond to a company's previous activities yet avoids inspecting whether administrators endeavor to foresee such responses. In (Morgan, N. A., et al., 2006), authors observed that while repurchase probability and extent of clients whining have some prescient worth relying upon the particular component of business execution, measurements in light of proposal aims (net advertisers) and conduct (normal number of suggestions) have practically zero prescient worth. As per (Palmatier, R. W., et al., 2013), the unique parts of social builds should assume a significant part in driving presentation. To move toward a hypothesis of relationship elements, the creators present the development of responsibility speed or the rate and course of progress in responsibility and expressive its significant job in getting connections. (Slater, S. F., et al., 2001) depicts a review that surveys the ramifications of matching advertising systems to business procedures. To direct this review, we previously assessed the writing on promoting the system to recognize its key aspects. As per (Slater, S. F., et al., 2007), business strategy is generally worried about the activities needed to make predominant client esteem in the association's objective business sectors with a definitive objective of accomplishing prevalent execution.

(Van de Ven, et al.,1992) points out the three ideas to specialists for concentrating on the system interaction. In the first place, characterize the importance of the cycle. The cycle is regularly utilized: a rationale used to clarify a causal relationship in a

difference hypothesis; a class of ideas that allude to activities of people or associations; a succession of occasions portrays how things change over the long haul. The subsequent idea is to explain the hypothesis of interaction. The third idea is configuration examination to notice the procedure cycle in a manner reliable with one's definition and interaction hypothesis. In (Vorhies, D. W., et al., 2003).the hypothesis sets that coordinating promoting exercises in manners that fit the execution necessities of a business' procedure improves execution. In any case, applied and systemic issues make it hard to survey this suggestion comprehensively that is hypothetically outlined precisely. Drawing on setup hypothesis approaches in administration, the creators address these issues by evaluating showcasing association fit with business technique as how much a business' promoting association varies from that of an observationally determined ideal profile that accomplishes unrivaled execution by orchestrating advertising exercises in a manner that empowers the execution of a given system type. In (Walker Jr, O. C., et al., 1987), the authors audit and incorporate different hypothetical viewpoints, regulating explanations, and experimental proof with regards to the authoritative constructions.

In (Whittington, R., 2006), the work distinguishes a training turn in momentum technique research, regarding methodology as something individuals do. The paper proposes a structure for system research that incorporates these two levels in view of the three ideas of procedure praxis, practices, and professionals. The paper creates ramifications of this system for research, especially as to the effect of methodology rehearses on procedure praxis, the creation and move of technique rehearse, and the creation of system professionals. As per (Zhou, K. Z., et al., 2005), the creators conceptualize and test a model that joins various vital directions and market influences through hierarchical learning to advancement developments and firm execution. The outcomes show that a market direction works with developments that utilize cutting edge innovation and proposition more prominent advantages to standard clients (i.e., innovation-based advancements) yet restrain advancements that target developing business sector portions (i.e., market-based developments). An innovation direction is helpful to innovation-based advancements; however, no effects market-based developments and pioneering direction work with the two kinds of forwarding leaps. Different market influences (request vulnerability, innovation choppiness, and serious power) essentially impact innovation and market-based advancements, and these two sorts influence firm execution in an unexpected way. The outcomes have critical ramifications for firm procedures to work with item advancements and accomplish upper hands.

FINDINGS AND DISCOVERED FACTS

Fact 1 - Approximate computation of predictive timing instant of occurrence of an event

(either profit or loss) can be realized based on radial interpolation of contribution factor and arrival time of related past sequences in the present state as well as that of related sequences in the future state.

Justification

Let E be the predictive future event (either profit or loss), T_1 be the timing instant of transition of event from past state to present state T_2 be the timing instant of transition of event from the present state to future

state,

 $(T_1 + x)$ be the timing instant of occurrence of the event E in the future, S = {S₁, S₂, S₃, ..., S_n} be the set of past sequences related to E in the present

state,

 $F = \{F_1, F_2, F_3, \dots, F_m\} \text{be the set of sequences related to E featured in the future.}$

We assign a contribution factor value in each of the sequences featured in the future such that summation of the values of both past and future equals 1 (in probabilistic form).

Let CF_{S1} , CF_{S2} , ..., CF_{Sn} be the contributing factors of past sequences, CF_{F1} , CF_{F2} , ..., CF_{Fm} be the contributing factors of future sequences,

 CF_{E} be the contribution factor of event E in the future (which is obviously equal

to 1),

 $T_{S1}, T_{S2}, T_{S3}, \ldots, T_{Sn} is \ the \ timing \ instants \ of \ occurrence \ of \ S_1, S_2, S_3, \ldots, S_n, respectively.$

and $T_{F1}, T_{F2}, \ldots, T_{Fm}$ be the predicted timing instants of occurrence of $F_1, F_2, F_3, \ldots, F_m$, respectively.

We apply radial-based interpolation taking origin (assumed point of estimation)

as event E, and individual interpolated value of each sequence and event E denotes its contribution factor.

Therefore, based on the radial interpolation technique, we get

$$\begin{bmatrix} \frac{CF_{S_1}}{(T_1+x-T_{S_1})} + \frac{CF_{S_2}}{(T_1+x-T_{S_2})} + \dots + \frac{CF_{S_n}}{(T_1+x-T_{S_n})} + \\ \frac{CF_{F_1}}{(T_{F_1}-(T_1+x))} + \frac{CF_{F_2}}{(T_{F_2}-(T_1+x))} + \dots + \frac{CF_{F_m}}{(T_{F_m}-(T_1+x))} \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{(T_1+x-T_{S_1})} + \frac{1}{(T_1+x-T_{S_2})} + \dots + \frac{1}{(T_1+x-T_{S_n})} + \\ \frac{1}{(T_{F_1}-(T_1+x))} + \frac{1}{(T_{F_2}-(T_1+x))} + \dots + \frac{1}{(T_{F_m}-(T_1+x))} \end{bmatrix}$$

$$= CF_E - - - - - (1)$$

Substituting values of all the parameters (except x, which is unknown) in Eq(1), we get a polynomial equation of degree (n + m - 1) and solution of that will yield the value of x, and then we can easily compute $(T_1 + x)$ which is the timing instant of occurrence of the event E in the future.

Therefore, we can claim that

i. Approximate computation of predictive timing instant of occurrence of an event (either profit or loss) can be realized based on radial interpolation of contribution factor and arrival time of related past sequences in the present state as well as that of related sequences in the future state.

ii. The degree of the polynomial is equal to one less than the total number of sequences related to E.

Fact 2 – Statistical modeling of the trend in perspective to one of the end products of the external analysis of the strategic market management can be ruled by Laplace's Rule of Succession.

Justification-

In some cases, due to undetermined reasons, any unanticipated event linked to the sales and profit may be found stochastically. Let x be the number of instances of an event (which is gain or loss) with unknown probability p. Think that S is the information set after studying the events in earlier time intervals. Therefore it gives an idea concerning about the status of sales and profit.

Then, p ≈ unif[0,1], f(p) = 1
In Bayesian form, P(S|p) = p^x - - - - - - - - - - - - - - - - - (2)
and P(S) =
$$\frac{1}{(x+1)}$$
 - - - - - - - - - - - (3)
After Eq(2) and Eq(3), which is in the posterior distribution form, we find that
 $f(p|S) = \frac{P(S|p) \times f(p)}{P(S)} = (x+1)p^x, (0 \le p \le 1)$
Here the posterior means are characterized by $E[p|S] = \int_{0}^{1} p \times f(p|S)dp$
 $= (x+1)\int_{0}^{1} p^{(x+1)} \times dp$
or, $E[p|S] = \frac{(x+1)}{(x+2)}$ - - - - - - - - - - - - - (4)

Eqn. (4) implies that the stochastic arrival of any random event (which is in the gain or loss) in business sales and profit is Laplace's Rule of Succession.

Fact 3-The customer-based methodology of classifying the competitors can be controlled by the concept learning approach and artificial neural modeling.

Justification –

The purpose of the customer-based approach is mainly to examine the participants' power and market influence and to realize whether they are categorized in strategic groups based on their assets, capabilities, etc.

In the point of view of above mentioned, the prosed concept learning based 4-tuple hypothesis is suggested (£, €, α , β) where

£suggests any value that is acknowledged,

€implies a required and sufficient value,

 α implies no value is adequate, and

 β suggests unclear value.

Agree to the random variables $\mu_1, \mu_2, \mu_3, \mu_4$ represent the relative level of strength, the relative rate of market impact, the strength network based on resources, and the sales-profit level in the past.

The statistical hypothesis is to be studied based on the variables mentioned above. Consequently, the variables are to be mapped with the 4-tuple form $(\pounds, \in, \alpha, \beta)$.

Let us take on as an X is a possible competitive competitor. As there is no trend analysis is accessible, then the alternative hypothesis indicates which is to be recorded as the 4-tuple representation $(\varphi, \mu_3, \varphi, (\mu_1, \mu_2, \mu_4))$ where φ suggests the null attribute

Established on the statistical statement, the concept learning based mapped interpretation is as follows

 $(\varphi, (\mu_3, \mu_4), (\mu_1, \mu_2), \varphi)$ if X is a less strong competitor and $((\mu_1, \mu_2), (\mu_3, \mu_4), \varphi, \varphi)$ if X is a more strong competitor.

We suggest the artificial neural-based model established upon the input factors (where the measured value in a 1-point scale is as per hypothesis) and is linked to the competitor analysis.

Let x_1 : level of dedication of the competitor x_2 : is the cost structure of the competitor x_3 : is the efficient image and positioning strategy of the competitor x_4 : is the market growth value of the competitor x_5 : estimates of the power of the competitor x_6 : is the strong network of the competitor

Then the output collected by the soma of artificial neuron is as follows:

Where w_i is the equivalent weight of the parameter x_i .

The foregone conclusion is the major output collected by the soma of the artificial neuron of the company whose competitor analysis is to be analyzed. Therefore, the actual output of the future neural model can be denoted as the trivalent form (-1, 0, +1), which is again established in the following situations as

If δ > bias, then output is +1 showing the competitor is more concentrated ;

If δ < bias, then output is -1 showing the competitor is less intense ;

If δ = bias, then output is -1 showing the competitor is as per the level.

Fact 4 - The exponential growth model controls understanding of the competitors based upon success. The decline in the tolerance limit in the expansion of sales and market share is a function of the level that determines the damage in the strength of the business strategy.

Justification – Growth in productivity on the timing basis suggests the increase in level, which is again gaining access to capital in the investment.

The suggested mathematical relation is as seen

where $L_{P2},\,L_{P2}$ indicate the productivity levels at the timing instants t_2,t_1 respectively $(t_2>t_1)$

 $L(C_2)$, $L(C_1)$ is the level to gain access to the capital for the investment at timing instants t_2 and t_1 individually.

and x is a parameter such that x = 1/T, T is a time constant which is going to offer a rate of how quickly the variable L_{Pi} changes

Consequently, Eq(7) indicates the authenticity of the exponential growth pattern.

We further suggest

| $RT_E = ma$ | $ax(0, RT_{(Ti)}) $ | (8) |
|-------------|--|-----|
| and | $RT_{(Ti)} = (\in \times LT_N - \beta) $ | (9) |

where $\mbox{RT}_{\rm E}\mbox{is the decrease in the tolerance limit in the level and growth of sales and market share,$

RT_(Ti) is the reduction measure of the tolerance limit,

Fact 5 - In the situation of competitor analysis of the image and positioning strategy, which is regarding the most significant factors, like the market impact and productivity, a future

prediction concerning the competitor analysis is desirable.

Justification-

Let us believe that the study period of competitor analysis of the image and positioning strategy is with respect to market effect as well as of the productivity is of x units and it is between the timing instants t_1 and t_x .

We suggest a bivalent state [-1, +1] such that -1 suggests the competitor is less powerful or at par level while +1 suggests the competitor is more intense.

In the preliminary two observation periods, the importance of each market influence and productivity has been examined in the 4 timing instants. Let $M_1 = (+1, -1, -1, +1)$, $P_1 = (+1, -1, +1, -1)$, $M_2 = (-1, -1, +1, +1)$, $P_2 = (+1, -1, +1, +1)$.

We suggest calculating $M_1^T \times P_1 + M_2^T \times P_2$, which is in the structure of a 4 x 4 matrix (say S₁). This S₁ will serve well as the needed solution, and in the next study period, the following conclusions are herewith suggested as-

Step 1–Form a matrix (1×4) for market effect or productivity (say S₂).

Step 2–Calculate $S_2 \times S_1$ and generate a 1 × 4 matrix (say S_3)

Step 3 – Now represent the values of the 4 elements of S_3 with that of the bivalent state [-1,+1] in such a way that a value that is less than or equal to zero is characterized by (-1) while a value which is more than zero by (+1).

Step 4- The resulting mapped 1×4 matrix will calculate the correlated factor's subsequent predicted status (either market impact or profitability).

Therefore, in the case of competitor analysis of image and positioning strategy, which is with respect to the most two important aspects like as market impact as well as profitability, a future prediction which is again about the competitor analysis, is created on

any one of the factors that can be comprehended and are founded upon the past trend analysis of the other.

CONCLUSIONS

The paper entails certain discovered facts in context to statistical analysis of strategic market management based on radial interpolation, Laplace's Rule of Succession, concept learning, artificial neural modeling, exponential growth model, and forecasting. The statistical justifications suffice the facts mentioned.

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