Trust and Reputation System

Trust and reputation system is a technique to assess the credibility, quality and reliability of online available resources that will help to decide which resources have to relay and safe to trust for the actual objective. It also helps the serious service provider and online players to correctly represent the reliability of their services.

Explanation:

In PayPerSurvey the T&R system is used to calculate the trust of the subscribers. The working of T&R System depends on different parameters in “PayPerSurvey”. These parameters are the basic component for calculating the trust of an individual subscriber. Our system calculates the trust of a subscriber on the bases of following three parameters:

1. Question attempt time
2. Constraint Questions
3. Acceptance Rate

We used honesty value and honesty badge for subscribers trust and reputation. On the bases of the above mentioned parameters our system will categories the individual trust in Gold, Silver and Brown Badges. The subscriber will be paid according to the badges.

Parameter scaling

There are three parameters mentioned above they all have different unit. Each parameter should be on the same scale to avoid inconstancy. For this purpose, we used feature scaling methodology to scale each parameter with continuous value between 0 and 1. If parameter value goes towards 1 it will have positive impact on subscriber honesty value and vice versa.

1. Deviated Attempt Time:

**Attempt time (Ta)** of a question in survey is the time which user takes during answering of survey question. Our system will calculate the attempt time against the answer of each question.

The **benchmark time (TBM)** is the minimum time to take a question, calculated on the bases of two factor:

1. Reading time (Tr)
2. Decision time (β)

According to research average human being English reading speed is between **170WPM-280WPM. So**

Minimum Reading time (Tr) = total no of words of a survey /280WPM

**Decision time (β)** is given to each question on the base of its complexity by Researcher/company. Decision time is calculated in licked scale (1------60s) with 5s difference.

So bench mark time will be

TBM = Tr + β ------------------------- (1)

**Time difference (T▲)**

Time difference will show the deviated time with benchmark time of a question to calculate it take difference between benchmark time and attempt time by subscriber.

T▲ = TBM - Ta --------------------------(2)

**Constraint on T▲:**

If a subscriber takes more time, then benchmark time system will consider it as completely authentic. So

T▲ <= 0 then T▲ = 0 -------------------------(3)

Total (**T▲t)  = 1/n \* T▲**

Where n = number of questions in the survey

T▲ = sum of time difference of each question in a survey

**Parameter time (Pt)**

**Pt  = 1 - T▲t / TBM ----------------------------(4)**

T▲ value can be more then 1, that’s way we have to scale it between 0-to1

By dividing it with Benchmark time (**T▲ / TBM)**

(T▲ / TBM) will give negative parameter impact. Other two parameter have positive impact. To calculate overall positive impact of all parameter we need to subtract it from 1 to make it positive impact in the final calculation.

2. Constraint Questions

To maximize the authentication of each survey response and to update subscriber honesty value and honesty badge. System used the constraint question (Cq). It’s a second step of authentication of subscriber responses. e.g.

Q. Select the Word GIFT?

A) Pakistan

B) GIFT

C) Gujranwala

D) Punjab

This question will check whether subscriber is responding the survey consciously or not. This constraint question will impact as 0 in case of wrong answer, and 1 in case of right answer. So, the final Cq value will be

If (constraint question == right answer)

**Pcq = 1 ------------------ (5)**

if (constraint question == wrong answer)

**Pcq = 0 ------------------ (6)**

3**. Acceptance rate**

It deals with the total survey offered to a subscriber, total survey answered. Acceptance rate is actually difference between offered surveys and accepted surveys.

Total Offered Survey = So

Total Accepted Surveys = SA

**Arate= So / SA ----------- (7)**

**Subscriber Honesty value (SH):**

We have to assign weight to each parameter on the bases of their impact/importance.

w1 =1, w2 = 1 and w3 = 0.75.

**SH = 1/3\*(Pt\*w1 + Pcq\*w2 + Arate\*w3) ---------------------------(9)**

Honesty badge policy

In this system there will be three badges Brown, Silver and Gold. System will assign honesty badge to each subscriber on the bases of their survey honesty value and number of completed survey and they will be paid on the basis of these badges.

**Brown badge policy:**

If the subscriber have **SH** <= 0.5 and number of completed survey <=20 then System will assign this badge.

**Silver badge policy:**

If the subscriber have **SH** <= 0.8 and number of completed survey <=50 then System will assign this badge.

**Gold badge policy:**

If the subscriber have **SH** > 0.8 and number of completed survey >50 then System will assign this badge.

T&R Demo

Let there is a subscriber with 15 offered surveys and 11 accepted surveys. The average acceptance rate is:

Total Offered Survey = So = 15

Total Accepted Surveys = SA = 11

**Arate= So / SA ----------- (7)**

**Arate= 11/ 15 = 0.73**

|  |  |  |
| --- | --- | --- |
| **Survey ID** | **Attempt time deviation** | **Constraint Q.** |
| S1 | 0.2 | 1 |
| S2 | 0.5 | 1 |
| S3 | 0.2 | 1 |
| S4 | 0.6 | 0 |
| S5 | 0.3 | 0 |
| S6 | 0.4 | 1 |
| S7 | 0.8 | 0 |
| S8 | 0.7 | 0 |
| S9 | 0.9 | 1 |
| S10 | 0.9 | 1 |
| S11 | 0.2 | 0 |
| mean | 5.7/ 11 = 0.51 | 6 /11 = 0.54 |

**calculate subscriber honesty value**

**SH = 1/3\*(Pt\*w1 + Pcq\*w2 + Arate\*w3) ---------------------------(9)**

**SH = = 1/3 \* (0.51\*1+0.54\*1 + 0.73\*0.75)**

**SH = 0.53**

**Badge = Brown**