



UNIVERSITI PUTRA MALAYSIA

***USER RECOMMENDATION ALGORITHM IN SOCIAL TAGGING SYSTEM
BASED ON User Trust METHOD***

WONG PEI VOON

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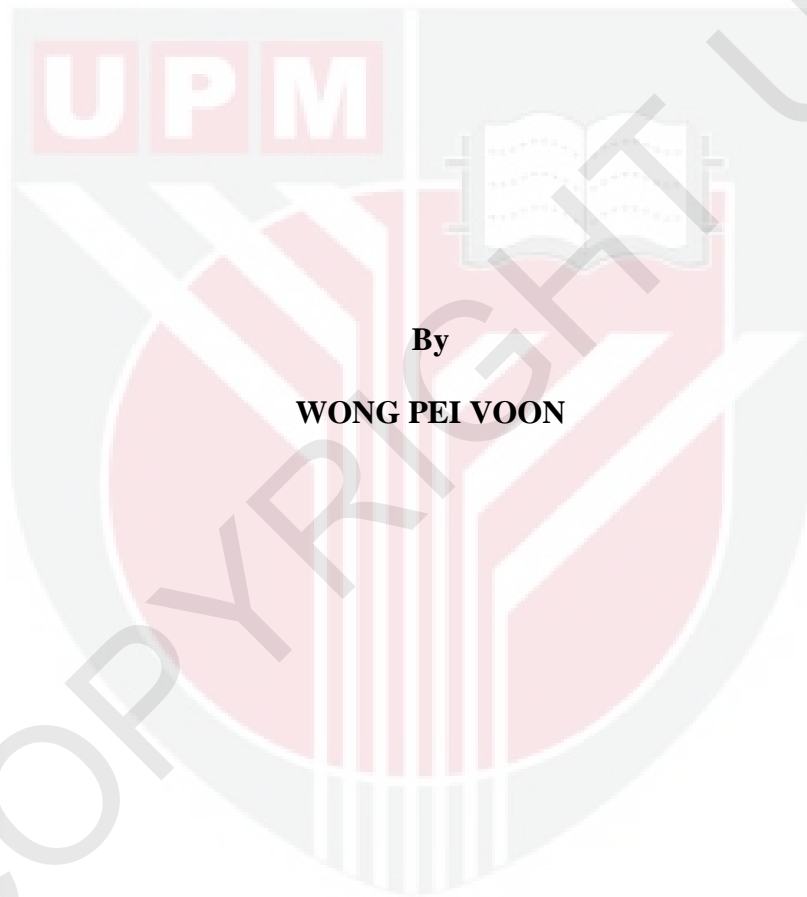


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BASED ON User Trust METHOD**



By

WONG PEI VOON

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirement for the Degree of Master of Science**

January 2012

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

**USER RECOMMENDATION ALGORITHM IN SOCIAL TAGGING SYSTEM
BASED ON User Trust METHOD**

By

WONG PEI VOON

January 2012

Chairman: Associate Professor Norwati Mustapha, PhD

Faculty: Computer Science and Information Technology

Collaborative Tagging Systems such as Flickr, del.icio.us, and BibSonomy are examples of Web 2.0 applications that have recently gained widespread popularity, where users label digital resources by means of personalized tags. The simplistic and user-centered design of those systems have encouraged many Web users to annotate their data using tags to provide easy search and retrieval of non-textual Web sources such as photos or videos, hence resulting in huge amount of data and metadata becoming available over the Web. This causes the task of searching to be out of reach especially among the common Internet users. This is where recommendation systems or tools come in handy.

A lot of methods can be used for the purpose of recommendation. Collaborative filtering is the most popular technique among recommendation system that makes use only past user activities such as transaction history or user satisfaction expressed in ratings. Collaborative filtering has been a substantial success; however they do not rely on the

actual content of the items. To improve recommendation quality, metadata such as content information in items and tags have been typically used as additional knowledge. Nonetheless, this type of recommendation is not entirely reliable since the knowledge are sourced from people whom we do not know or trust. The accuracy of recommendation system will generally be improved through incorporation of user trust information into the systems due to the fact that acquaintances might share professional interest while social friends might share hobbies. Unfortunately, the level of existing recommendation accuracy to date is still at unsatisfactory level among the users.

In effort to improve recommendation in terms of accuracy and coverage, we propose a hybrid method for user recommendation approach based on User Trust method to allow users to easily find other users with similar interest in social tagging system. This method is a combination of developing trust network based on user interest similarity and trust network from social network analysis. The user interest similarity is derived from personalized user tagging information. The User Trust method is able to find the similar users and selected them as neighbors to make automated recommendations.

The proposed method is tested using the Del.icio.us dataset. The experiment results showed that the proposed User Trust method outperforms the user-based collaborative filtering in making recommendations with the Pearson Correlation Coefficient (PCC) (Resnick et al., 1994) around 49%, Tidal Trust (TT) (Golbeck, 2006) around 32%, UserRec (Zhou et al., 2010) around 39%, tag-based Similarity Trust (ST) (Bhuiyan et al., 2010) around 45%, as well as incorporation of social network information in collaborative filtering (PCC-SN) (Liu and Lee, 2010) around 29%.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**SARANAN PENGGUNA ALGORITMA DALAM *Social Tagging System*
DENGAN KAEDAH *User Trust***

Oleh

WONG PEI VOON

Januari 2012

Pengerusi: **Profesor Madya Norwati Mustapha, PhD**

Fakulti: **Sains Komputer dan Teknologi Maklumat**

Sistem tag kerjasama seperti Flickr, del.icio.us, dan BibSonomy adalah antara contoh-contoh aplikasi Web 2.0 yang mendapat populariti yang meluas baru-baru ini, di mana pengguna melabel sumber digital melalui tag peribadi. Reka bentuk sistem yang sederhana dan berpusatkan pengguna telah menggalakkan ramai pengguna Web untuk menganotasi data mereka dengan menggunakan tag yang memberikan carian dan dapatan semula mudah ke atas sumber-sumber Web bukan teks seperti foto atau video, mengakibatkan penjumlahan data dan metadata yang begitu besar tersedia di Web. Ini menyebabkan tugas pencarian menjadi di luar jangkauan terutamanya kepada pengguna biasa. Ini adalah di mana sistem saranan atau alatan sangat berguna.

Banyak kaedah boleh digunakan untuk membuat saranan pengguna. Kerjasama penapisan adalah teknik yang paling popular dalam sistem saranan yang menggunakan hanya aktiviti lampau pengguna seperti sejarah urusan atau kepuasan pengguna yang dinyatakan dalam bentuk penilaian. Kerjasama penapisan merupakan satu kejayaan yang

besar, walau bagaimanapun teknik ini tidak bergantung kepada kandungan sebenar item. Untuk meningkatkan kualiti saranan, metadata seperti kandungan maklumat dalam barangan dan tag telah lazimnya digunakan sebagai pengetahuan tambahan. Tetapi, saranan jenis ini tidak boleh dipercayai secara menyeluruh kerana pengetahuan tambahan tersebut datang dari sumber pengguna yang tidak dikenali atau dipercayai. Ketepatan sistem saranan akan meningkat melalui penggabungan maklumat rangkaian percaya ke dalam sistem saranan berdasarkan fakta bahawa kenalan mempunyai kemungkinan tinggi untuk berkongsi minat profesional yang sama manakala rakan-rakan sosial mungkin berkongsi hobi. Malangnya, tahap ketepatan bagi sistem saranan sedia ada setakat ini masih berada pada tahap tidak memuaskan di kalangan pengguna.

Dalam usaha untuk meningkatkan saranan berdasarkan ketepatan dan liputan, kami mencadangkan satu kaedah baru bagi pendekatan saranan pengguna dengan kaedah *User Trust* yang membolehkan pengguna mudah mencari pengguna lain dalam sesebuah *social tagging system* yang mempunyai minat yang sama secara mudah. Kaedah ini merupakan gabungan antara pembangunan rangkaian amanah berdasarkan persamaan kepentingan pengguna dengan rangkaian amanah daripada analisis rangkaian sosial. Persamaan kepentingan pengguna adalah diambil daripada maklumat tag peribadi pengguna. Kaedah *User Trust* berupaya untuk mencari pengguna yang sama dan dipilih sebagai jiran saranan untuk membuat saranan pengguna secara automatik.

Kaedah yang dicadangkan diuji menggunakan dataset Del.icio.us. Keputusan eksperimen menunjukkan bahawa kaedah *User Trust* yang dicadangkan mengatasi pencapaian daripada kerjasama penapisan berasaskan pengguna - Pekali Pearson

Korelasi (PCC) (Resnick et al, 1994) 49%, Amanah Tidal (TT) (Golbeck, 2006) 32%, UserRec (Zhou et al., 2010) 39%, Amanah Persamaan tag-berasaskan pendekatan (ST) (Bhuiyan et al., 2010) 45%, serta gabungan maklumat rangkaian sosial dalam kerjasama penapisan (PCC-SN) (Liu dan Lee, 2010) 29%.



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Lastly, thanks to God for my life through all tests in the past two years.

APPROVAL

I certify that a Thesis Examination Committee has met on 20th Jan 2012 to conduct the final examination of **Wong Pei Voon** on her thesis entitled " User Recommendation Algorithm in Social Tagging System based on User Trust Method" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U. (A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science. Members of the Thesis Examination Committee were as follows:

Rusli Abdullah, PhD

Associate Professor
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Chairman)

Abu Bakar Md. Sultan, PhD

Associate Professor
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Internal Examiner)

Masrah Azrifah Azmi Murad, PhD

Associate Professor
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Internal Examiner)

SEOW HENG FONG, PhD

Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

Norwati Mustapha, PhD

Associate Professor

Faculty of Computer Science and Information Technology

Universiti Putra Malaysia

(Chairman)

MD. Nasir B Sulaiman, PhD

Associate Professor

Faculty of Computer Science and Information Technology

Universiti Putra Malaysia

(Member)

BUJANG BIN KIM HUAT, PhD

Professor and Dean

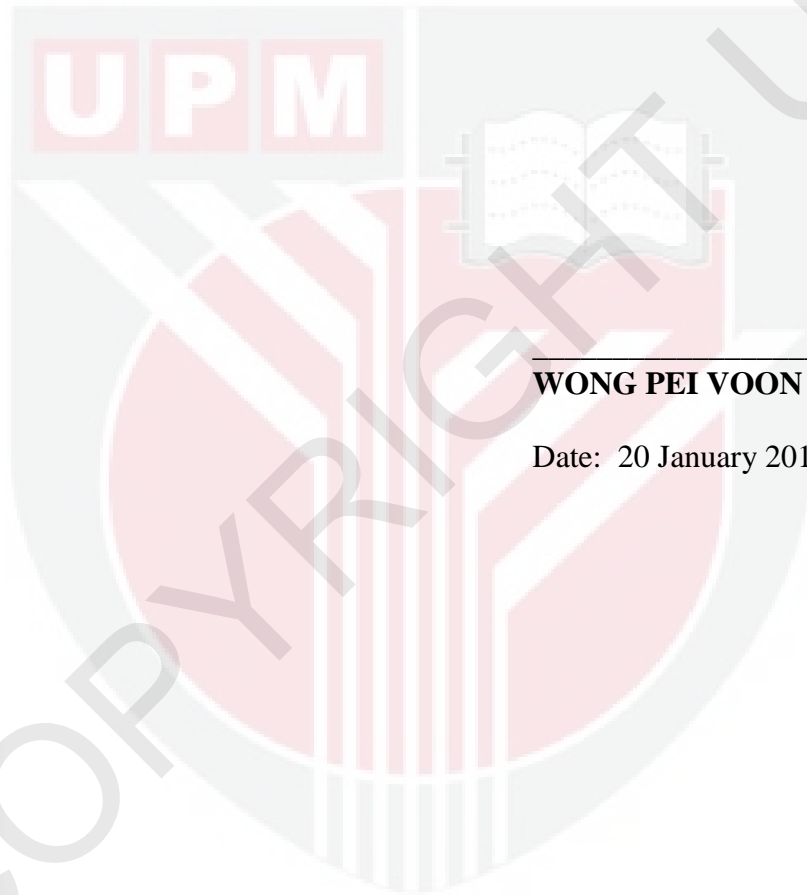
School of Graduate Studies

Universiti Putra Malaysia

Date:

DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at University Putra Malaysia or other institution.



WONG PEI VOON

Date: 20 January 2012

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