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Combining Feedback and Trust Scope Parameter: A New Model for Assessing Information Source Trust

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Abstract

Reliable information is incredibly essential for policy and decision makers, especially when the decision to be made is related to a crucial interest. There are various ways used to get a reliable information. One of them is by looking at the trust level of the information source. This trust level can be determined by assessing the source of information's reputation. There are some parameters used in determining the value of the source of information reputation: such as feedback, trust scope, and trust level. Generally, these parameters are used separately in accordance to the purpose of the trust assessment conducted. Feedback, for example, is usually used to get a direct trust value. It is conducted to determine reputation value by accumulating the direct trust value with the previous reputation value. Meanwhile, trust scope is usually used to assess the trust of the information source based upon the context. However, implementing trust scope or feedback method alternately will not allow combined external and internal representations. In brief, separate implementation does not provide optimum result. Therefore, this paper proposes to combine two parameters: feedback and trust scope, considering each advantages and disadvantages. The underlying reason of combining both parameters is to get a stronger and more balanced trust assessment, as the trust value will be obtained both from feedback and the source of information trust in the context.

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1. Introduction

Based on the survey conducted, the largest internet users in the world is in Asia. As much as 44.8% internet users worldwide are from Asia, and from that number 54% of it are from Indonesia (<http://www.internetworldstats.com>). A large number of internet usages shows a high need for internet connection within the society. Especially, to fulfill the need in getting and sharing information. These internet users will be the potential source of information.

Many research found that people use the internet to get information from various sources, but they want a reliable information nonetheless [1]. So, differentiating a reliable information from unreliable information is crucial when we want to make a decision. One way to ensure the reliability of an information is by knowing that the source of information is credible. Some research suggest trust determination model that has widely been used, such as trust model to determine one's trust based on peer service [2], trust model to assess users' trust towards an application [3], determining internet users trust [4], and source of information trust assessment model [5], [6], [7], [8].

Source of information trust can be used to determine the trustworthiness of the information made or spread by the source. We determine one's trust by differentiating trust value to: direct trust and reputation trust [8]. Direct trust is a credibility value counted from the interaction happened between user and source of information. Generally, this direct interaction is stated in the form of feedback, such as the use of feedback in social network [7], to determine the source of information trust in a certain network. It also can be used to collect opinions from users with different needs [5], and also to build a reputation [9].

There is another parameter we can use to determine the source of information trust, a trust scope. Trust scope as proposed by Thirunarayan [10], is used to determine the credibility based on a credibility scope used by an agent. Another use of trust scope introduced by Singh and Sinha, applied a context in trust scope that resulted in one source's credibility towards one context but not credible towards the other context.

This paper proposes the use of both parameters, feedback and trust scope, as a new model for assessing a stronger source of information's trust to get a better credibility value because not only this assessment is based on other users assessment that probably has bias values, but also focus on assessing source of information's context in the information field. The result of the assessment reflects a credibility or reputation value of source of information that can be used to determine information reliability based on its credibility value.

2. Model trust

In this research, we proposed a trust model that has three modules; direct trust module, trust scope assessment, and reputation module. The first module is to count the credibility value based on the feedback received. The second module, trust scope assessment, is to determine the credibility value based on the source of information's context in the field by determining whether or not the assessment match the information context with the source of information context in the same field. And the third module, reputation module, will be used as the source of information credibility value. Here is the model trust structure:

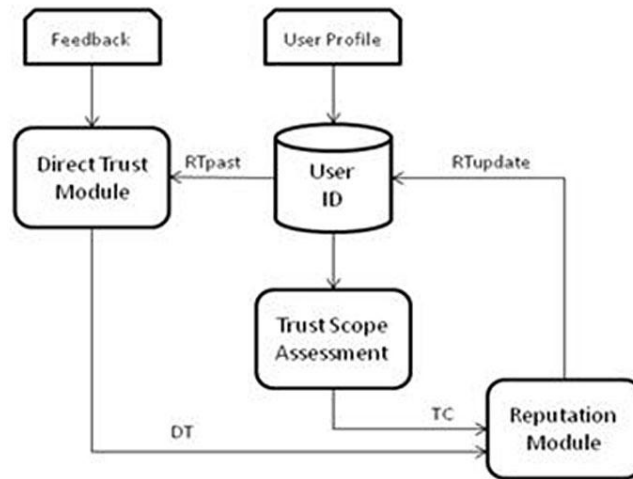


Fig. 1. Model Trust for Assessing Information Trust

Reputation module is built on the direct trust value (feedback) and the trust scope value. The composition of both values should be balanced to gain a fair trust value or reputation value.

2.1. Direct trust module

Ibotombi Smriti Singh and K. Sinha assumed that there are two kinds of trust; direct trust and recommended trust. Direct trust is often obtained during a direct interaction among users, usually in the form of feedback [8], or experience gained from the frequent interaction that make it possible to assess a direct trust [11].

The feedback used in the model [7] is comments made by social network users by dividing them to “good comment”, “middle comment”, and “bad comment” with a sequential value 1, 0, -1.

Whereas the feedback used in this module is in the form of quality values: strongly agree, agree, neutral, disagree, and strongly disagree, with a sequential value 2, 1, 0, -1, -2. The strength given by this assessment is on controlling bias value by evaluating feedback giver profile. Therefore, we can confirm that the feedback given is not a made up feedback to manipulate the source of information’s reputation. The following formula defines the value of feedback:

$$DT(x) = \sum \text{Feedback}(tr_{\text{trustscope}}) \quad (1)$$

DT is direct trust of information source, tr is trustor whom assessing performance’s information source or feedback giver

2.2. Trust scope assessment

The trust scope assessment is intended to complement the feedback assessment. Sometimes, feedback assessment is lack in credibility because there is a tendency that the feedback given is somewhat objective or subjective depends on the feedback giver’s relationship with the source of information. Meanwhile, trust scope assessment doesn’t require a lot of other users’ participation because it is only applied to assess the source of information’s credibility.

We can use the source of information context in the field discussed to assess source of information trust. The context is obtained from the user’s data about knowledge, ability, task/function, and experience in the task [10] we

get from the user's profile that belongs to the source of information. Generally a user profile is a media for the user to show his/her identity to others. It is also usually provided by the internet service too.

In this model, source of information context will use user's data about his/her education, interest, occupations, rank or class obtained from the user profile available in the internet service. Here is the trust scope assessment on assessing source of information credibility:

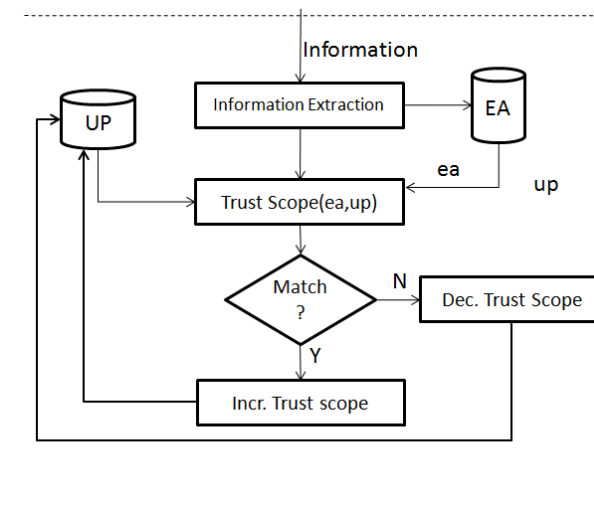


Fig. 2. Trust scope assessment on assessing credibility mechanism

The mechanism will not only evaluate information obtained, but also extract any information gained to get its context on the information automatically. Once the context is revealed, the next process is to match the information context with the source of information context. When the information context matches the source context, then the trust scope value will be given as much as the level of its resemblance. But, when there is a mismatch between them, the trust scope value will be reduced and the information will be ignored. Value range in use is from 1 to 4.

The trust scope value obtained will be added into the previous trust scope value and counted to get its average value. Each source will get different trust scope value on a different context; therefore, there won't be any influence between one context with the other.

To match the information and the trust scope we must have the source of information data in the database. The database will also be used to save any changes on the source of information's trust value. The trust value will not only be used to determine whether an information will be ignored or not, but it also can be used together with the feedback assessment result from other users to get a reputation value. So, when there is not enough feedback to assess trust, then the reputation value can be used to replace the unavailable feedback value. Therefore, the trust value will be dynamic.

The advantages of using trust scope assessment are: a dynamic and more objective data, specified source of information, suitability between the source of information context with the acquired information context, and the automated assessment. A well evaluated information database will provide valid information needed by other users.

2.3. Reputation module

A reputation module is a module to count source of information credibility using direct trust and trust scope value. The reputation value will determine whether the information is reliable or unreliable.

Reputation value of the source of information can be used to replace the direct trust value when the feedback availability is not met. However, the reputation value used is the previous reputation value. The new reputation value will add up to the old one, so the reputation value will show the contribution given by the source of information. If the contribution by other people is reliable, therefore, the credibility value will be raised.

3. Conclusion

Combining Feedback and Trust Scope Parameter as a New model for Assessing a Stronger Source of information trust requires many further research to test its effectiveness. Therefore, the next stage to be conducted is developing an automated model. It is expected that this future effort will allow a more accurate and faster results.

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