研究生国家奖学金申请审批表

<table>
<tr><td rowspan="5">基本情况</td><td>姓名</td><td>刘雷</td><td>性别</td><td>男</td><td>出生年月</td><td>1992.06</td></tr>
<tr><td>政治面貌</td><td>团员</td><td>民族</td><td>汉</td><td>入学时间</td><td>2016.09</td></tr>
<tr><td>基层单位</td><td>信息与软件工程学院</td><td>专业</td><td>软件工程</td><td>攻读学位</td><td>硕士学位</td></tr>
<tr><td>学制</td><td>3 年制</td><td>学习阶段</td><td>☑ 硕士
□博士</td><td>学号</td><td>201621220112</td></tr>
<tr><td>申请理由</td><td colspan="5">我在研二学年中认真学习前沿知识，关注热点问题，积极思考，主动帮助同学解决问题，并结合学习的知识用于解决实际问题。
在研二期间，我主要研究机器学习和深度学习在社交网络、话题推荐方面的运用，研究话题包括：跨网络的用户识别、融合网络表示和用户内容的社交媒体话题推荐。对于跨网络的用户识别，我结合深度学习技术提出一种 DeepLink 的方法，该方法相比于传统的方法在准确率上有了很大提升，最终该论文被 CCF-A 类会议 INFOCOM 接收，会议于今年 4 月中旬召开。另一个话题中，我结合已有的局部敏感哈希和卷积神经网络等技术进行创新，目前已写出期刊正则投稿中。
总体说来，研二期间我的生活忙碌而充实，个人也得到了很大的锻炼和提升。

申请人签名：

年　　月　　日</td></tr>
</table>

IEEE ComSoc™
IEEE Communications Society

December 26, 2017

Lei Liu
University of Electronic Science and Technology of China
Shahe Campus: No.4, Section 2, North Jianshe Road
Chengdu, Sichuan 610054
China

Dear Lei Liu:

Your paper entitled *DeepLink: A Deep Learning Approach for User Identity Linkage* has been accepted for presentation at the IEEE International Conference on Computer Communications (INFOCOM) which is scheduled to be held on April 15 – 19, 2018 in Honolulu, Hawaii, USA. Per IEEE Policy, all accepted papers must be presented in person by an author in order to be published in the conference proceedings. You are expected to undertake all expenses associated with the travel to this conference.

Prior to applying for the visa, please be sure to learn about the policies and requirements associated with getting a visa to enter the United States. The information is available at https://travel.state.gov/content/travel/en/us-visas.html.

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Sincerely,

Galen Sasaki

Galen Sasaki
General Chair

Dear Authors,

Congratulations again on your accepted paper(s) for IEEE INFOCOM 2018!

This is a friendly reminder that INFOCOM 2018's final paper uploading deadline is *** Jan. 5, 2018 ***. If you have already done this, please ignore this email. Otherwise, please make sure you have completed and uploaded the copyright form, completed conference registration, and uploaded the final manuscript to EDAS.

The detailed instructions can be found at (including visa letters):
http://infocom2018.ieee-infocom.org/content/final-camera-ready-paper-submission-main-conference

Thank you for your contribution, and we look forward to meeting you at IEEE INFOCOM 2018 in Honolulu, HI in Apr. 2018.

Best regards,

Shiwen Mao, Tommaso Melodia, Prasun Sinha
IEEE INFOCOM 2018 TPC Co-Chairs

DeepLink: A Deep Learning Approach for User Identity Linkage

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***Abstract*—The typical aim of User Identity Linkage (UIL) is to detect when users from across different social platforms are actually one and the same individual. Existing efforts to address this problem of practical relevance span from user-profile-based, through user-generated-content-based, user-behavior-based approaches to supervised or unsupervised learning frameworks, to subspace learning-based models. Most of them often require extraction of relevant features (e.g., profile, location, biography, networks, behavior, etc.) to model the user consistently across different social networks. However, these features are mainly derived based on prior knowledge and may vary for different platforms and applications. Inspired by the recent successes of deep learning in different tasks, especially in automatic feature extraction and representation, we propose a deep neural network based algorithm for UIL, called *DeepLink*. It is a novel end-to-end approach in a semi-supervised learning manner, without involving any hand-crafting features. Specifically, DeepLink samples the networks and learns to encode network nodes into vector representation to capture local and global network structures which, in turn, can be used to align anchor nodes through deep neural networks. A dual learning based paradigm is exploited to learn how to transfer knowledge and update the linkage using the policy gradient method. Experiments conducted on several public datasets show that DeepLink outperforms the state-of-the-art methods in terms of both linking precision and identity-match ranking.**

***Index Terms*—user identity linkage, social networks, deep learning, reinforcement learning**

I. Introduction

Online social networks (OSNs) such as Facebook, Twitter, and Instagram allow their respective users to generate and share various contents, and communicate with other users (individuals or public accounts) on topics of mutual interest. Such activities provide a rich data source – both contextual (i.e., text, pictures), as well as networked-related – for many valuable applications. But one example is cross-platform audience targeting in marketing and malicious (fake or duplicated) account detection in cyber-security [1]. All such applications typically involve an important step of User Identity Linkage (UIL) which usually aims to find users across different social platforms that refer to the same individual/entity [2]. UIL has important impact in multiple applications – e.g., user behavior prediction [3], identity verification and privacy protection [4].

Variety of approaches have been proposed to tackle this practically relevant problem, and majority of them fall into two broad categories: (1) Feature-based approaches: they require to extract a set of independent features from account profiles or activities, e.g., username, gender, writing style, etc... for representing user's identity. This hand-crafting feature engineering is often based on domain knowledge and deep understanding of user activities. For example, Goga et. al [4] combine several characteristics extracted from user's posts, e.g., geo-location, timestamps and language, to profile their identities. Zafarani et. al [5] apply theories from sociology and psychology to model user behavioral patterns to map identities across OSNs. (2) Network-based methods: much attention has been recently paid to make use of user network structural information for correlating accounts across social platforms. For example, COSNET [6] considers the local and global consistency among multiple networks and Adamic/Adar scores are computed to measure neighborhood similarities. IONE [7] learns network embedding from the follower/followee-ship couplings in order to preserve the proximity of users with "similar" relationships. We note that several other works (e.g., [8]–[10]) combine profile features and network information to improve account alignment across OSNs.

Challenges and Our Approach: The drawbacks of the existing approaches addressing the UIL problem can be categorized as follows: (1) They do not provide a comprehensive framework to address the heterogeneity of users and OSNs. Namely, the different social network sites are independent and activities on one site can be very different from other(s). Additionally, users often act differently in multiple sites – thus, mapping the behaviors of cross-site accounts to a particular user is complex. (2) User representation: capturing latent semantic relationships among users based on network structures is difficult, especially if one seeks a meaningful and generalizable model for different networks and applications. Most of the existing works that focus on cross-platform behavior prediction or account correlation are using transfer learning, which assumes that multiple networks are either fully-overlapped or non-overlapped. In reality, however, there may be a very high degree of partial overlaps. (3) Lack of labeled data: Obtaining a set of users with the same identity across platforms is not easy. There is no central repository that would provide an explicit information to this effect. From a complementary perspective – manual labeling is time-consuming and sometimes infeasible.