



# IMAGINATION System

Image-based CAPTCHA Technology

# Vulnerable CAPTCHAs Pose Significant Financial Exposure

## FBI "CAPTCHAs" Scalpers Who Hacked Security Codes

Computer hackers engaged in \$25 million fraud indictment says

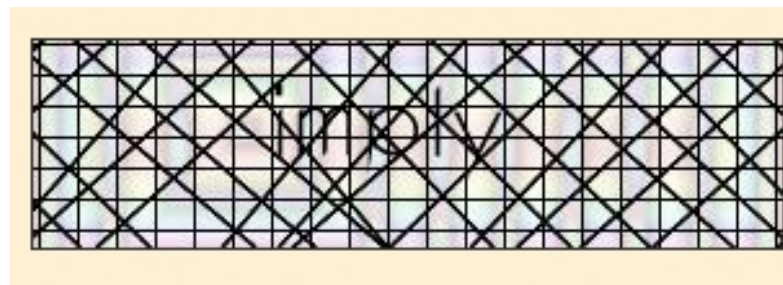
**IMAGINATION System is the solution to this problem!**

Source: nbcnewyork.com

# Increasing Sophistication of OCR Software is Pressuring Text-based CAPTCHAs



30% - 60%



Source: computerworld.com

# IMAGINATION System: Patent Pending

Patent Application filed with USPTO on **Jan. 30, 2007** based on provisional on **Jan. 31, 2006**

## Two-step Mouse-click-only Process

### Step1:

Click on the **center** of an image in the composite

### Step 2:

Click on the annotation identifying the distorted image

US Patent Application No.: 11/668,853

# Demonstration of IMAGINATION System



[Demo Site](#)

# The Time to Invest in IMAGINATION System is Right Now

- 1. Increased defense against bot attacks**
- 2. Improved experience for the end-user**
- 3. Unique and targeted marketing tool**
- 4. Short time-to-market**

# IMAGINATION System Offers Several Advantages Over Existing CAPTCHAs

## Enhanced Security

- ✓ Carries more information
- ✓ No “memory accumulation”

## Customizable

- ✓ Easily adapted to other languages
- ✓ Customer selected images

## Low-cost

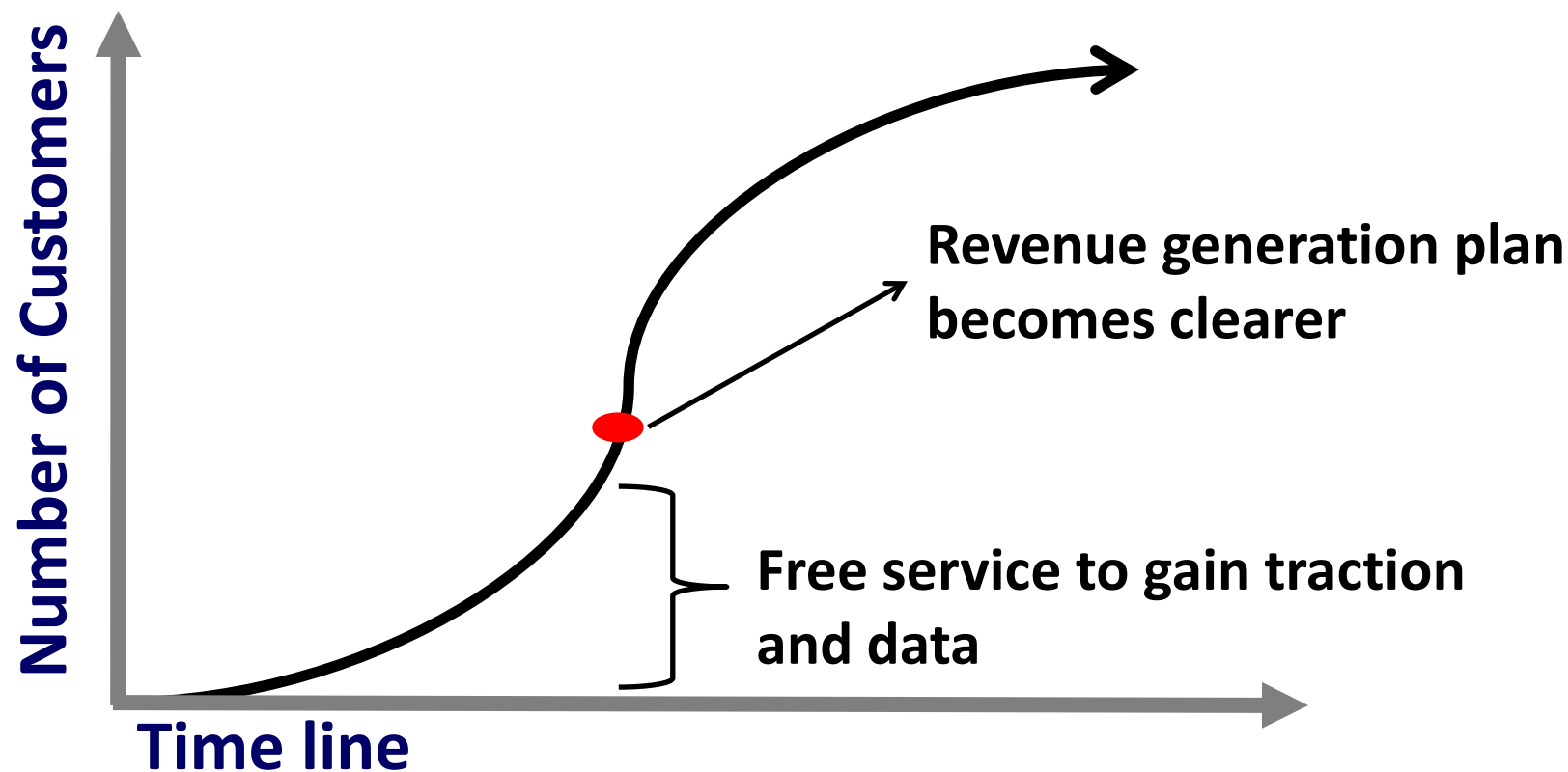
- ✓ Smaller image database
- ✓ Smaller annotation database

# Competitive Landscape

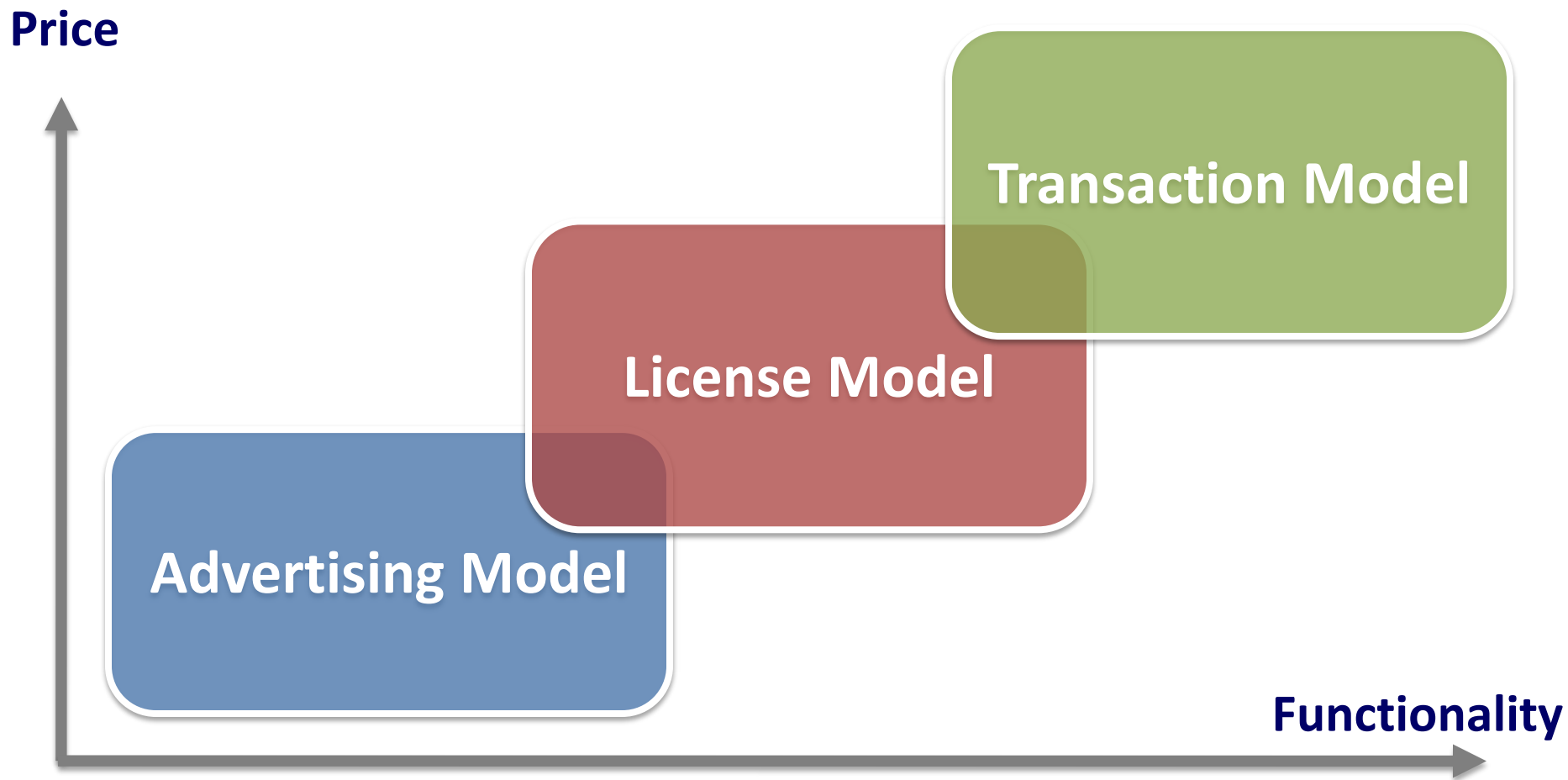
Source: capthca.net

	Security	Ease of Use	Resiliency	Price
<b>IMAGINATION System</b>				
<b>reCAPTCHA (Google)</b>				
<b>SQUIGL-PIX</b>				
<b>ESP-PIX</b>				
<b>ASIRRA (Microsoft)</b>				

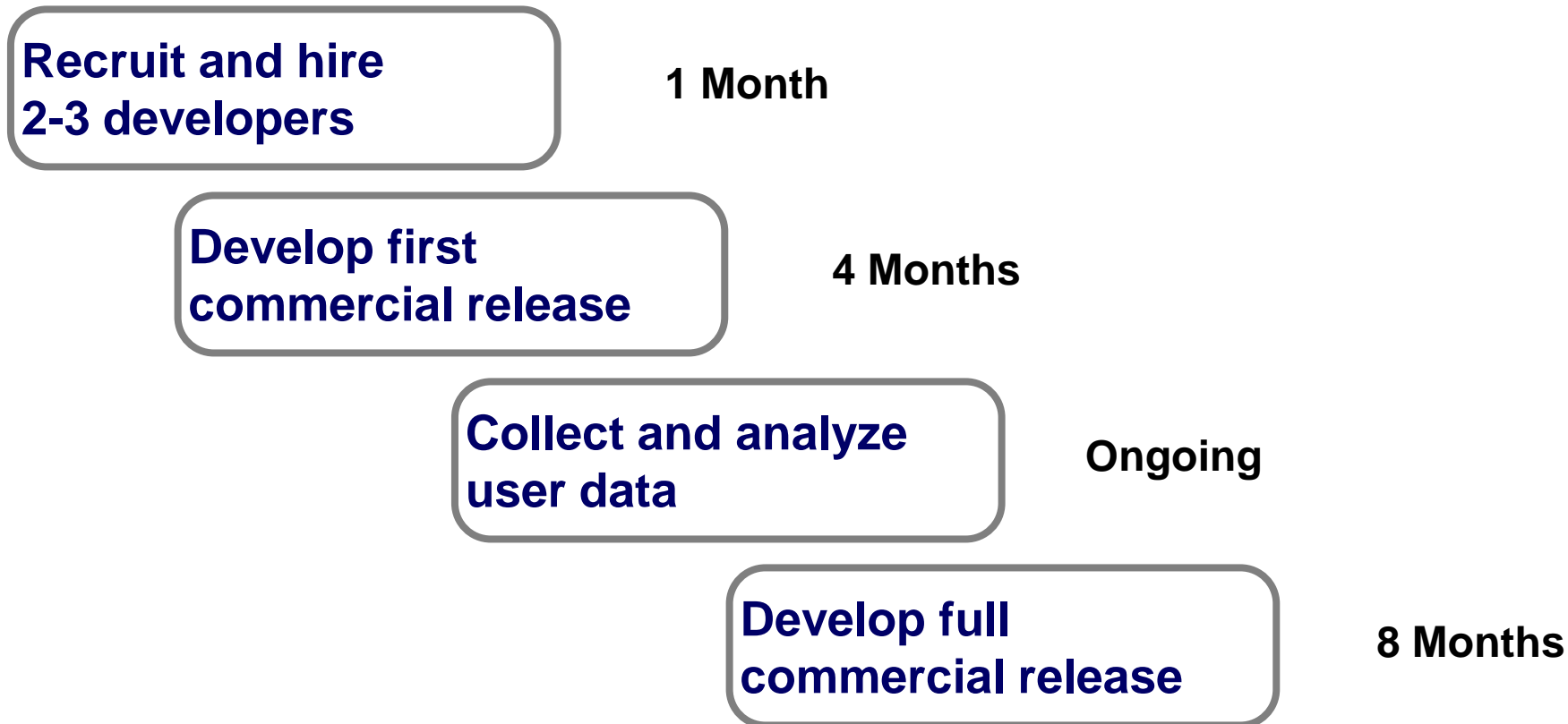
# IMAGINATION Adoption Curve



# Potential Revenue Models



# Technology Development Timeline



# Questions?



# Back-up Slides

# The IMAGINATION Team

## Chief Technology Officer

- James Wang, Ph.D in computer science from Stanford University in 2000.
- Currently an Associate Professor with the IST College at Penn State University.
- Senior member of the IEEE and ACM.



**\*Additional team members are currently being sought**

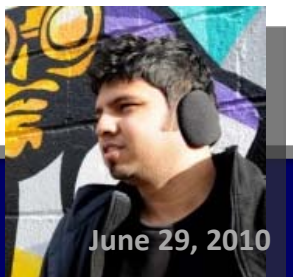
# The Brains Behind IMAGINATION



James Z. Wang received the BS degree (summa cum laude) in mathematics and computer science from the University of Minnesota, Twin Cities, in 1994, the MSc degree in mathematics and the MSc degree in computer science from Stanford University, Stanford, California, in 1997, and the PhD degree in medical information sciences from the Stanford University Biomedical Informatics Program and Computer Science Database Group in 2000. He is an associate professor at the College of Information Sciences and Technology, and by courtesy in the Department of Computer Science and Engineering and the Integrative Biosciences Program at The Pennsylvania State University, University Park. He was the holder of the endowed PNC Technologies Career Development Professorship from 2000 to 2006, a recipient of a US National Science Foundation Career award in 2004, a Visiting Professor of the Robotics Institute at Carnegie Mellon University from 2007 to 2008, and the lead guest editor for IEEE Transactions on Pattern Analysis and Machine Intelligence Special Issue on Real-World Image Annotation and Retrieval in 2008. He is a senior member of the IEEE and the ACM.



Jia Li received the MSc degree in electrical engineering in 1995, the MSc degree in statistics in 1998, and the PhD degree in electrical engineering in 1999, all from Stanford University. She is an associate professor of statistics and by courtesy appointment in computer science and engineering at The Pennsylvania State University, University Park. She worked as a visiting scientist at Google Labs in Pittsburgh from 2007 to 2008, a research associate in the Computer Science Department at Stanford University in 1999, and a researcher at the Xerox Palo Alto Research Center from 1999 to 2000. Her research interests include statistical modeling and learning, data mining, computational biology, image processing, and image annotation and retrieval. She is a senior member of the IEEE.



June 29, 2010

Ritendra Datta received his PhD in computer science and engineering at The Pennsylvania State University in 2009. His research interests include statistical learning, computer vision, computational aesthetics, multimedia, and information retrieval. He has a BE in information technology from the Bengal Engineering and Science University, Shibpur, India. He is a recipient of the Glenn Singley Memorial Graduate Fellowship in Engineering. He is currently with Google's Pittsburgh office.

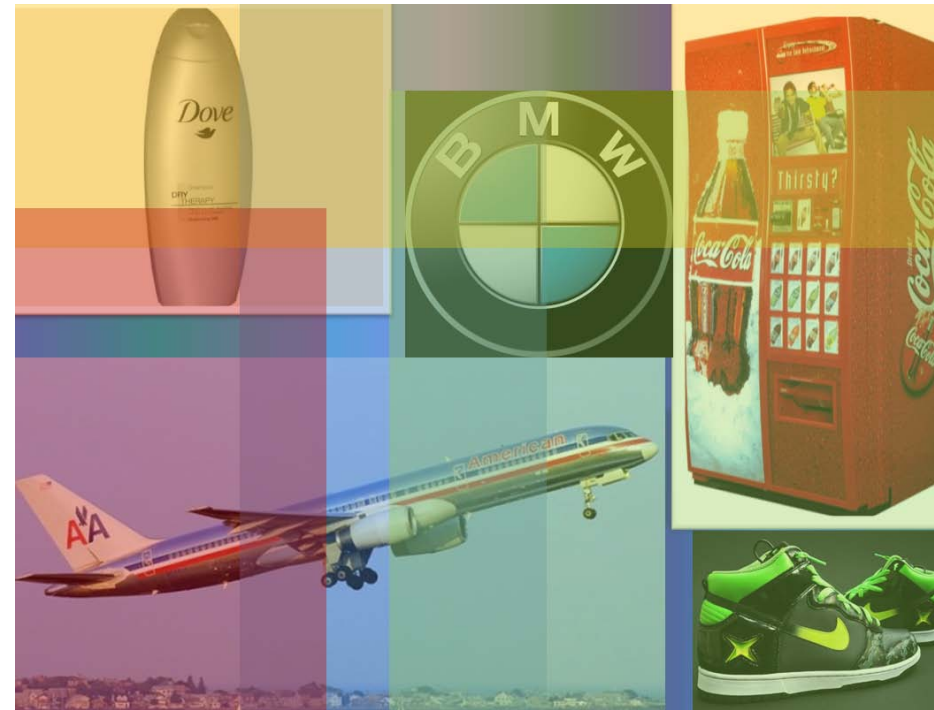

# Examples of Advertising Within the IMAGINATION System

Ask your doctor about CIALIS for daily use. **Get your FREE trial** ★★

**Cialis**  
tadalafil tablets  
CIALIS is indicated for the treatment of erectile dysfunction.

> Patient Information > Prescribing Information  
**Important Safety Information for CIALIS® (tadalafil)**

- Do not take CIALIS if you are allergic to CIALIS or ADCIRCA™ (tadalafil) or any of its ingredients.
- CIALIS is also marketed as ADCIRCA for the treatment of pulmonary arterial hypertension (PAH). Do not take both



# Ad Revenue Model Assumptions

<b># of people using CAPTCHA's per day**</b>	200,000,000					
<b>CPM</b>	\$1.00	\$5.00	\$10.00	\$15.00	\$25.00	\$50.00
<b>Percent of the market</b>	0.05%	0.10%	0.50%	1%	5%	10%
<b>Hits per day</b>	100,000	200,000	1,000,000	2,000,000	10,000,000	20,000,000
<b>Divided by 1,000 (for CPM measurement)</b>	100	200	1,000	2,000	10,000	20,000
<b>Annual CPM calculation number (300)</b>	30,000	60,000	300,000	600,000	3,000,000	6,000,000

\*\*The data for the CAPTCHAs per day came from reCAPTCHA market analysis on:

<http://googlewebmastercentral.blogspot.com/2010/01/protect-your-site-from-spammers-with.html>

# Annual Revenue Model

## Market Penetration Rate

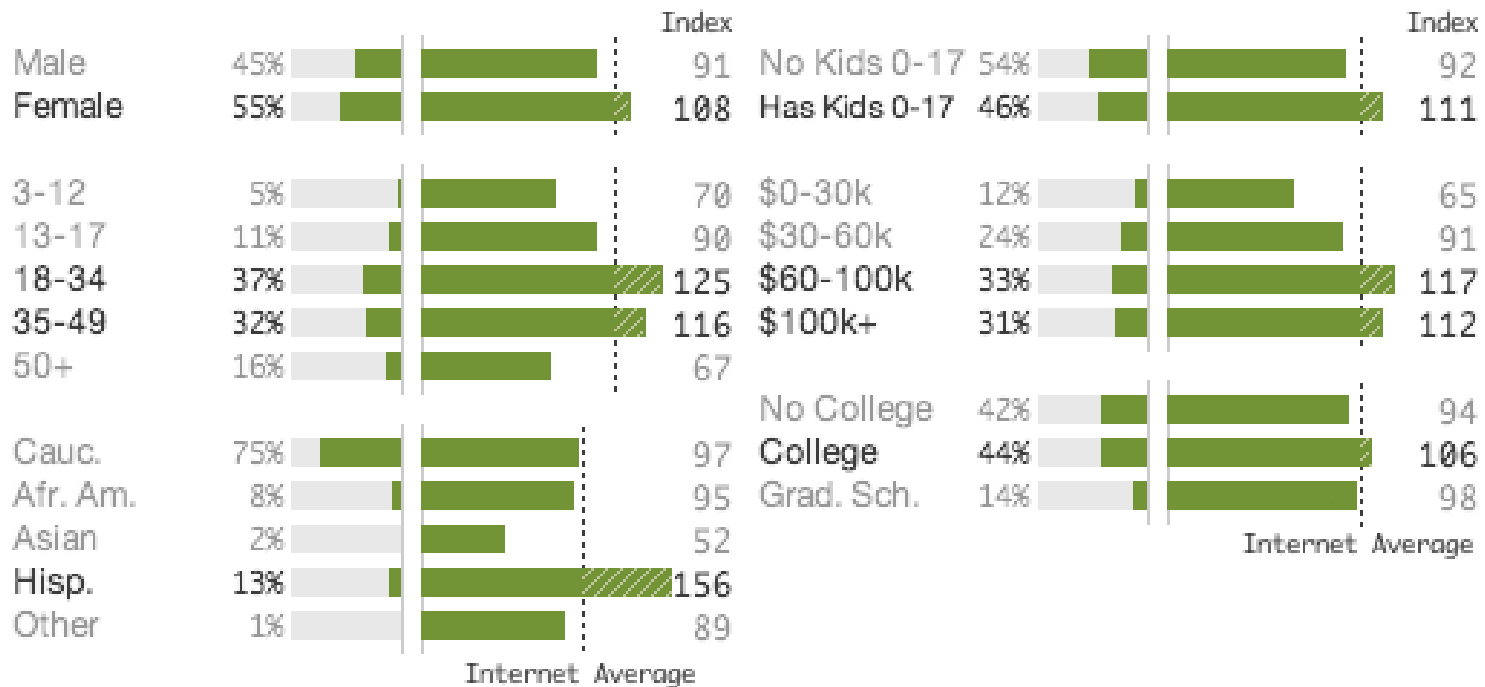
	0.05%	0.10%	0.50%	1%	5%	10%
<b>\$1.00</b>	\$30,000	\$60,000	\$300,000	\$600,000	\$3,000,000	\$6,000,000
<b>\$5.00</b>	\$150,000	\$300,000	\$1,500,000	\$3,000,000	\$15,000,000	\$30,000,000
<b>\$10.00</b>	\$300,000	\$600,000	\$3,000,000	\$6,000,000	\$30,000,000	\$60,000,000
<b>\$15.00</b>	\$450,000	\$900,000	\$4,500,000	\$9,000,000	\$45,000,000	\$90,000,000
<b>\$25.00</b>	\$750,000	\$1,500,000	\$7,500,000	\$15,000,000	\$75,000,000	\$150,000,000
<b>\$50.00</b>	\$1,500,000	\$3,000,000	\$15,000,000	\$30,000,000	\$150,000,000	\$300,000,000

Cost Per Thousand (CPM)

# TicketMaster Demographics

## US Demographics <sup>?</sup>

Updated 3/2010 • Next: 4/2010



Income represents total household income.  
100 index is internet average.

Source: Quantcast.com

# The Voice of the End User

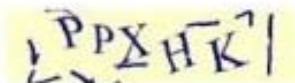
Web Images Videos Shopping News Maps More MSN Hotmail

bing

## Pardon the interruption

We ask that you view the characters in the following picture and enter them in the box below.

View this picture:



Enter the characters that you see:

Continue

## Commenting Guidelines

Share your comments with us! Please be polite and treat others with respect.

Comments that are abusive, profane, or overly racist can result in a ban.

Each comment may only be 1500 characters long.

**Hate Captchas?** Captcha's prove you are a human and not a spamming robot. We use a small selection of real words in order to make it as easy as possible.



[redcrew](#) Stupid [#captcha](#) on the GLITR online survey. I hate captchas! [#ally](#)

2 days ago from HootSuite

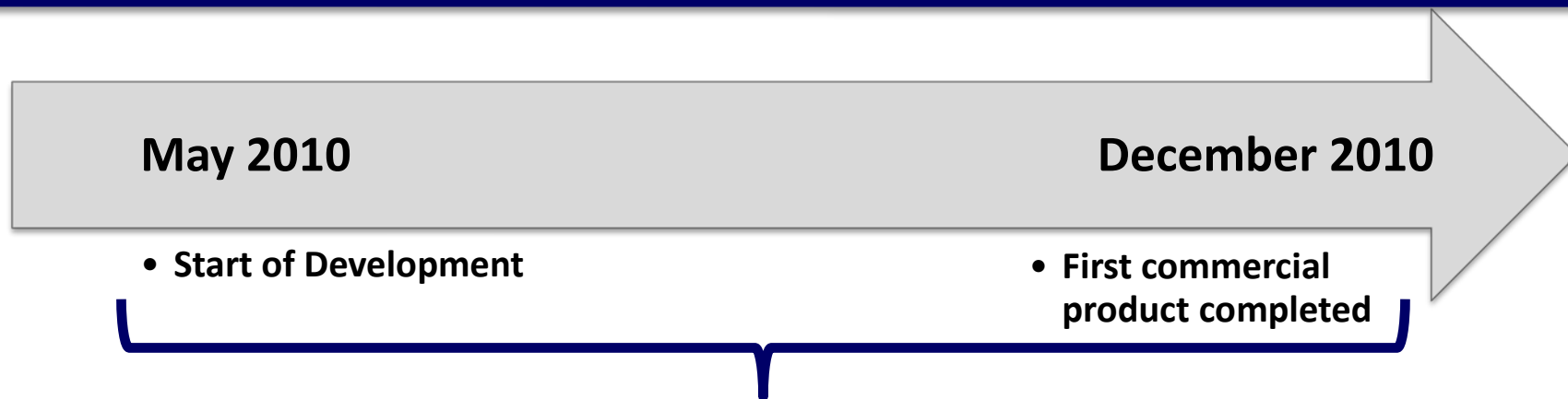


[rebeccalweber](#) I'm visually literate & 20/20 w glasses, but I'm SO bad at these gatekeeper captchas. Any freelance [#captcha](#) crackers out there?

about 8 hours ago from web

Reply Retweet

# Timeline of development process



- Developing wrapper for the core technologies (C/C++)
- Front-end development (PHP, MySQL, java-script programming)
- Managing accounts for different categories of users (PHP, MySQL)
- Managing of the image collection (some UNIX and some MySQL)
- Cleaning up the existing core algorithm code (C programming).