# The Devil is in the details

## Social Engineering by means of Social Media

BY

DAAN WAGENAAR
YANNICK SCHEELEN

# Introduction

- Online Social Networks
  - LinkedIn (service data, disclosed data)
  - Facebook (entrusted data, incidental data)
- Social Engineering
- Relevant information
- What else is new?

# Research Questions

*How can Online Social Networks be used in the automated creation of a graphical view of the company hierarchy and its employees for the purpose of social engineering?*

- How can current information gathering techniques be combined to achieve this goal?
- What are the consequences for companies?
- What can companies do to mitigate this process?

# How did we start?

START ON LINKEDIN

CREATE FAKE PROFILE

LINKEDIN TIERS

GETTING CONNECTED WITH THE COMPANY

SEARCHING & FILTERING

CRAWLING THE RESULTS

# Create fake profile

- Being a member is a necessity
  - Access to user profiles
  - Use LinkedIn's search functionality
  - Etc...

- Create a false identity with information that conforms to the target company = zombie profile

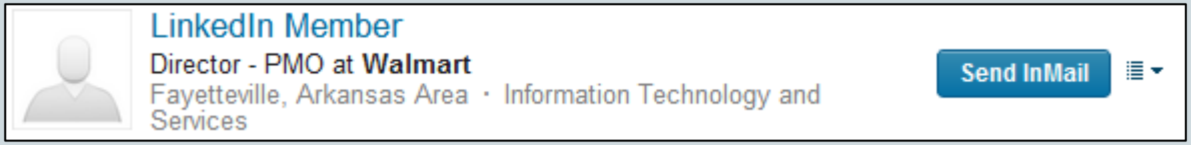
# LinkedIn tiers

- Getting information from other users depends on the tier:
  - 1st tier
  - 2nd tier
  - 3th tier
  - Out of Network

- 2nd tier show enough unobfuscated information
- Need at least one 1st tier connection to get 2nd tier results

# LinkedIn tiers

- Getting information from other users depends on the tier:
  - 1st tier
  - 2nd tier
  - 3th tier
  - Out of Network



LinkedIn Member

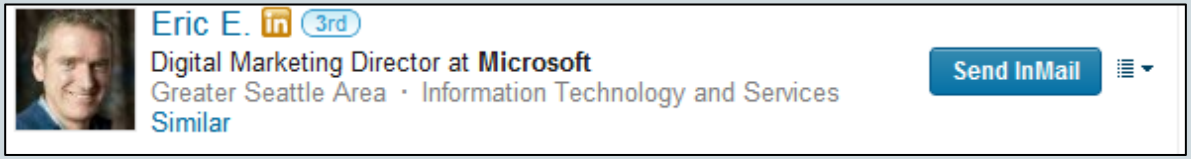
Director - PMO at **Walmart**

Fayetteville, Arkansas Area · Information Technology and Services

- 2nd tier show enough unobfuscated information
- Need at least one 1st tier connection to get 2nd tier results

# LinkedIn tiers

- Getting information from other users depends on the tier:
  - 1st tier
  - 2nd tier
  - 3th tier
  - Out of Network



Eric E. 3rd

Digital Marketing Director at **Microsoft**

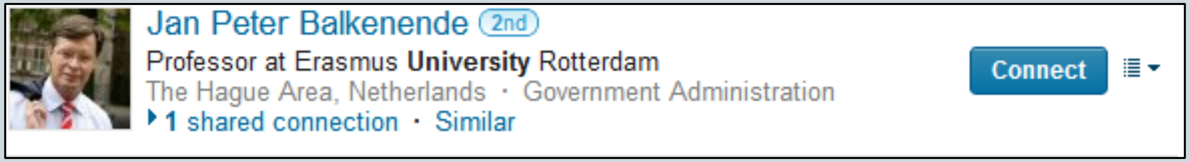
Greater Seattle Area · Information Technology and Services

Similar

- 2nd tier show enough unobfuscated information
- Need at least one 1st tier connection to get 2nd tier results

# LinkedIn tiers

- Getting information from other users depends on the tier:
  - 1st tier
  - 2nd tier
  - 3th tier
  - Out of Network



Jan Peter Balkenende 2nd

Professor at Erasmus **University** Rotterdam

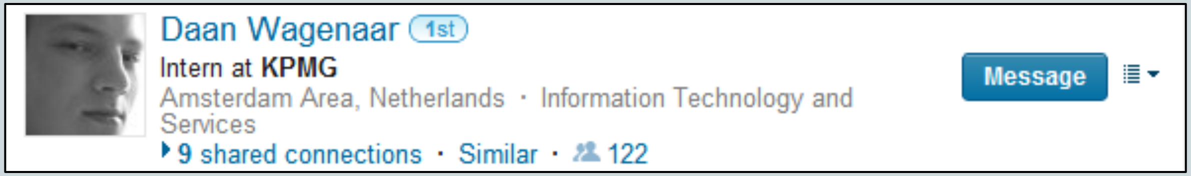
The Hague Area, Netherlands · Government Administration

1 shared connection · Similar

- 2nd tier show enough unobfuscated information
- Need at least one 1st tier connection to get 2nd tier results

# LinkedIn tiers

- Getting information from other users depends on the tier:
  - 1st tier
  - 2nd tier
  - 3th tier
  - Out of Network



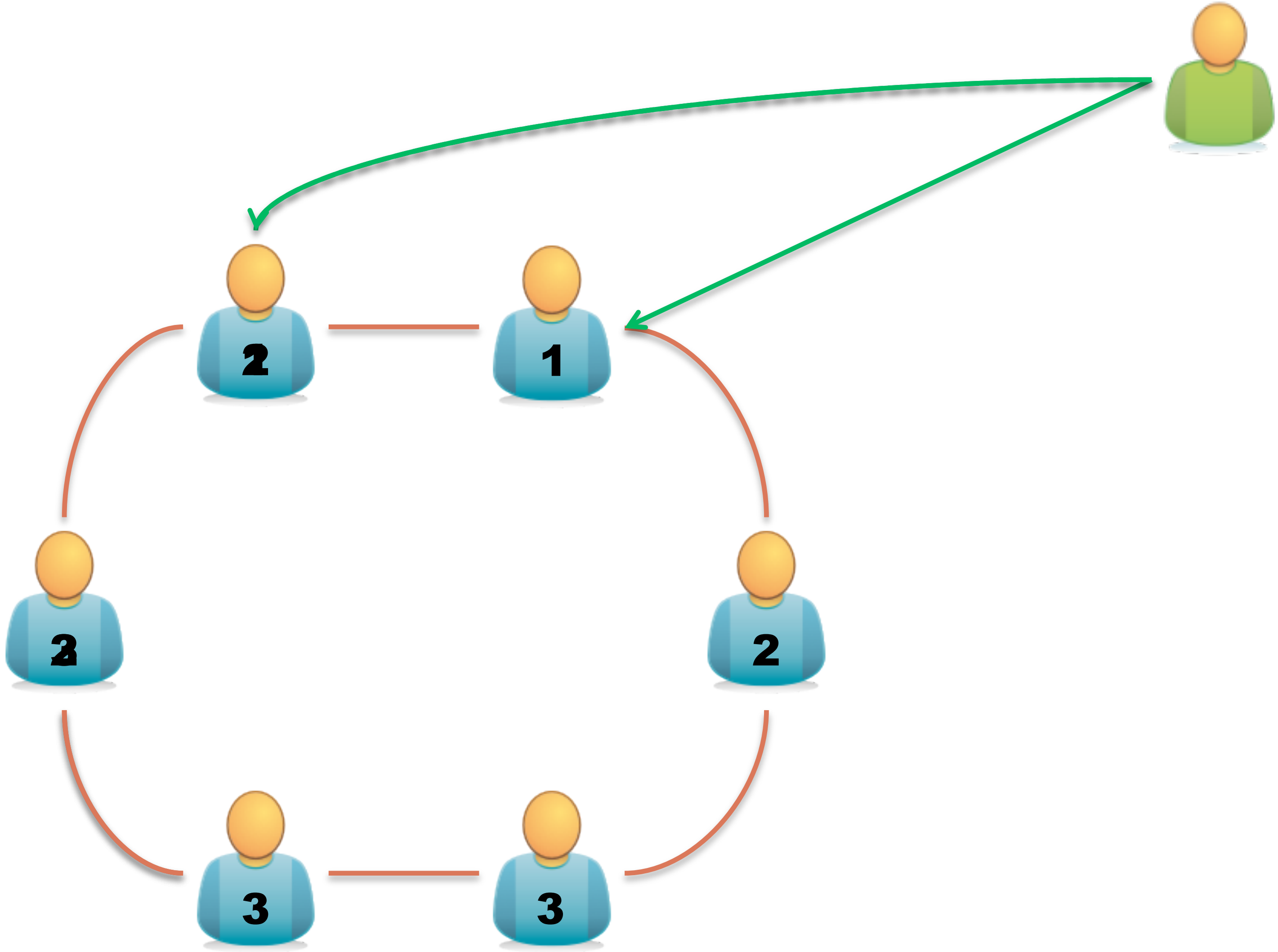
Daan Wagenaar 1st

Intern at KPMG

Amsterdam Area, Netherlands · Information Technology and Services

9 shared connections · Similar · 122

- 2nd tier show enough unobfuscated information
- Need at least one 1st tier connection to get 2nd tier results


2
1
2
2
3
3

# Getting connected with the company

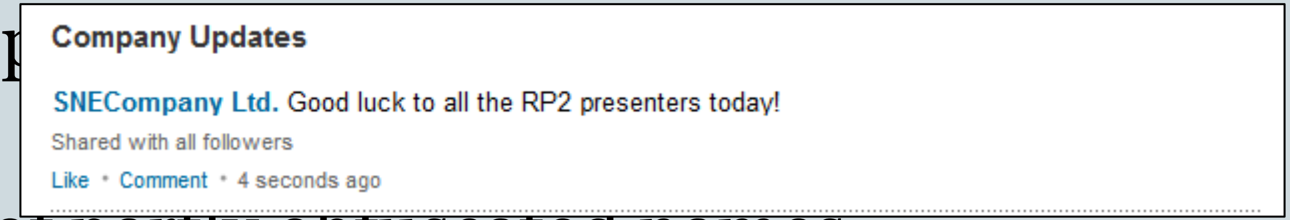
- Company’s “followers” list

- List of partly obfuscated names
  - Current employment
  - First name + first letter of the last name
  - Hyperlink to the public profile
    - Public profile shows the full name…

- Crawl list of followers and send connection requests
  - Once the first connection was made, the company circle was infiltrated

# Getting connected with the company

- Comp



**Company Updates**

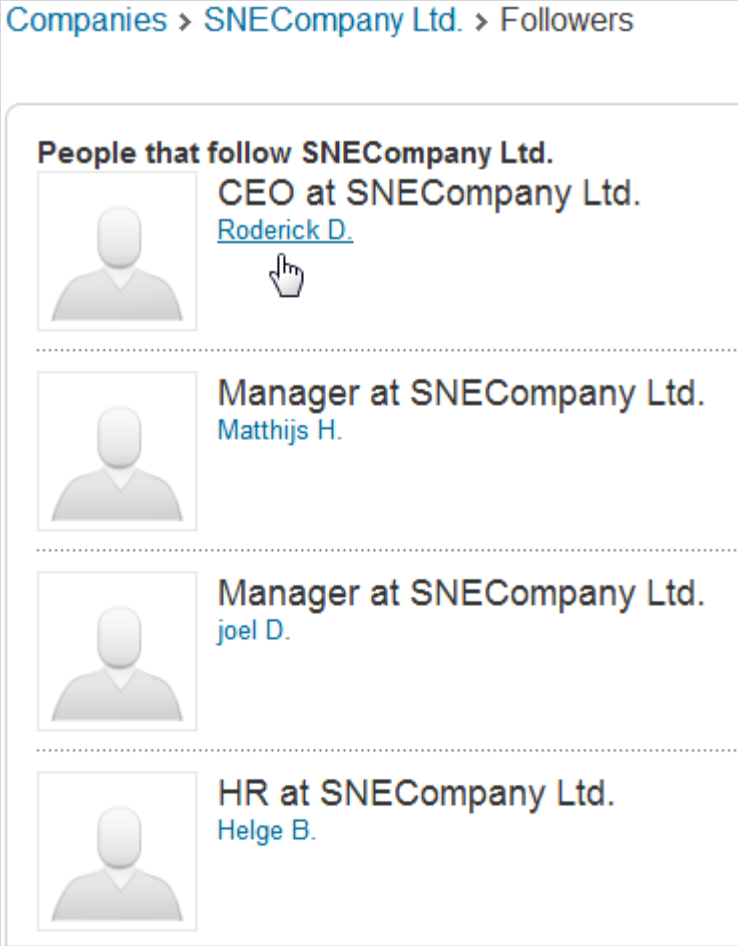
SNECompany Ltd. Good luck to all the RP2 presenters today!

Shared with all followers

- List of partly obfuscated names
  - Current employment
  - First name + first letter of the last name
  - Hyperlink to the public profile
    - Public profile shows the full name…

- Crawl list of followers and send connection requests
  - Once the first connection was made, the company circle was infiltrated

# Getting connected with the company



Companies › SNECompany Ltd. › Followers

**People that follow SNECompany Ltd.**

CEO at SNECompany Ltd.
Roderick D.

Manager at SNECompany Ltd.
Matthijs H.

Manager at SNECompany Ltd.
joel D.

HR at SNECompany Ltd.
Helge B.

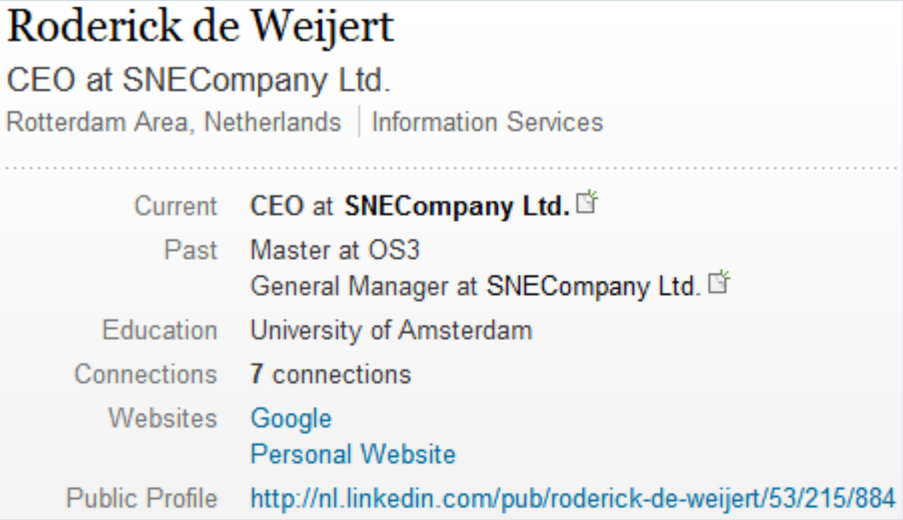
s” list

ted n

of the

profil

full n



Roderick de Weijert

CEO at SNECompany Ltd.

Rotterdam Area, Netherlands | Information Services

| | |
|---|---|
| Current | CEO at **SNECompany Ltd.** |
| Past | Master at OS3<br>General Manager at SNECompany Ltd. |
| Education | University of Amsterdam |
| Connections | 7 connections |
| Websites | Google<br>Personal Website |
| Public Profile | http://nl.linkedin.com/pub/roderick-de-weijert/53/215/884 |

s and send connection requests

n was made, the company circle was

# Searching & Filtering

- Searching 2nd tier connections
  - Limit of 100 search results
- Scoping the target company
  - Define keywords
- Reducing the LinkedIn dataset
  - Apply filters

# Crawling the results

- Final dataset was defined by the filtering process
- Our custom made crawler managed to:
  - Crawl all the names of 1st and 2nd tier connections
  - Crawl all the information these profiles put on their account

# Now what?

## CONTINUE ON FACEBOOK

# Why Facebook?

- Data enrichment

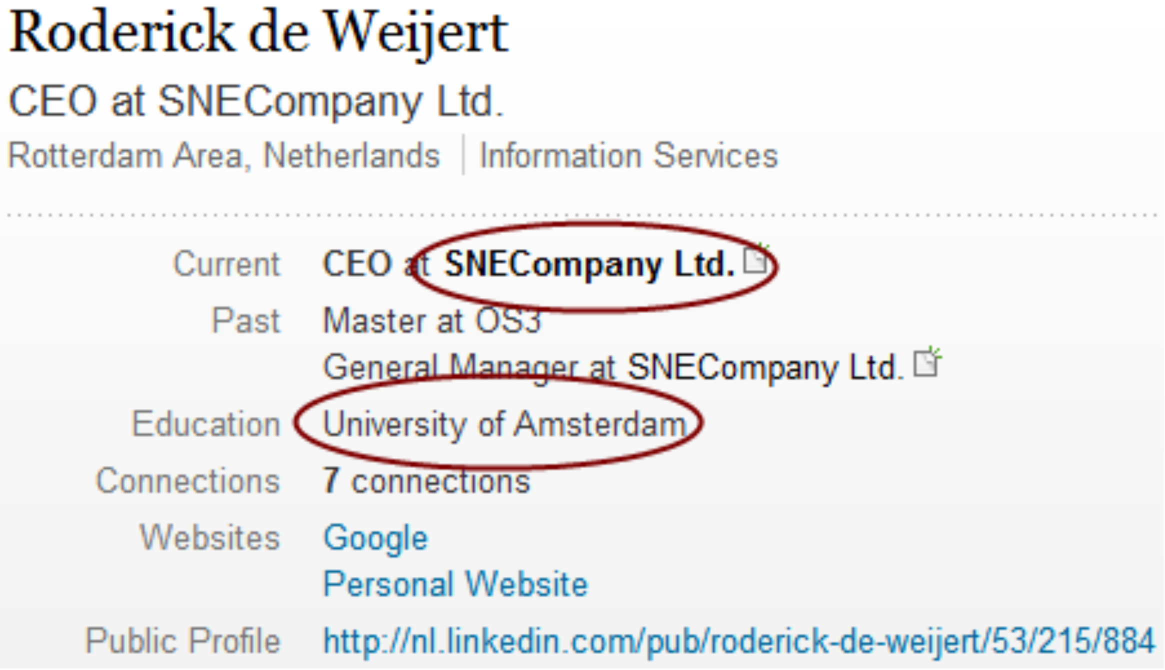
- Getting to user’s private information
  - Not found on LinkedIn

# Profile matching

- Unfortunately the profiles are not a 1-1 relation
- One user’s name on LinkedIn can appear many times on Facebook
  - ~901 million users…
- Matching profiles just by using the name won’t work
  - Social synergy is the key

# Profile matching

- Unfortunately the profiles are not a 1-1 relation

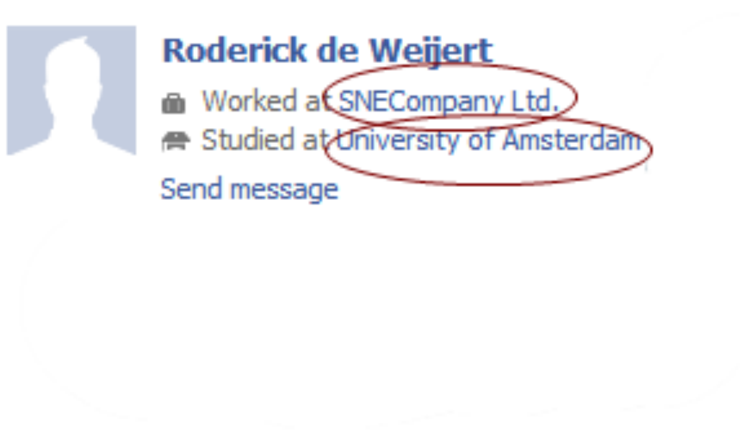


Roderick de Weijert

CEO at SNECompany Ltd.

Rotterdam Area, Netherlands | Information Services

| | |
|---|---|
| Current | CEO at SNECompany Ltd. |
| Past | Master at OS3<br>General Manager at SNECompany Ltd. |
| Education | University of Amsterdam |
| Connections | 7 connections |
| Websites | Google<br>Personal Website |
| Public Profile | http://nl.linkedin.com/pub/roderick-de-weijert/53/215/884 |



Roderick de Weijert

Worked at SNECompany Ltd.

Studied at University of Amsterdam

Send message

# When do we have a match?

- Three ways to define when we have a certain match

1. Matching using public data
2. FLEMP
3. Zombie profiles

# 1) Matching using public data

- Using publicly available data on Facebook

- Can a match be found?
  - Same name, current employment, education, location, etc…

# 2) FLEMP

- “Friend List of Earlier Matched Profiles”
  - Why can this work?
- Search through the publicly available friend lists
- Compares names found in these lists to names of unidentified profiles in our dataset
- If a match is found, the profiles match

# 3) Zombie Profiles

- Use zombie profiles to spam friendship requests
  - When  search returns multiple names and no match can be made
  - Spam friendship requests to all those profiles

- If the user accepts the friendship request
  - Crawl the data
  - Try to make a match with private data that is now accessible

# How do we get the data?

- Public crawling
  - Collect all the information that is publicly available
- Zombie Profiles
  - Shotgun approach – friend as many people as possible
  - Undirected
- iCloner
  - Surgical approach
  - Directed

# iCloner

- Take profile from one social network
- See if it doesn’t exist on the other social network

- Clone his details onto that social network
- Try to connect to his connections

- From LinkedIn ➔ Facebook

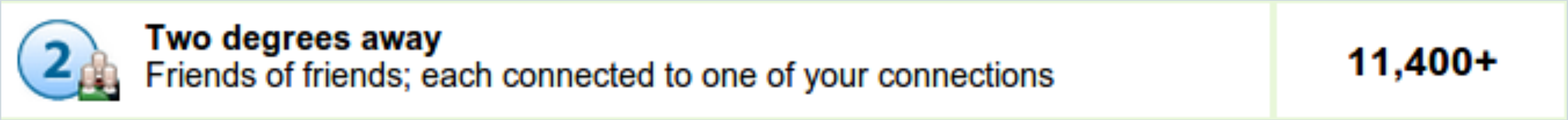
# Which results did we get?

# Time

- 1 day of connecting
- 1 day of crawling
- Resulted in…

# LinkedIn Zombie Profile

- 106 invitations sent
- 39 accepted
- **36.7%**



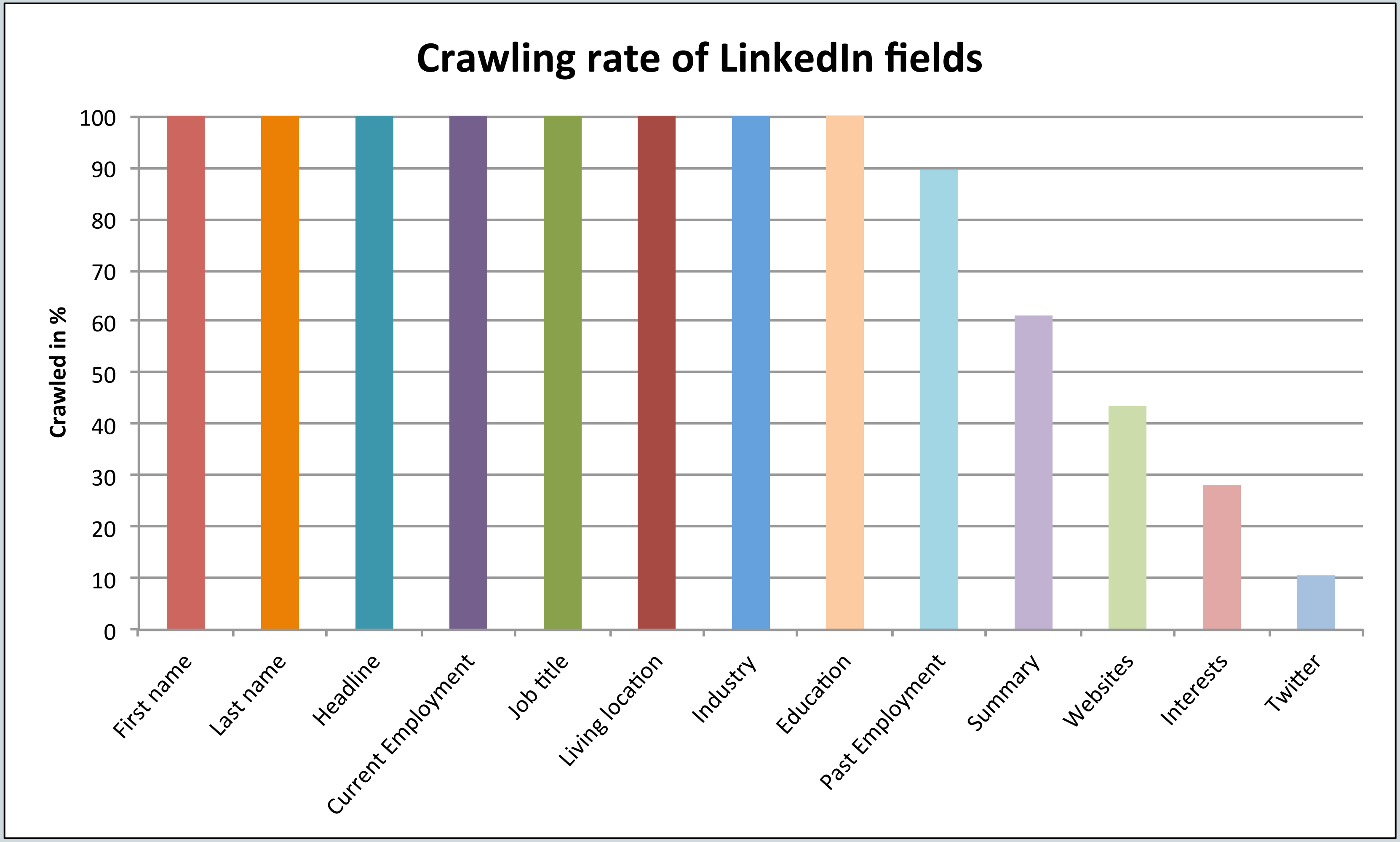
2 **Two degrees away**
Friends of friends; each connected to one of your connections

**11,400+**

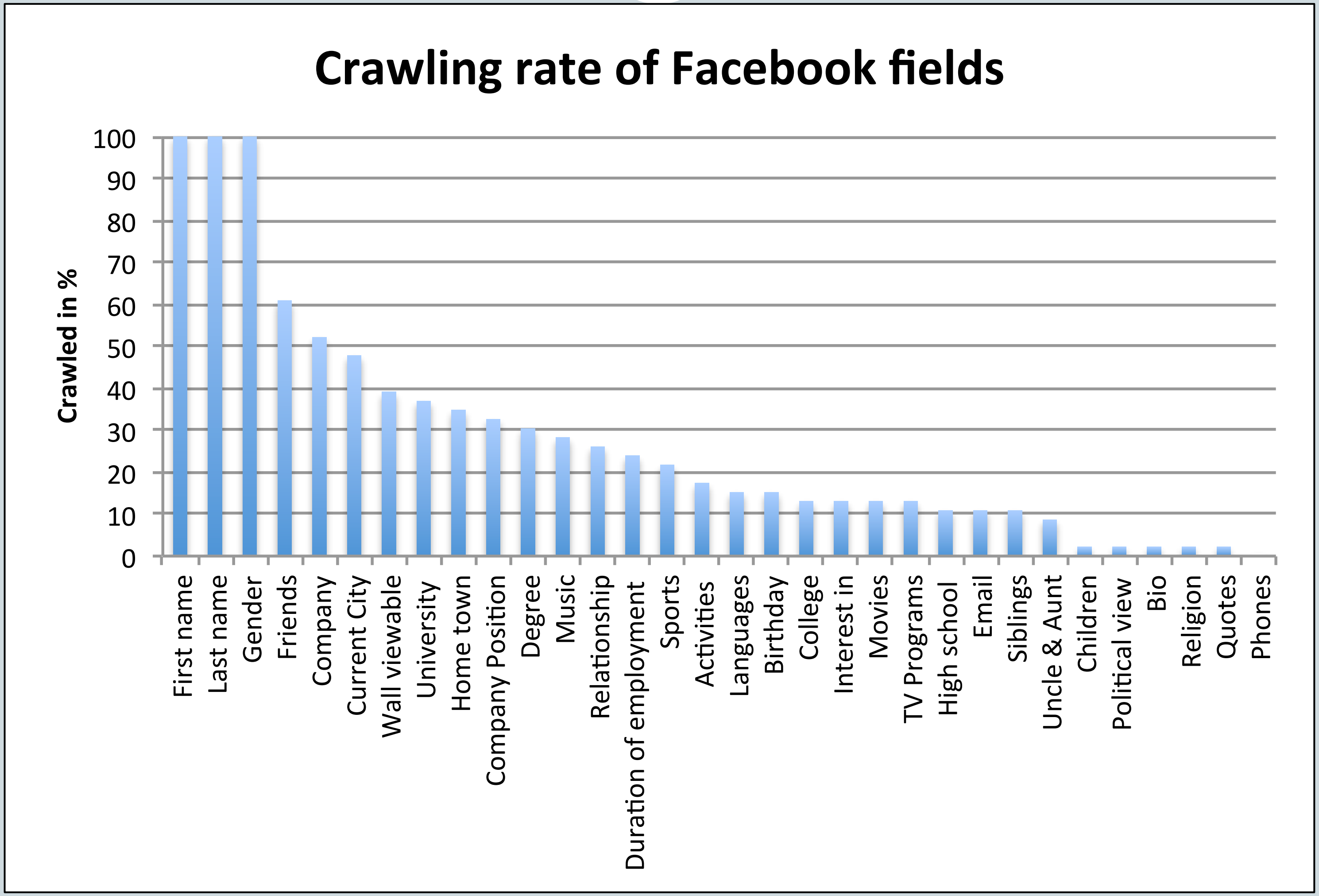
# Defining the final dataset on LinkedIn

- First filtering: 286 profiles
  - Conformed to our initial search on the company
  - All information crawled
- 125 profiles were matched on Facebook
  - **43%**
- After final filtering: 86 profiles defined on LinkedIn
  - 37 on Facebook
  - Another 9 found using FLEMP
  - 0 found by using Zombie Profiles
  - 46 Facebook profiles in total
  - **55%**

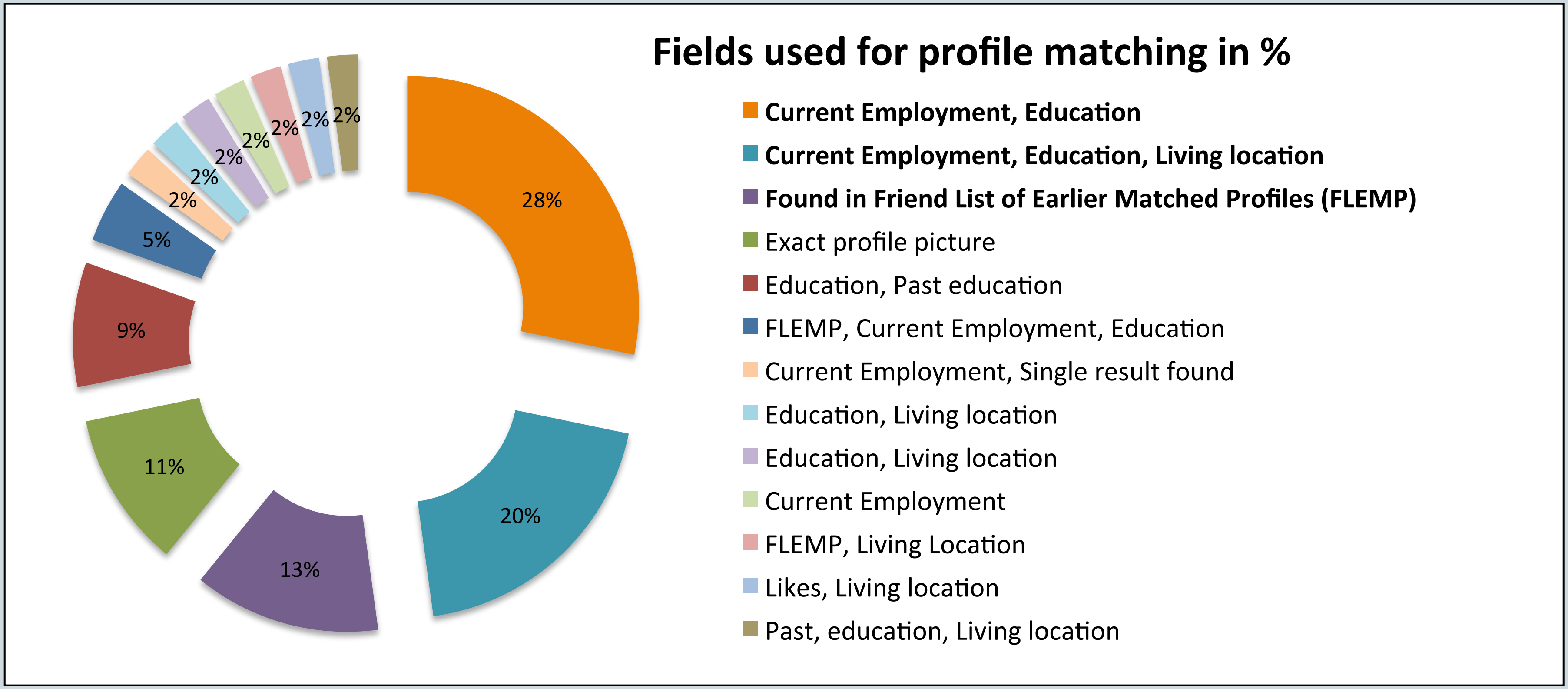
# Information collected on LinkedIn



# Information collected on Facebook



# Matching the information – Social Synergy



# Zombie Profiles and iCloner

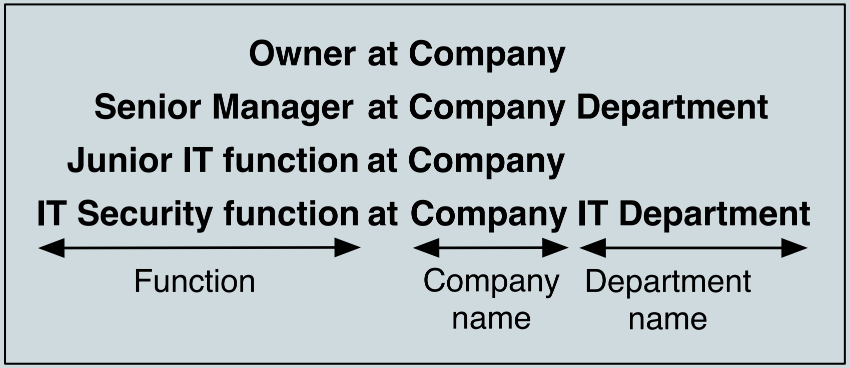
- Zombie Profiles
  - 200 friendship requests sent
  - 13 accepted
  - **6.5%**

- iCloner
  - 10 friendship requests sent
  - 6 accepted
  - **60%**
  - 4 friendship requests received

# What does it all mean?

# Job function parsing

- Parse sub-departments in the targeted department
- Parse job function per sub-departments
- Assign weight to function
- Sort based on weight



Owner at Company

Senior Manager at Company Department

Junior IT function at Company

IT Security function at Company IT Department

Function

Company name

Department name

# DEMO

# Why is this useful?

# Information gathering

- More data can be gathered faster
- Data is automatically sorted
- Hierarchical structure of a company becomes visible
- Allows for social engineers to create attack scenarios easier

# Creating a bond of trust

- Try and build a bond of trust with the target
  - Hey, I heard you just went on a holiday, how was it?
    - Of course you know the target went on a holiday because you saw his Facebook wall posts…
  - I heard from a colleague you bought a new book, how is it?
    - You know the colleague because you created a hierarchy of the company that puts them in the same function
    - But in fact you just crawled the Facebook wall

- Get the target to tell you information that he/she would otherwise have never told you

# Cr trust

- Try and build the target
  - Hey, I heard yo how was it?
    - Of course you holiday because you saw his Facebook v
  - I heard from a ew book, how is it?
    - You know the ted a hierarchy of the company that tion
    - But in fact you wall

[redacted]

[redacted]

- Get the target on that he/she would otherwi ou

# Creating a bond of trust

- Try and build a bond of trust with the target
  - Hey, I heard you just went on a holiday, how was it?
    - Of course you know the target went on a holiday because you saw his Facebook wall posts…
  - I heard from a colleague you bought a new book, how is it?
    - You know the colleague because you created a hierarchy of the company that puts them in the same function
    - But in fact you just crawled the Facebook wall
- Get the target to tell you information that he/she would otherwise have never told you

# t

- Try and rget
  - Hey, I h as it?
    - Of cou because you saw his Fac
  - I heard f k, how is it?
    - You kn erarchy of the compa
    - But in
- Get the t at he/she would ot

# Creating a false sense of authority

- Reference persons placed higher in the company hierarchy
  - Boss X just told me he needs access to those files, can you mail them to me?
- Create a false sense of authority
- Incline the target to comply faster to the social engineer

# What can companies do?

## MITIGATION

# Creating Policies

- Prevent social synergy
  - Don’t put your work or education details on Facebook
- Reduce the effect of data gathering techniques
  - Set the right privacy settings on Facebook data
  - Verify that who you friend is that actual person
- Be generic on LinkedIn
  - Omit exact job function and department?

# Generating user awareness

- Periodic testing of publicly available data
- Perform awareness sessions with concrete examples from our research

# Conclusions

# Conclusion

- How can current information gathering techniques be combined to achieve our goal?
  - Zombie profiles
  - iCloning technique
  - Efficient matching
- What are the consequences for companies?
  - Gathering data becomes easier and faster for social engineers
  - Social engineering attacks can be created easier
  - The company hierarchy can be visualized
- What can companies do to mitigate this process?
  - Create company policies for social media usage
  - Generate user awareness

# Conclusion continued

- Creating a visualized hierarchy of a company and its employees in an automatic way is possible
  - Automated
  - Fast

- Allowed by the wealth of information that is available online

- People are generally not aware at how much information they share online and how easy it is to get access to it – if you really want it

# Questions?

THANK YOU