Preserving Privacy against Active Friending Attacks in Online Social Networks

Mentor: Aston Zhang  
Mentee: Weijia Luo

Department of Computer Science, University of Illinois at Urbana-Champaign

Did you know that?

- Privacy settings in social networks can be extremely vulnerable when a stranger’s friend request is accepted.
- Your friend’s ignorance in privacy can cause your account to be vulnerable against potential adversaries. [3]

Accepting Friend Requests

- Social Factor, i.e. number of mutual friends. [2]
- Homophily Factor, i.e. similar interest or personality [2]
- 40% of people will accept friend request from a complete strangers, i.e. no mutual friends. [1]

Active Friending Attack

1. Obtain background information on the target, use it to find potential friends known as seeds, and send friend requests to seeds.
2. Follow friend recommendation and send friend requests to recommended potential friends.
3. Repeat step 2 until number of mutual friends is high with the target.
4. Send friend request to target

Table 1. Friend Request and Acceptance Probability

<table>
<thead>
<tr>
<th>Profile Id</th>
<th>Friend Requests Sent</th>
<th>Accepted Friend Requests</th>
<th>Acceptance Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Izzy</td>
<td>1900</td>
<td>224</td>
<td>23 N/A</td>
</tr>
<tr>
<td>Kate</td>
<td>1972</td>
<td>389</td>
<td>20 59</td>
</tr>
<tr>
<td>June</td>
<td>1991</td>
<td>207</td>
<td>19 50</td>
</tr>
<tr>
<td>Abe</td>
<td>1000</td>
<td>125</td>
<td>13 54</td>
</tr>
<tr>
<td>Total</td>
<td>5063</td>
<td>955</td>
<td>19 55</td>
</tr>
</tbody>
</table>


Real Life Impact

- Profile information can be used by adversaries for potential identity theft, spam or fraud.
- Obtain sensitive information from publicly released anonymized datasets by de-anonymization. [4]
- One vulnerable friend can lead to privacy breach for all of its friends. [3]

Future Work

- Experiment and analyze the effectiveness of active friending attack in real life online social network.
- Design security measures that limits the chance that the adversary’s friend request to can be accepted

References and Sponsors


[4] Aston Zhang, Xing Xie, Kevin Chen-Chuan, Carl A Gunter, Jiawei Han, and Xiaofeng Wang. 2014. Privacy Risk in Anonymized Heterogeneous Information Networks. In Proceedings of the 17th International Conference on Extending Database Technology