

Dirty Jobs — The Role of Freelance Labor in Web Service Abuse

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Vulnerability of Web Services

- Many Web services today are free/open access
 - Supported by advertising revenue
 - Reaching critical mass requires low barrier to entry
 - Page views driven by user-generated content
 - Videos, social networking updates, blogs, etc.
- However: openness leaves sites vulnerable
 - Exploitation of free resources
 - Ex: Sending spam from Web-based email accounts
 - Unsanctioned advertising channels
 - Ex: Spamming links on blog comments

Abuse Labor Markets

- Abuse is profitable
 - Kanich et al. estimated \$7k/day email spam revenue
 - Nontrivial to execute many schemes
- Labor markets have evolved to supply workers
 - One such labor market: online freelancing sites
- Why outsource abuse jobs?
 - **Cost effective**: workers originate from low wage regions
 - **Agile**: workers are adept and technically capable
 - **Scale**: ~one million workers on Freelancer.com

Ex: Account Registration

- Scenario: Abuser wants to send spam via Web email
- Prerequisite: Bulk accounts on Gmail

Gmail
by Google

Create an Account

Your Google Account gives you access to Gmail and [other Google services](#). If you already have a Google can [sign in here](#).

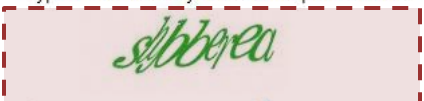
Get started with Gmail


1 First name:

Last name:

Desired Login Name: @gmail.com
Examples: JSmith, John_Smith

Word Verification: Type the characters you see in the picture below.

2 


Letters are not case-sensitive

1 Gmail Fast Account Creator

[Gmail Fast Account Creator](#) is project number 359297 posted at [Freelancer.com](#). [Click here](#) to post your own project.

2 need gmail captcha codes entered

[need gmail captcha codes entered](#) is project number 452532 posted at [Freelancer.com](#). [Click here](#) to post your own project.

"i need gmail captcha entry agent immediately. 1000's new captcha entrys per week

Ex: Account Registration

- Problem: Google detects mass account creation
- Solution: Purchase IP proxy services



This account has been locked down due to unusual account activity. It may take up to 24 hours for you to regain access.

Unusual account activity includes, but is not limited to:

1. Receiving, deleting, or downloading large amounts of mail via POP in a short period of time.
2. Sending a large number of undeliverable messages (messages that bounce back).
3. Using file-sharing or file-storage software, browser extensions, or third party software that automatically logs in to your account.
4. Leaving multiple instances of your Gmail account open.
5. Browser-related issues. Please note that if you find your browser continually reloading while attempting to access your Inbox, it's probably a browser issue, and it may be necessary to clear your browser's cache and cookies.

Need software to hide IP, Proxy , Switch IP, Proxy

[Need software to hide IP, Proxy , Switch IP, Proxy - HQ](#) is project number 1063009 posted at [Freelancer.com](#). [Click here](#) to post your own project.

Proxy - We Need THOUSANDS of USA Anonymous

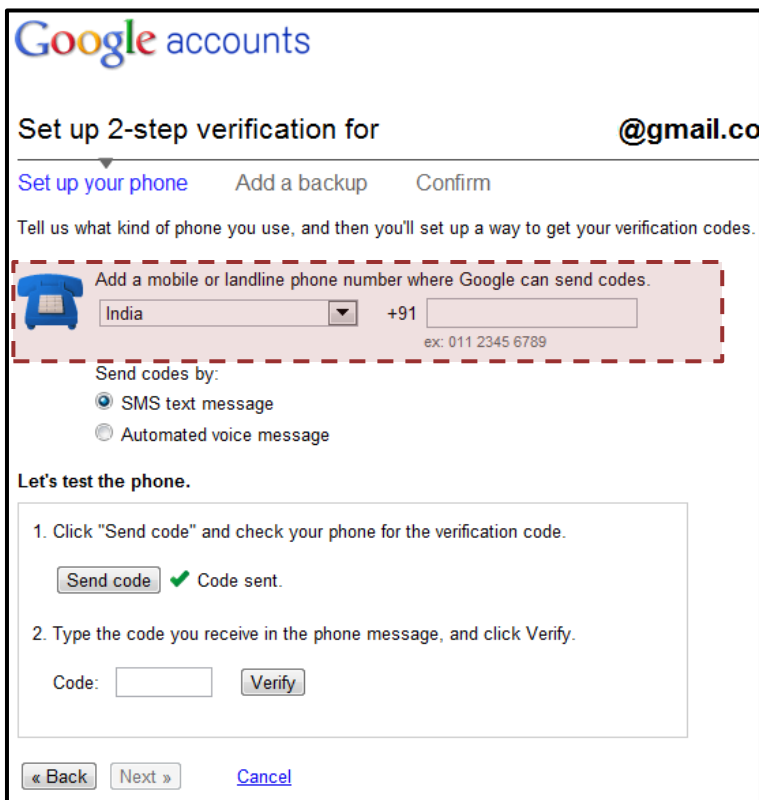
[Proxy - We Need THOUSANDS of USA Anonymous Proxies](#) is project number 1098131 posted at [Freelancer.com](#). [Click here](#) to post your own project.

Proxy Need for Gmail & yahoo account Creating

[Proxy Need for Gmail & yahoo account Creating](#) is project number 445040 posted at [Freelancer.com](#). [Click here](#) to post your own project.

Ex: Account Registration

- Problem: Google implements phone verification
- Solution: Buy telephone numbers




Google accounts

Set up 2-step verification for **@gmail.co**

[Set up your phone](#) Add a backup Confirm

Tell us what kind of phone you use, and then you'll set up a way to get your verification codes.

 Add a mobile or landline phone number where Google can send codes.

India +91

ex: 011 2345 6789

Send codes by:

SMS text message

Automated voice message

Let's test the phone.

1. Click "Send code" and check your phone for the verification code.

✓ Code sent.

2. Type the code you receive in the phone message, and click Verify.

Code:

[Cancel](#)

Need U.S. Based Phone Numbers For PVA Verification

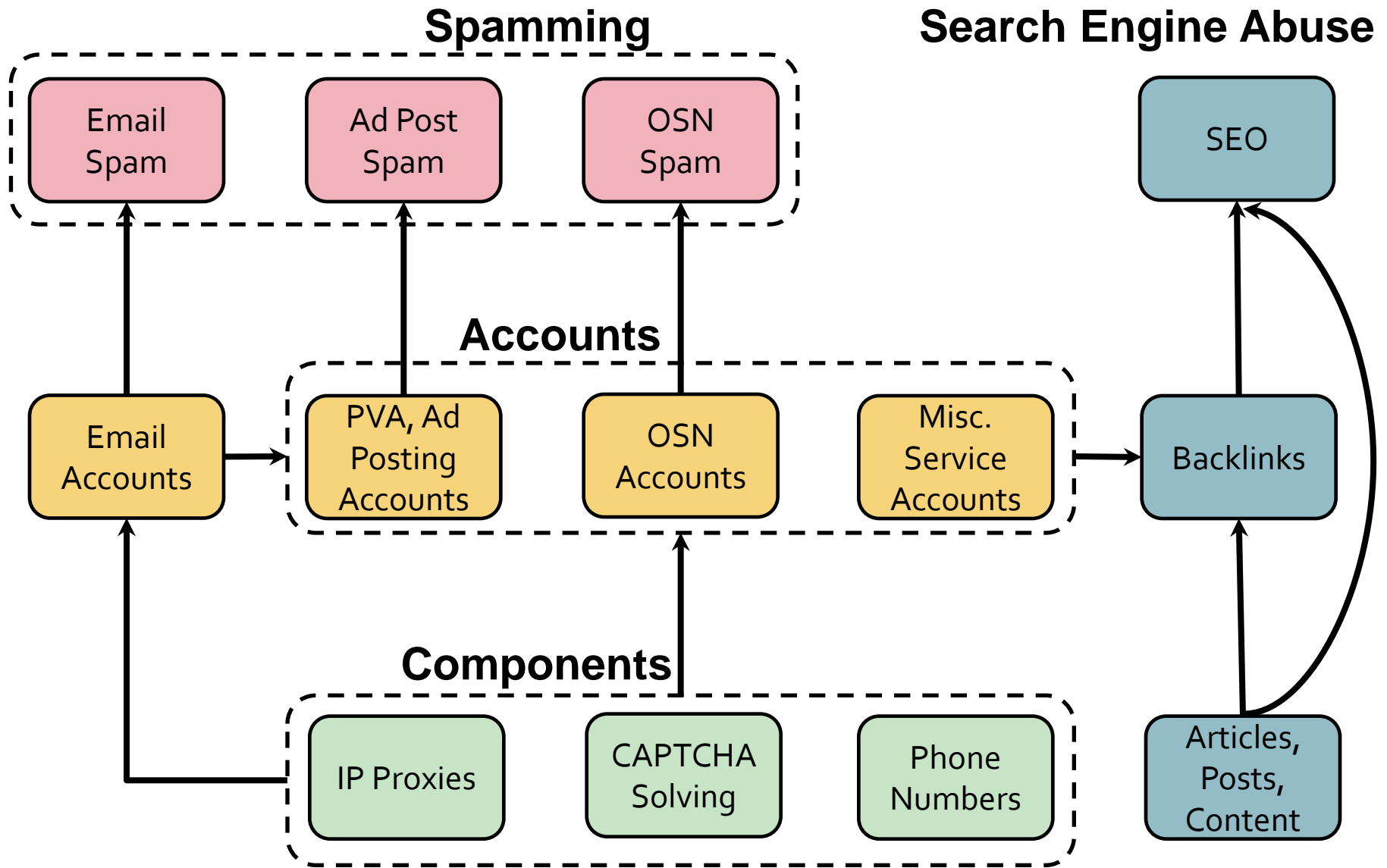
[Need U.S. Based Phone Numbers For PVA Verification](#) is project number 613889
posted at [Freelancer.com](#). [Click here](#) to post your own project.

100 DID Forwarding Numbers for PVA Creation

[100 DID Forwarding Numbers for PVA Creation](#) is project number 484506
posted at [Freelancer.com](#). [Click here](#) to post your own project.

1K Phone Activated Gmail Accounts Wanted

[1K Phone Activated Gmail Accounts Wanted](#) is project number 565733
posted at [Freelancer.com](#). [Click here](#) to post your own project.



Overview

- Goal: Assess the role of freelance labor in supporting Web abuse by investigating...
 - Types of services currently available
 - Demand for various jobs
 - Cost of each abuse task
 - Quality of the delivered work
- Approach:
 - Characterize job postings on Freelancer.com
 - Post jobs and hire workers

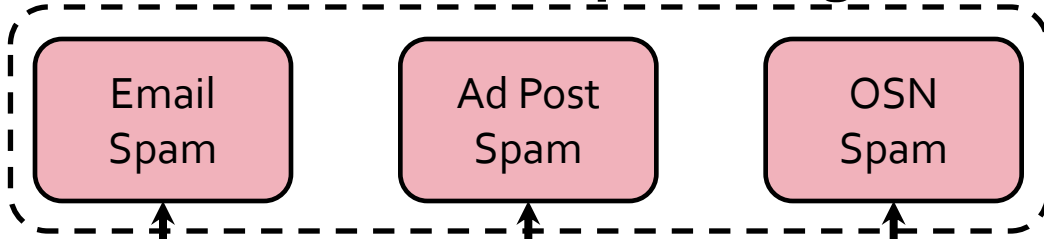
Freelancer.com Background

- Freelancer.com: one of the largest outsourcing and oldest freelancing sites
 - Claims over two million employers and workers
 - User population covers 234 countries/regions
 - Exports API to query info on users and jobs
- How it works:
 1. Buyers/employers post jobs
 2. Workers bid on jobs
 3. Buyers select workers

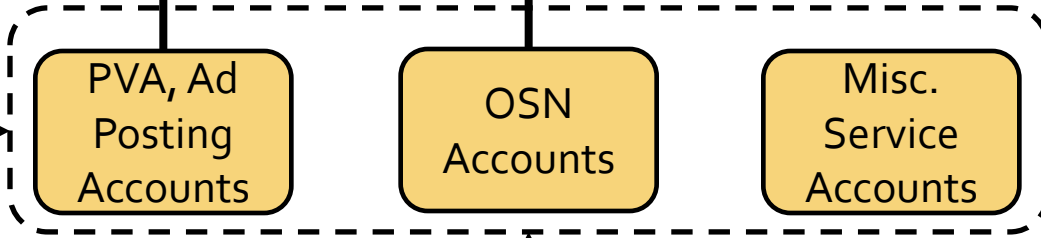
Methodology

- Obtained seven years worth of job/user data:
 - 840 k job descriptions
 - 815 k user profiles
 - 12 million bids
- Categorizing dataset:
 - Of 2k manually labeled jobs: ~30% abusive
 - Beyond 2k jobs: trained SVM classifiers for 9 job types
- Posted jobs to test quality/delivery of products

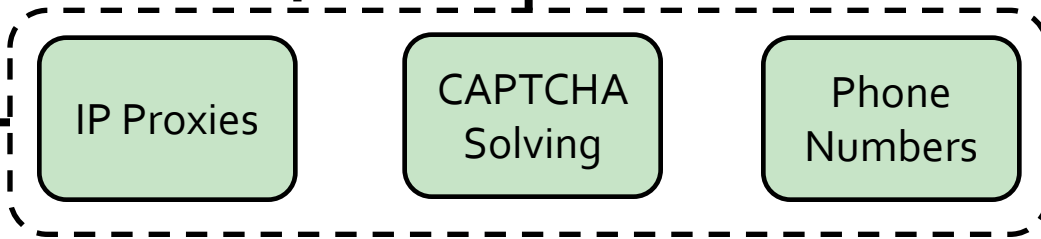
Spamming



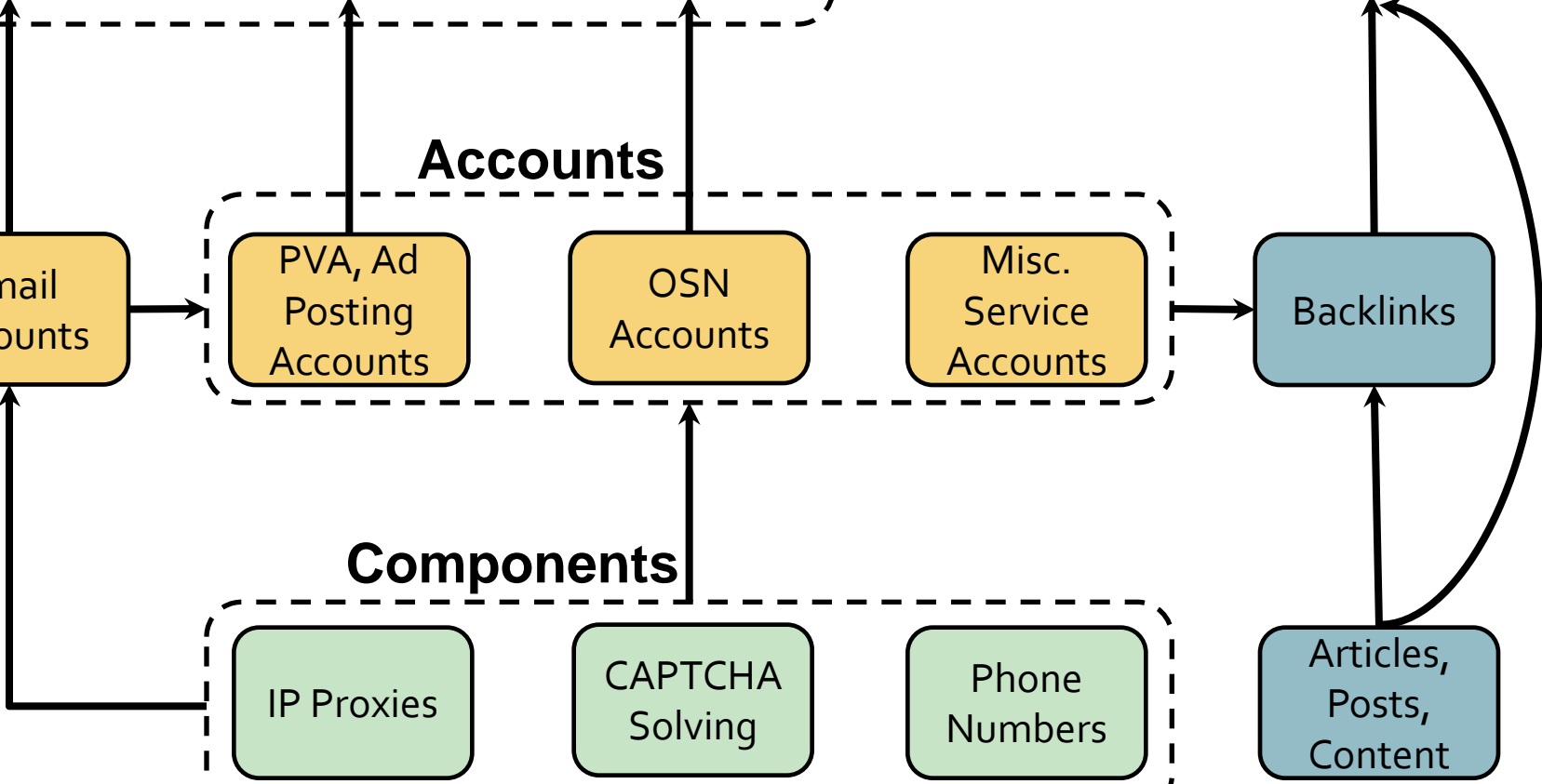
Accounts



Components



Search Engine Abuse



Accounts Registration Jobs

- Many abuse schemes require accounts
 - To scale abuse, need large quantity
- **Basic Accounts:**
 - Requirements: CAPTCHA solve, IP diversity
 - Examples: Plain Gmail, Hotmail, Facebook
- **Verified Accounts:**
 - Requirements: Phone numbers, credit cards, etc.
 - Examples: Craigslist PVA, Ebay Verified Seller

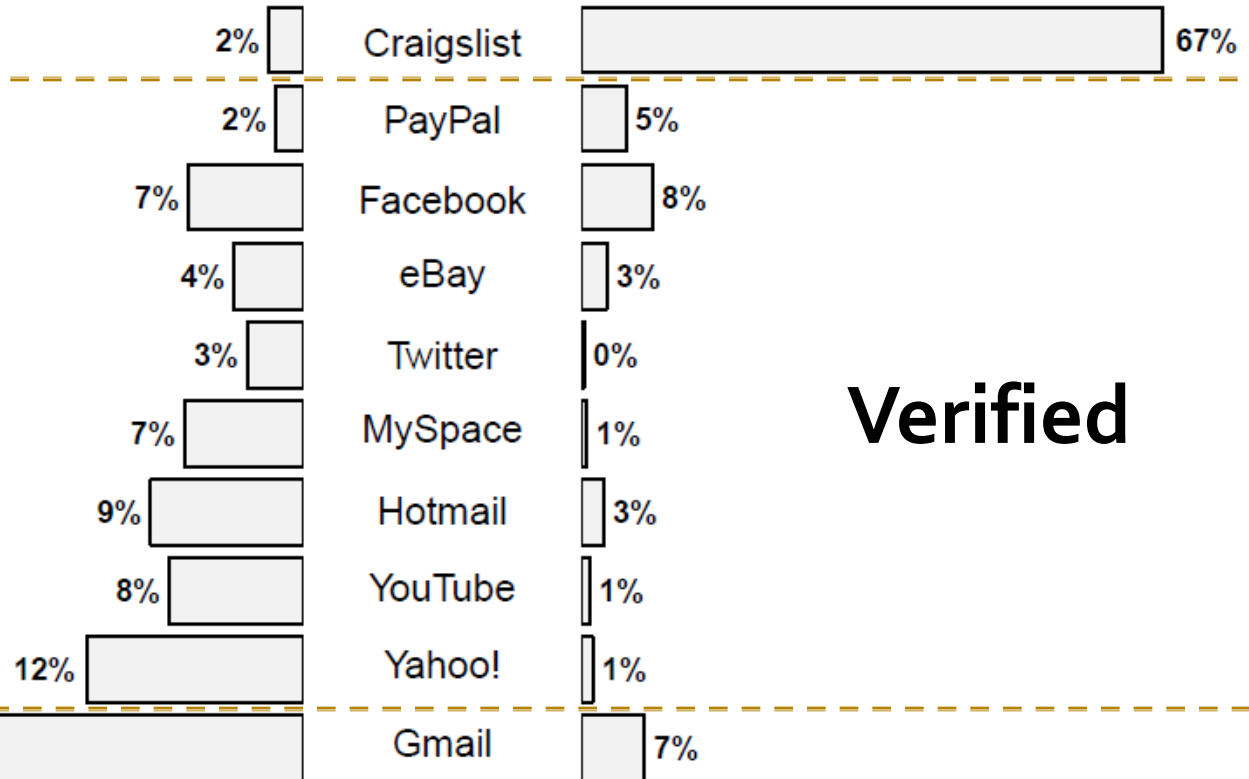
Need 50 - 200 fresh Craigslist PVA's

[Need 50 - 200 fresh Craigslist PVA's](#) is project number 425422 posted at [Freelancer.com](#). [Click here](#) to post your own project.

50-200 fresh Craigslist PVA's... made with different US IP... U.S phone number

Basic

Verified



Need 50K gmail account must US ips and female name

[Need 50K gmail account must US ips and female name](#) is project number 436204 posted at [Freelancer.com](#). [Click here](#) to post your own project.

Gmail accounts...US ips and female name ... rate \$9/1000, need 50k

Worker Engagement: Accounts

- Can workers deliver valid, bulk, web-based email accounts?

Name	Rating	Tested	Valid (%)	Age (Days)
IN ₁ *	9.8	500	100.0	0.4
UK ₁	9.9	3,500	99.9	25.7
BD ₁	10	6,999	99.6	24.7
IN ₂	9.8	5,015	99.6	9.7
PK ₁	10	4,999	99.4	78.6
PK ₂	9.8	4,000	95.4	82.6
PK ₃	9.9	4,013	77.3	414.7
IN ₃	9.9	6,200	76.2	30.7
CA ₁ **	9.6	508	15.7	21.7

Used Inboxes

Craigslist

██████████

Re: Looking for a real female that is real and down to earth and fun.. Thomas, your friends from curly wurly are waiting for you

██████████

Re: MM for Female - m4w (Morristown/Rogersville)

██████████

Re: MARRIED 4 MARRIED - m4w - 34 (long island)

██████████

Re: MARRIED 4 MARRIED - m4w - 34 (long island)

██████████

Re: Looking for a life experience - m4w - 23

Facebook

Facebook

Thomas, your friends from curly wurly are waiting for you

Facebook

Thomas, you have notifications pending

Facebook

██████████ wants to be friends on Facebook.

Facebook

██████████ confirmed you as a friend on Facebook...

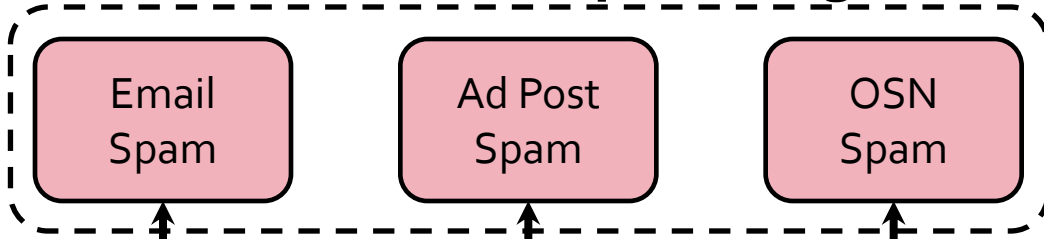
Facebook

██████████ confirmed you as a friend on Facebook...

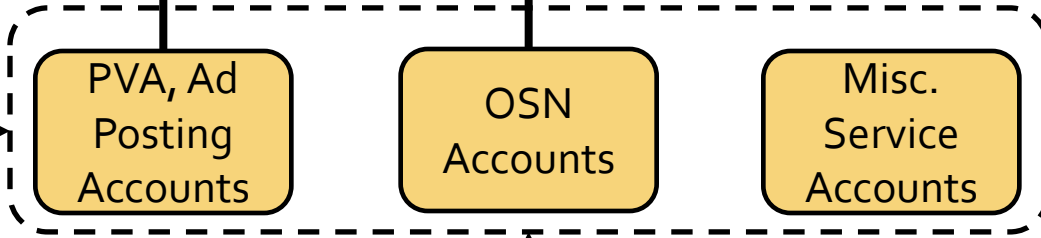
Facebook

██████████ wants to be friends on Facebook.

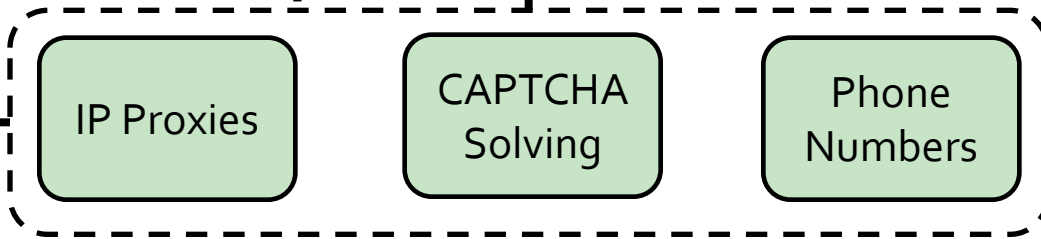
Spamming



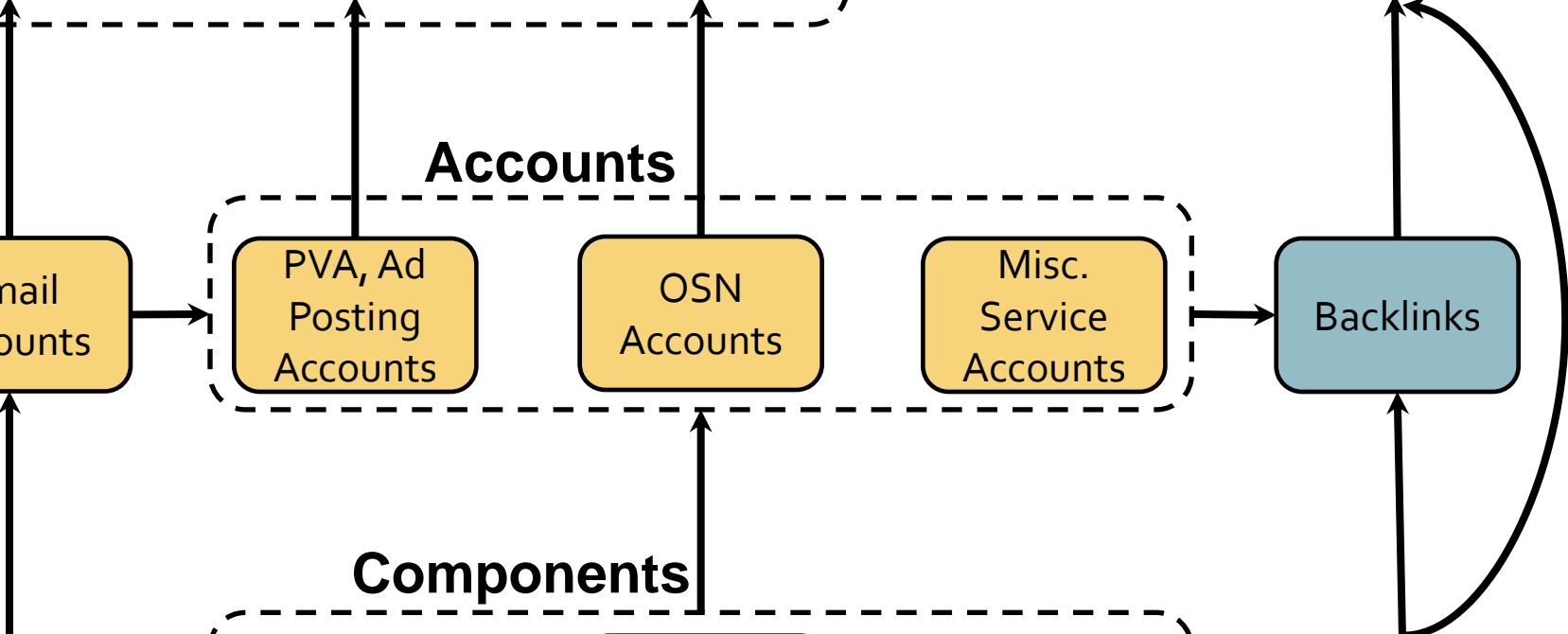
Accounts



Components



Search Engine Abuse

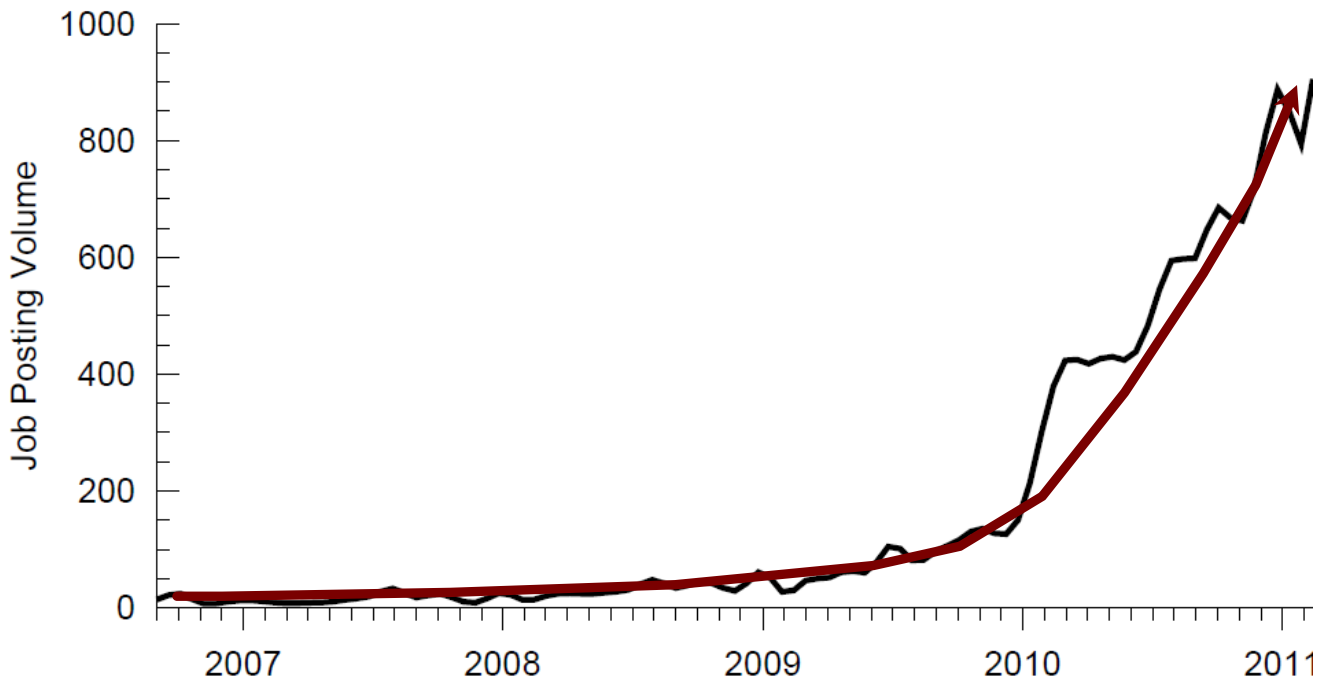


Spamming Web Services

- **Online Ad Postings**: Jobs to post daily advertisements to Craigslist, Kijiji, etc.
- **Bulk Emailing**: Jobs to send bulk emails
- **Online Social Network Linking**: Jobs that involve creating social links to users

OSN Linking

- Buying friends, Facebook fans/likes for website pages, Twitter followers, YouTube subscribers, etc.
- Trend: Surging rise in demand



Example: OSN Linking Job

Need Fans Added to my Facebook!!!

[Need Fans Added to my Facebook!!!](#) is project number 599817 posted at [Freelancer.com](#). [Click here](#) to post your own project.

I need to build up my fan base on Facebook for my musician page... Here is link to my page...

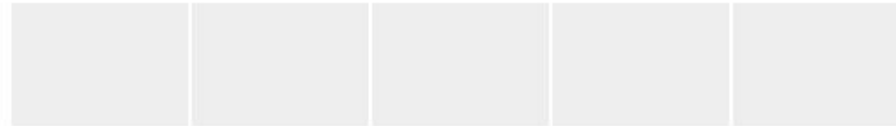


- Wall
- Info
- Photos
- Discussions
- Links

1,955
people like this

Trouble T. Like

Musician/Band



Wall

Trouble T. · Most Recent



Trouble T.

All the waaay thru. 'I'm On One' Freestyle.



I'm On One Freestyle [CDQ]--TROUBLE T.

www.youtube.com

Start to finish of just what I was feelin' went I thru the beat on...I was 'On One' when I went it!! DL the MP3:
<http://www.mediafire.com/?v1pt3drd9bcq58u>

 May 24 at 5:04pm · Share

 2 people like this.



Trouble T. Download here: <http://www.mediafire.com/?v1pt3drd9bcq58u>

May 24 at 5:05pm

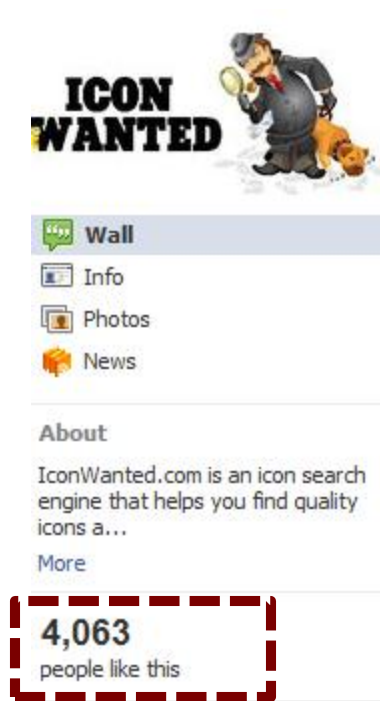
RECENT ACTIVITY

Example: OSN Linking Job


Facebook Fans Required (4,000) - Real working fans.

[Facebook Fans Required \(4,000\) - Real working fans.](#) is project number 1058372 posted at [Freelancer.com](#). [Click here](#) to post your own project.

I'd also like to know your plan for converting people into buyers and monetizing the page...



ICON WANTED



Wall
Info
Photos
News

About
IconWanted.com is an icon search engine that helps you find quality icons a...
More

4,063
people like this

IconWanted Like

Computers/Technology



Wall

IconWanted · Most Recent ▼



N TED IconWanted

10 Mistakes Feedback – Consider It!

Through this article the author is imagining to attract more icon lovers who are more excited to know about the various icon designs. However, the visitors are never required to move through the boring reading option. In this article 10 Mistake in Icon Design, the icons designers are offering lots of ideas that are much essential for the designers to design perfect and attractive icons that easily to access....

Source: [StyleXP](#)

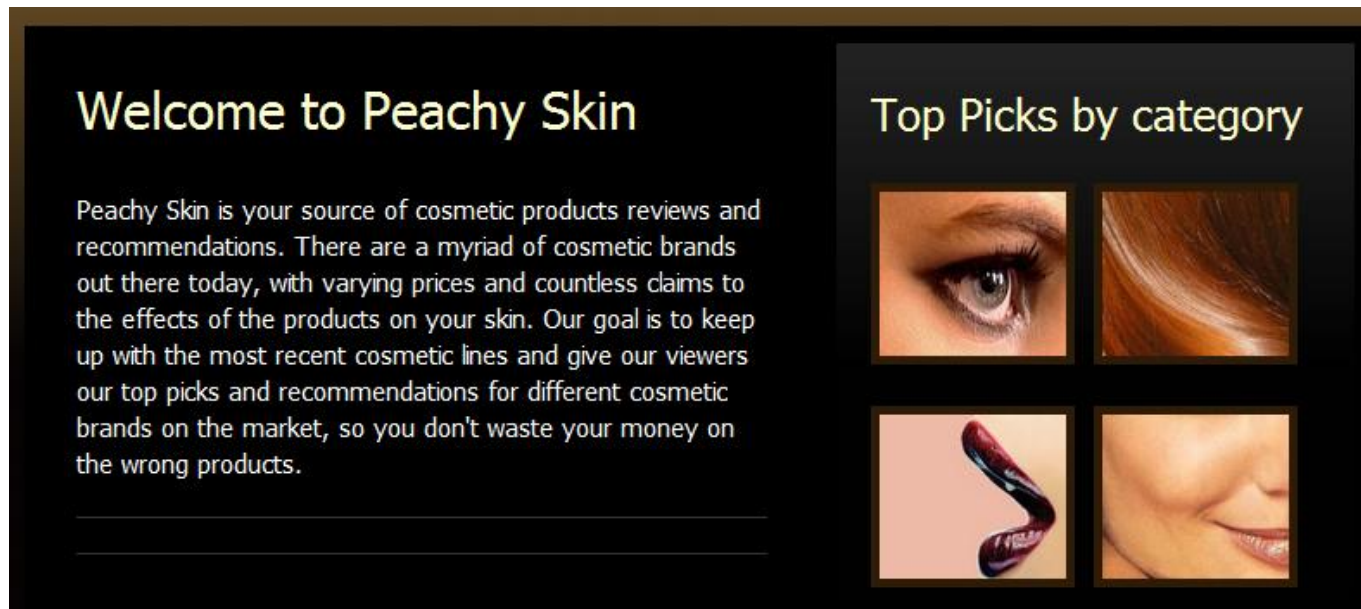
Published: 2011-06-20 07:54:01 GMT

Target Characteristics

- Facebook, MySpace, Twitter, and YouTube mentioned in 97% of jobs
- Targeted demographics: High-income English speaking countries
 - US (46%), UK (13.2%), Canada (9.5%) , AU(6.2%)
- Employers want real users:
 - Over 50% of jobs included “real” and “active”

Worker Engagement: OSN Links

- Can workers deliver quality social links?
- Task: Acquire 1k links for a skin care site
 - Target real people based in US, UK, and Canada







The screenshot shows the homepage of the website 'Peachy Skin'. The page has a dark background with white text. On the left, there is a 'Welcome to Peachy Skin' section with a paragraph of introductory text. On the right, there is a 'Top Picks by category' section featuring four small square images arranged in a 2x2 grid. The images show close-ups of a person's eye, hair, lips, and a smile.

Welcome to Peachy Skin

Peachy Skin is your source of cosmetic products reviews and recommendations. There are a myriad of cosmetic brands out there today, with varying prices and countless claims to the effects of the products on your skin. Our goal is to keep up with the most recent cosmetic lines and give our viewers our top picks and recommendations for different cosmetic brands on the market, so you don't waste your money on the wrong products.

Top Picks by category



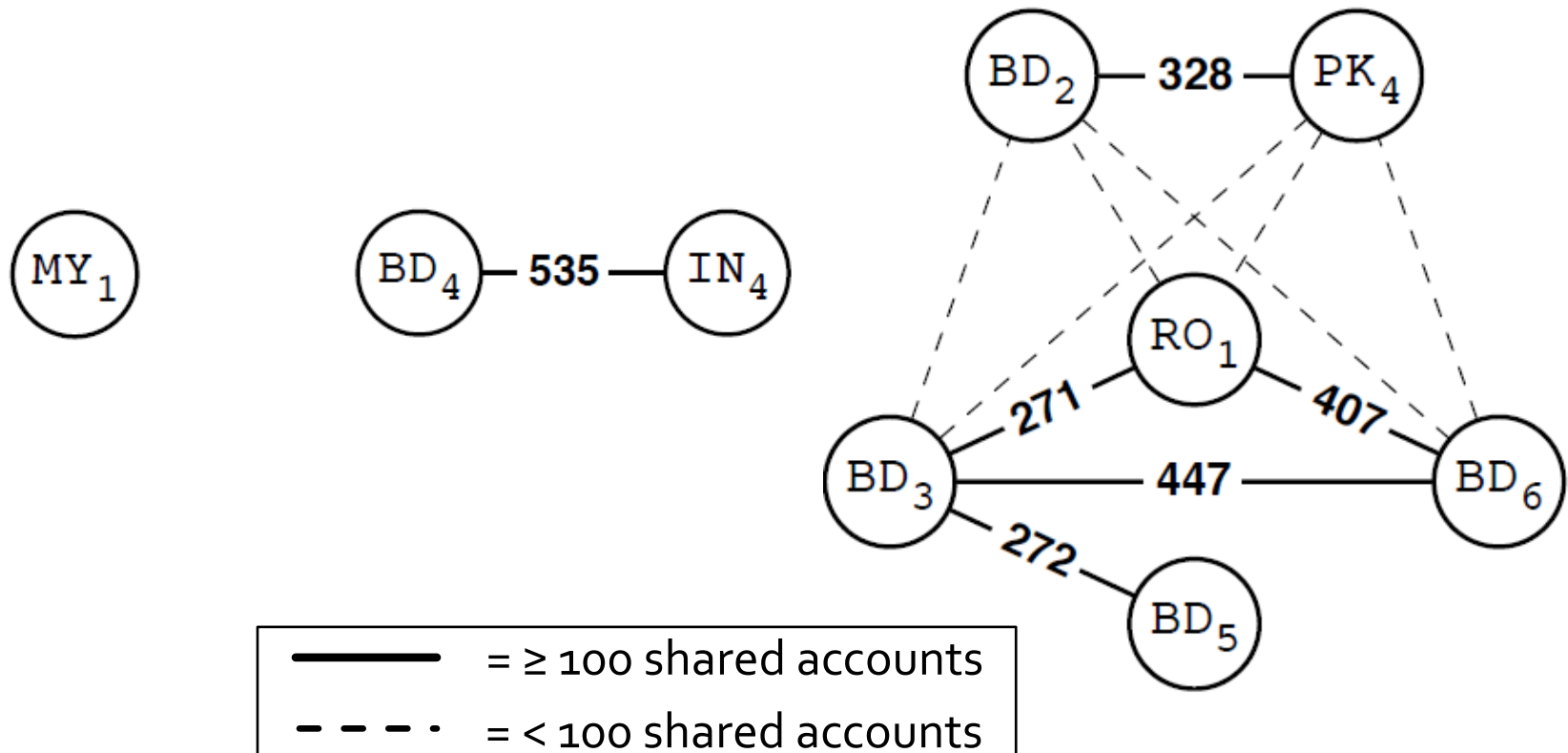
Result of Purchasing Links

- Overview: Of the 10 workers selected, only 1 delivered “quality” links

Name	Rating	Links	Top Countries (%)			
			US	IN	BD	PH
BD ₂	9.8	1,034	26.2	13.8	5.9	7.7
BD ₃	9.8	1,081	43.3	7.4	32.5	4.4
BD ₄	8.4	1,063	74.5	0.3	25.2	—
BD ₅	10	1,071	—	—	100	—
BD ₆	10	1,145	60.0	8.7	8.4	5.3
BD ₇ *	9.8	555	30.6	10.4	10.6	8.4
IN ₄	9.9	1,095	64.3	25.1	10.5	—
MY ₁	9.8	1,110	99.1	—	—	0.1
PK ₄	—	1,015	24.7	9.2	5.9	7.0
RO ₁	10	1,058	31.8	11.0	8.8	8.4

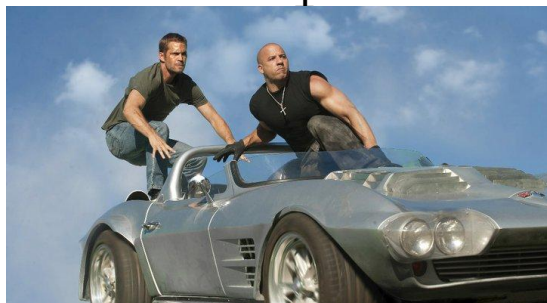
Determining User "Realness"

- Goal: Assess if page links come from real users
 - Observation: Same users appear in multiple sets



“Realness” of Delivered Users

- Users are fake: few friends, substantial number of links to other websites
 - MY₁ delivered real, unsuspecting users



Madden Scott
Friends: 0
Page Links: ~1,085

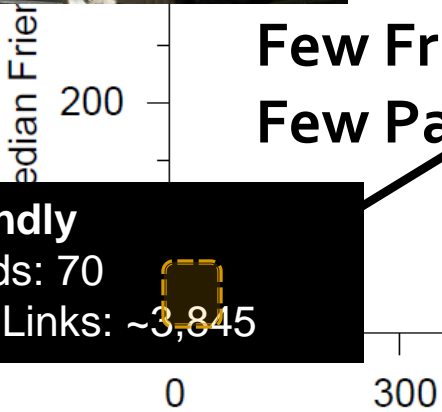


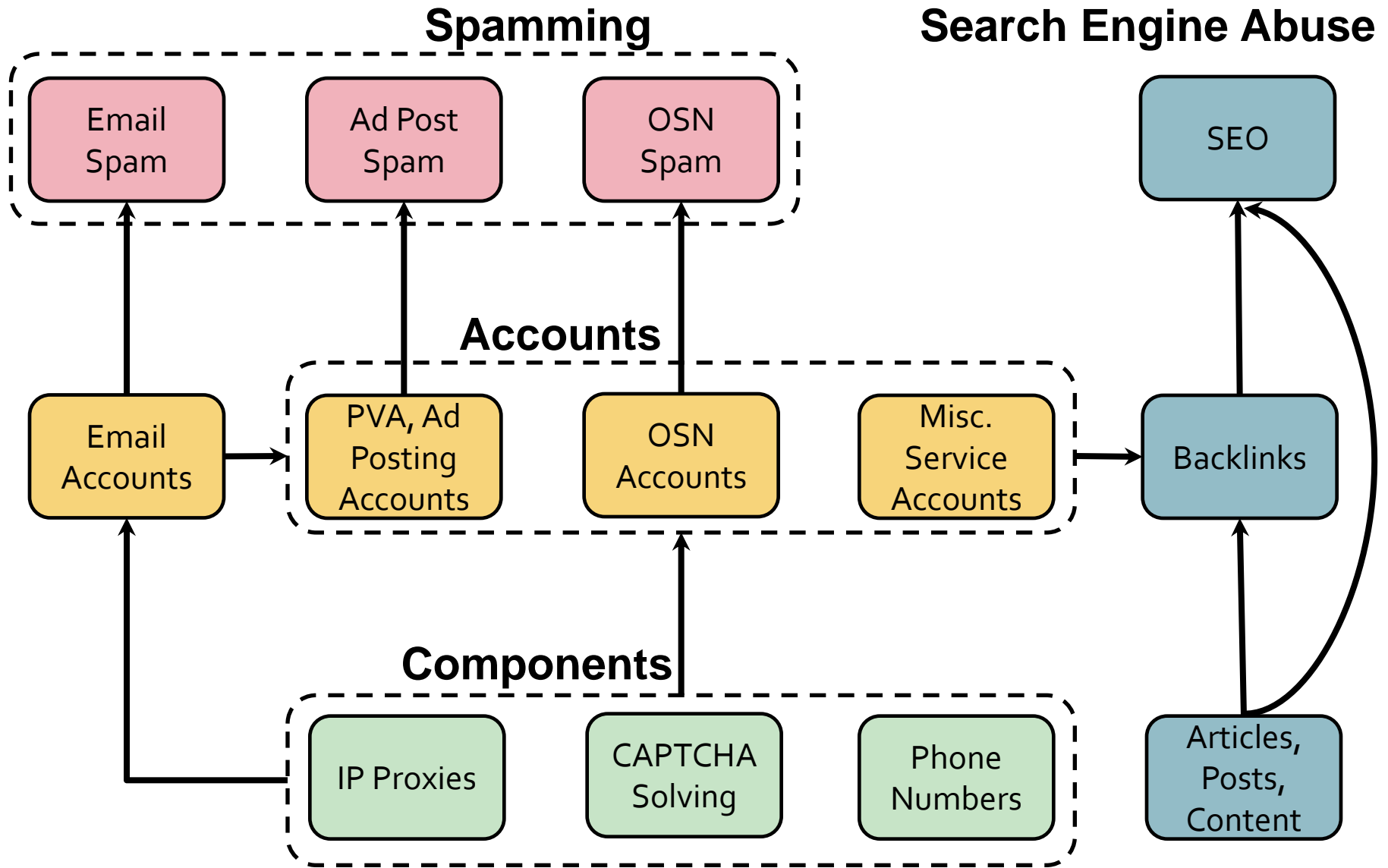
Few F
Many Page Links



Arthur Santos
Friends: 11
Page Links: ~32
About me:
I am an honest Man ... I am a single mom of 2 girls and it is not easy... I am a hot latina, LMAO!!!

Mia Windly
Friends: 70
Page Links: ~3,845





SEO Backlink Purchasing

- **Goal**: Drive traffic to target website by gaming search engine algorithms
- **Background** (Google):
 - Backlinks: Incoming links to target website
 - Site's PageRank score based on backlink quality
- **Scheme**: Acquire large quantities of backlinks, either by spamming or purchasing

Backlink Job Classes

Yahoo QA + Blog Commenting + Link Building Project

[Yahoo QA + Blog Commenting + Link Building Project](#) is project number 1011018
posted at [Freelancer.com](#). [Click here](#) to post your own project.

- Need someone with Level-2 Yahoo accounts who can post Q&A... will provide with live/click-able link to my website. I will pay 20 cents each.
- I need links for Relevant Blogs for product I am selling ...recommend my product and post a link to my website

- “Greyhat”: Spamming forums, blogs, social bookmarking sites with backlinks

Backlink Job Classes

Need 1000 backlinks from PR4+ sites

[Need 1000 backlinks from PR4+ sites](#) is project number 1143598 posted at [Freelancer.com](#). [Click here](#) to post your own project.

- No classifieds or mortgage, gaming, web directories...
- No article directories, forums...
- No link farms, no link-exchange programs...
- No exchange programs, web rings...
- No gambling, adult & porn sites, pharmacy sites....

- “Greyhat”: Spamming forums, blogs, social bookmarking sites with backlinks
- “Whitehat”: Explicitly forbids abusive techniques, but specifies PR of sites to purchase from

"Greyhat" SEO: Spammed Sites

- Objective: Determine sites targeted for backlink abuse
- Methodology: Extract target URLs from job posts and use Yahoo Site Explorer API to find backlinks

Social Bookmarking Submission Service

Social Bookmarking Submis
posted at Freelancer.com. Cli

Domain Name	Num. Sites	Num. Inlinks
Blogspot	316	10,028
Wordpress	213	2,402
Yahoo	147	1,187
ArticlesBase	143	747
Folkd	108	302

www.Naturalherbalz.com...

Bookmarking
ssions

www.svportal.com/xi

886. /
F

887. *benicar patient comments* Says:
February 4th, 2008 at 8:26 pm

Cool site. Thank you.

Don't suffer in silence get the average penis g
www.naturalherbalz.com/menshealth/penis-

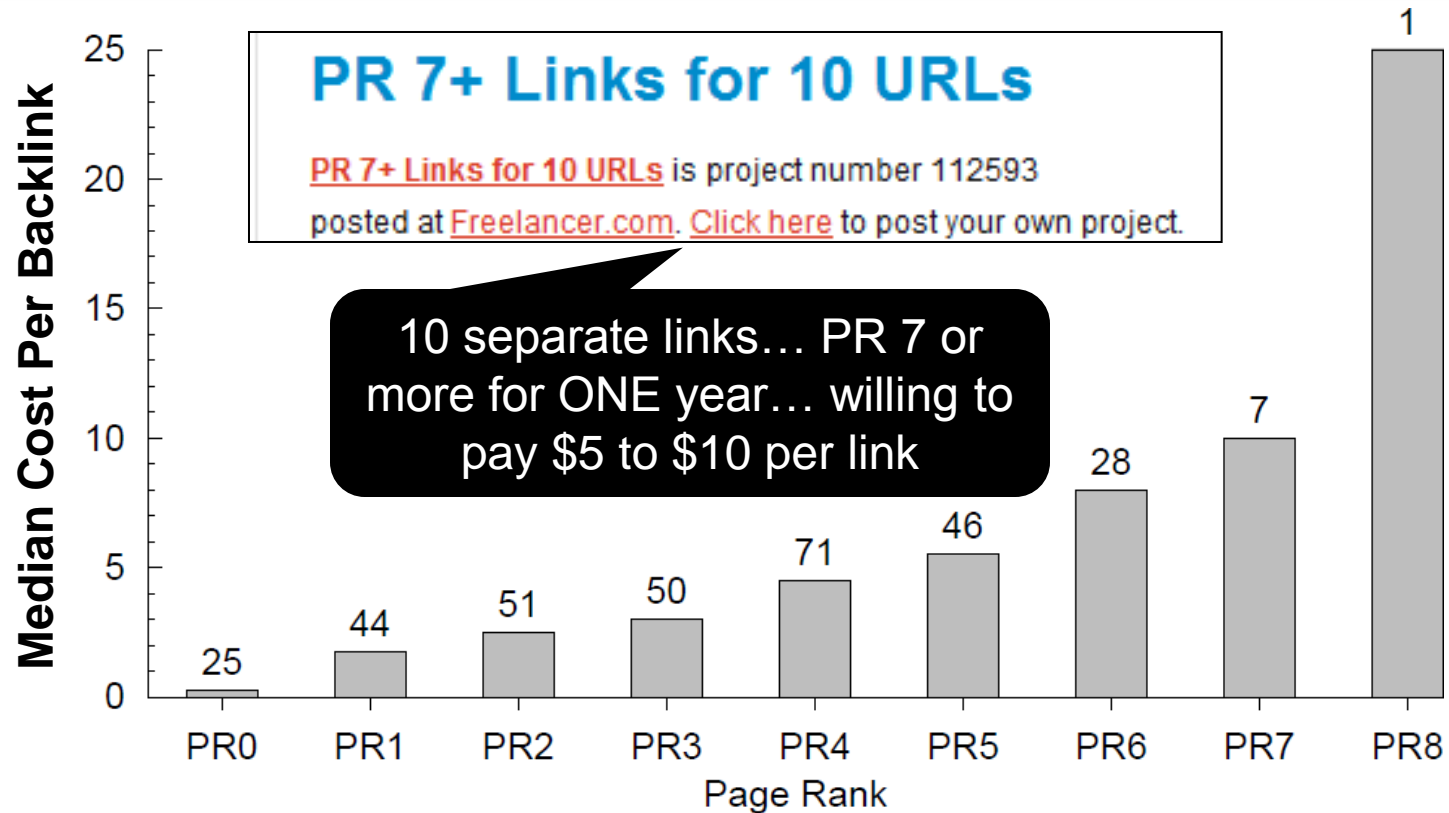
Enhancement:

is there any side effects of using virility ex male enhancement pill
virility ex pills to gain some inches in your penis length and girth?
effects of using any male enhancement pills? can i order it online
http://www.naturalherbalz.com ?

ylc=X3oDMTVrdW9h

Enlargement

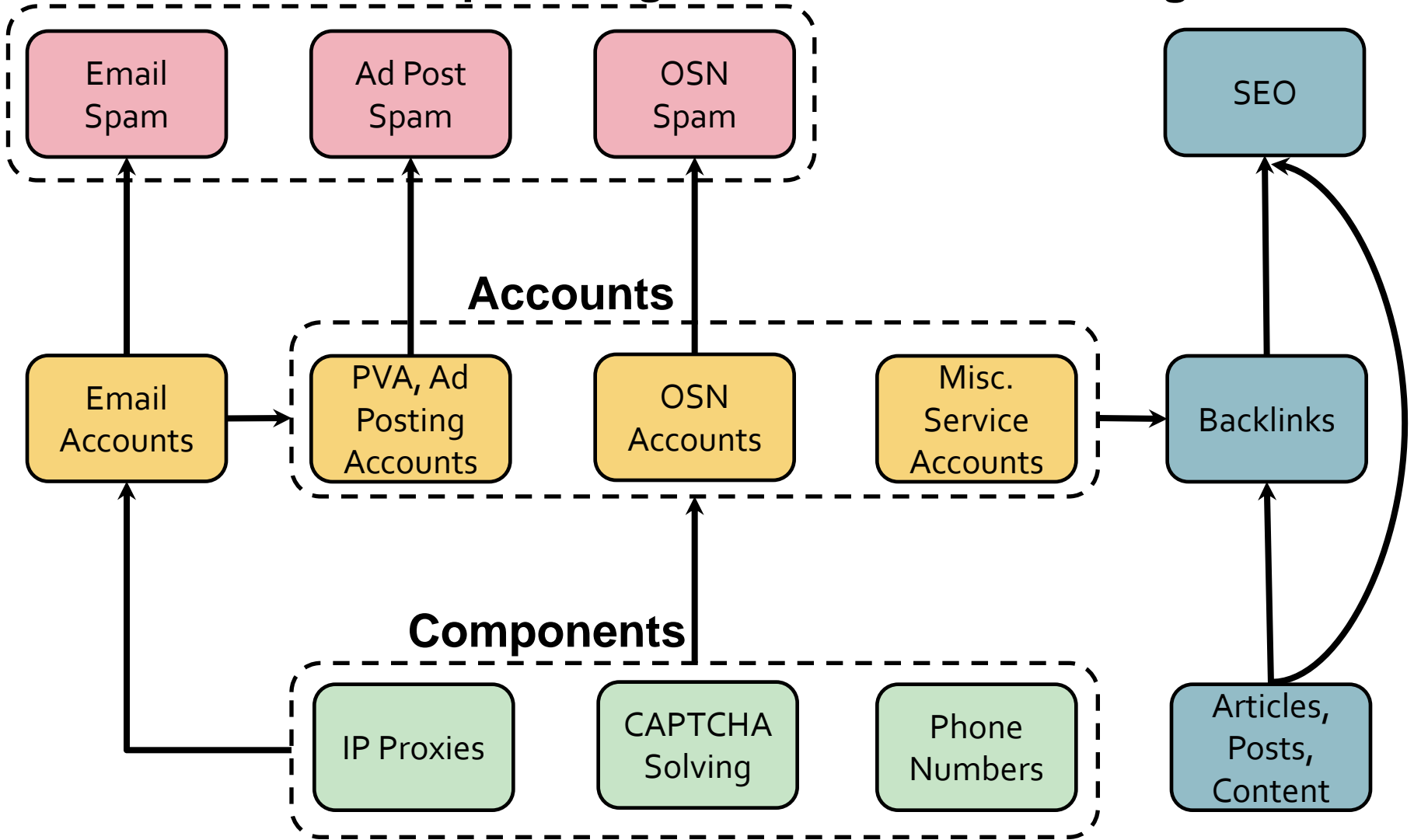
“Whitehat” SEO: Backlink Pricing



- Buyers willing to pay workers between \$0.50 and \$25 for backlinks depending on PR of site

Spamming

Search Engine Abuse



Search Engine-Oriented Content

Ads By Google [Pimple Treatment](#) [Reduce Acne Scars](#) [Pimples Remove](#) [Acne Treatment](#)

Acne Treatments - Getting Rid of Blackheads

By *Shane Nolan*

Ads by Google

[Neutrogena @ skiniD@](#)Your Personalized Acne Solution. Take Your Free skiniD@ Evaluation. [www.skiniD.com](#)

[Cystic Acne Treatment](#)Mario Badescu Skin Care's Proven Cystic Acne

Google™ Custom Search

Shane Nolan

[www.HSI](#)

No matter what type of Acne you suffer from, and no matter what area of your body is affected, getting rid of blackheads and Acne is possible. The sooner you start treating your Acne, the easier it is. If you want some help you can go to [www.gettingridofpimplesandzits.com](#), here you can get good advice and learn what to do, to improve your skin.

Getting rid of blackheads takes a small effort, but the boost to your self esteem and confidence will be tremendous.

Author
Shane Nolan

My main reasoning for article writing is to try to inform as many people as possible about the benefits of suffering from Acne and a lack of information about the causes of it. I have tried to inform and help suffer from Acne. If you truly want Good Clean Skin,you can visit [www.gettingridofpimplesandzits.com](#), this is a great site for information on how to treat your Acne Condition. Learn what you need to do, get your Confidence and Self Esteem back and

SEO Content Jobs

\$30 for 15 400-600 word articles

[\\$30 for 15 400-600 word articles](#) is project number 1116487 posted at [Freelancer.com](#). [Click here](#) to post your own project.

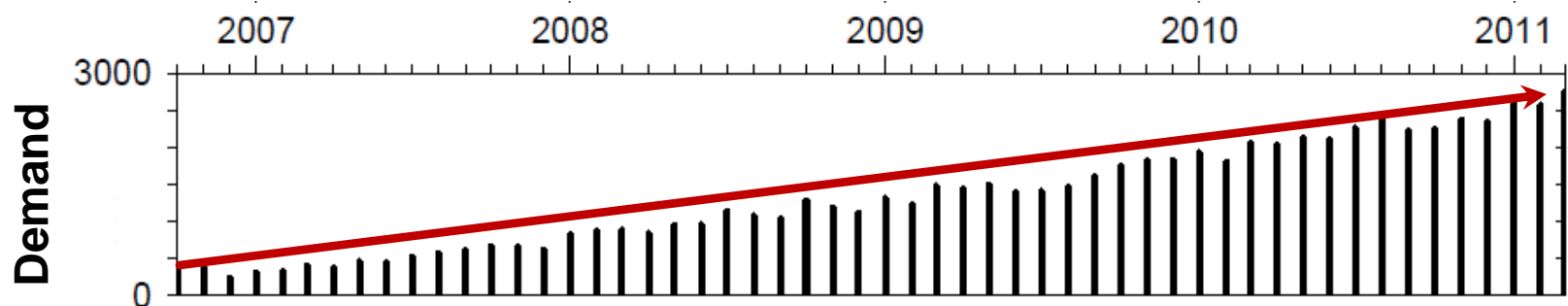
Given 10 keywords to write 1 articles about each...good keyword density...

Spintax ready articles (eg: {Hello|Hi|Hey})

[Spintax ready articles \(eg: {Hello|Hi|Hey}\)](#) is project number 1078208 posted at [Freelancer.com](#). [Click here](#) to post your own project.

Spinning in format {a|b|c|d}... 4 combinations average in brackets

- Largest abuse class in dataset:



Worker Engagement: SEO Content

- Can workers deliver quality SEO content ?
- Methodology:
 - Commissioned article writing task to 10 workers
 - Passes CopyScape, plagiarism detection tool
 - Keyword density (KD): 2-3%
 - Six article topics revolve around skin care (Anti-wrinkle creams, acne cleansing, etc.)

Quality of Articles

“Conjugated linoleic acids revitalizes the skin's rebirth while decreasing the emergence of lines.”

-Flesch-Kincaid grade level of 11

“A wrinkled face destroys the confidence of a person specially that of a woman. She becomes a subject of gossip.”

- Flesch-Kincaid grade level of 6

Summary

- Attackers outsource number of abuse jobs:
 - ~30% of Freelancer.com jobs abusive
 - Jobs spanned range of categories, from spamming, to account registrations, to SEO
- Engagement with workers showed:
 - Workers complete jobs
 - Quality of delivered product is highly variable

Conclusion

- Large, cheap labor pool changes threat model
 - Automation is not the only way
 - Largely removes difficulty in executing abuse task
- Outsourced workforce enables new attacks
 - Workforce is flexible, adapts to meet demand
 - Abusers innovate by trying different schemes
- Identification of abuse jobs is possible
 - Web services: acquire insight into abuse techniques
 - Freelance sites: filter abuse jobs to disrupt ecosystem

Questions?

CAPTCHA Solving

- Overview: Using humans to solve CAPTCHAs
- Employers post daily ads on Freelancer.com:

Captcha typing. Need night shift support.

Captcha typing. Need night shift support is project number 1078589 posted at [Freelancer.com](#). [Click here](#) to post your own project.

Nightshift support on following servers: Qlink , Goodearners, Fasttypers, Mars dooms.

Data entry operators for captcha work

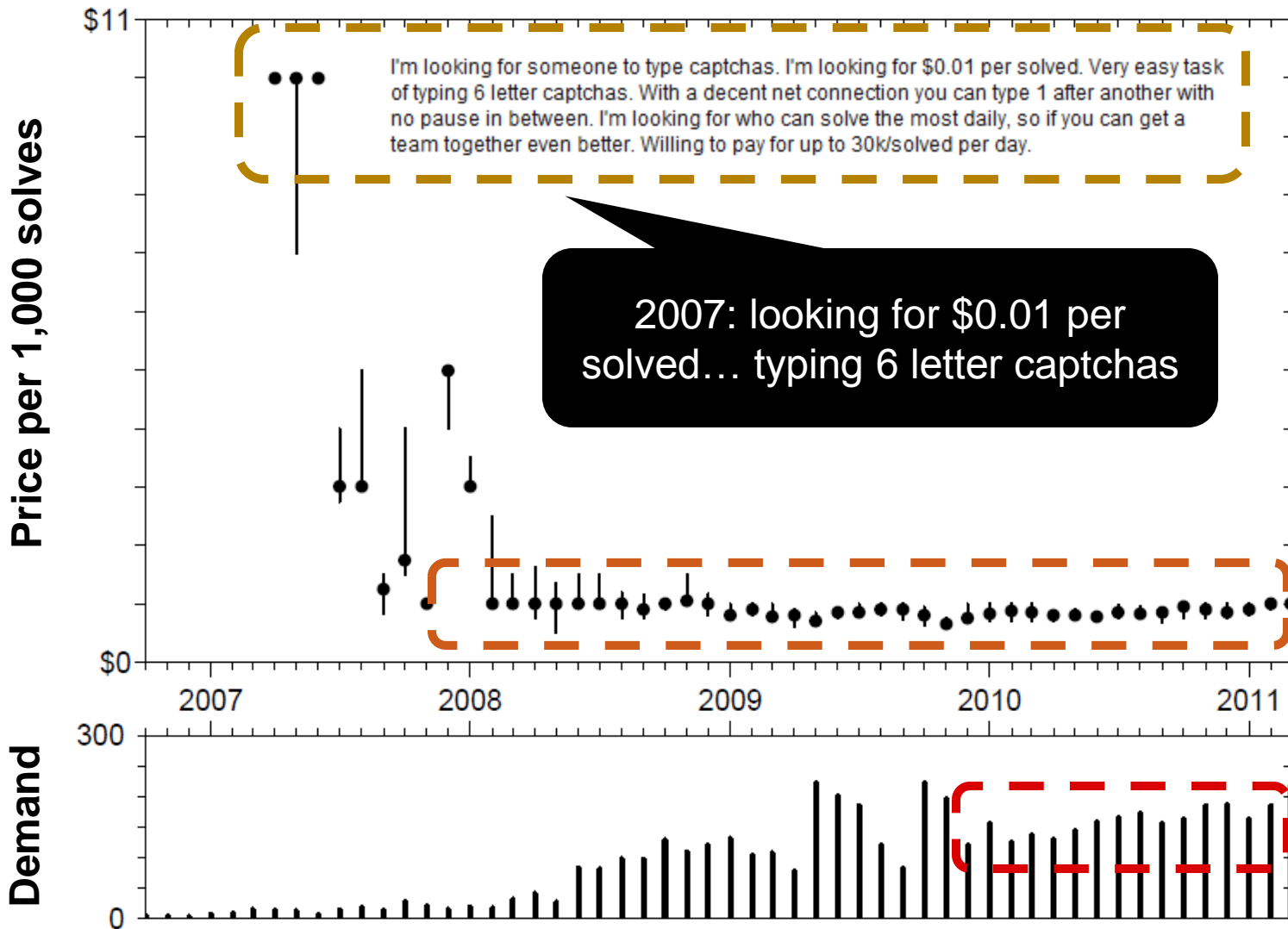
Data entry operators for captcha work is project number 1103100 posted at [Freelancer.com](#). [Click here](#) to post your own project.

Rate is .80\$-.85\$ per 1k ...
Bangladeshi workers are preferable

Big Captcha Team needed 24/7

Big Captcha Team needed 24/7 is project number 1112199 posted at [Freelancer.com](#). [Click here](#) to post your own project.

3000-4000 output per hour ...
image is yahoo captcha



- CAPTCHA solving began at nearly \$10/1,000 solves
- Price stabilized to roughly \$1/1,000 solves
- Demand has remained stable since 2010