

Analysis of the Characteristics of Twitch.tv Livestreaming and Content

Daniel Farrington, Nicholas Muesch

Video On Demand vs Live Streaming

- ▶ Most online video content is readily available on demand
- ▶ What is Video-on-demand?
 - Pre-Recorded
 - Hosted by Server(s)
 - Sends to Requested Users
- ▶ A newer, less popular, growing service
- ▶ What is Live Streaming?
 - User encodes and uploads
 - Server processes
 - Server sends to viewers

VoD

Live Streaming

YouTube and Twitch

- ▶ Created in 2005
- ▶ Second-most popular VoD Website
 - 18.69 percent of downstream traffic in NA (CNET.com)

- ▶ Created in 2011
- ▶ Most popular Livestreaming Website
 - 1.8% downstream traffic (Wallstreet Journal)

YouTube

Twitch

Previous Studies

- ▶ YouTube has been thoroughly analyzed
 - YouTube Traffic Characterization
 - Network/hardware requirements
 - Caching content allows for less bandwidth and reduces strain
 - Understanding characteristics... A YouTube Case Study
 - Content analysis
 - E.g. Most common video length is under a minute
- ▶ Twitch has fewer published papers

Motivation

- ▶ Studies such as these can be instrumental in aiding development of future live streaming sites
- ▶ Room for growth
- ▶ Our project provides one such study.

Methodology

User Data

- Demographics
- Preferred content
- Preferred Lengths
- Average Use
- Satisfaction

Content Data

- Total Streams
- Stream Popularity
- Game Popularity
- VOD Length
- VOD Views

Technical Data

- Resolutions
- Bitrates
- Frame Rates
- Key Frame Intervals

Survey

- ▶ Used Qualtrics to make survey
 - Display Blocks
- ▶ Deployed to CS and IMGD and WPI Grads
 - Gathered 150+ responses

How many hours a week, on average, do you watch YouTube content?

- Never
- 1-5 hours
- 6-10 hours
- 10-15 hours
- 15-20 hours
- 20+ hours

How many hours a week, on average, do you watch Twitch.tv content?

- Never
- 1-5 hours
- 6-10 hours
- 10-15 hours
- 15-20 hours
- 20+ hours

Crawler

- ▶ Automation
 - Faster, More Reliable, More Data
- ▶ Scrapy
 - Python based
 - Twitch API is RESTful
- ▶ Batch File and Windows Scheduler
 - Set a timer
 - Every hour, runs crawler through cmd

Crawler: Crawling

- ▶ Requests top 100 streams
- ▶ Grabs stream data
- ▶ Grabs each channel's top 100 VoDs
- ▶ After it reaches the 100th stream, process repeats

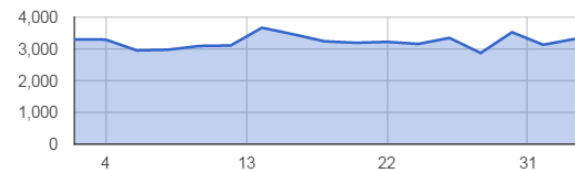
Technical Data

- ▶ Input 36 channels every day. (Input screenshot)
- ▶ Channels correlate to most and least popular, 245 each

Twitch Analyzer Results - [REDACTED]

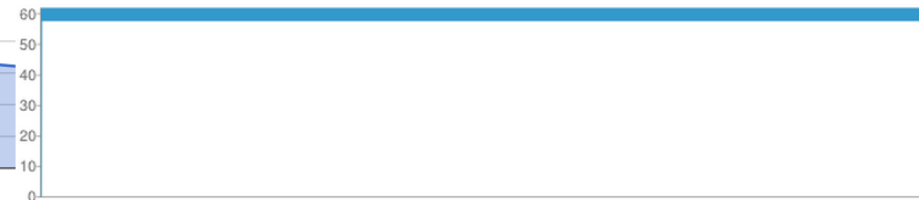
Results of analysis session for twitch.tv/[REDACTED] started on Tue, 03 Mar 2015 21:06:23 -0600.

Bitrate Stability ✓



Your bitrate looks stable at 3221 kbps with a deviation of ± 235.82 kbps.

Video Frame Rate ✓



Your average stream frame rate looks stable at 59 FPS ± 2.2 .

Dropped Frames ✓

No dropped frames were detected.

Keyframe Check ✓

Your keyframe interval looks good - 1.32s ± 0.63 (79.21 frames ± 38.07)

Stream Availability

United States: Poor

Europe: Poor

Quality Check ✓

Your bitrate is sufficient for the resolution and FPS you are using (qval: 0.07).

Your audio levels look good (level: -15.4061 dB, peak: -8.0875 dB).

Stream Info

- Resolution: 1120x700
- Frame Rate: 59 FPS
- Audio: aac, 44100 Hz, stereo, s16, 132 kb/s
- Total Bitrate: 3443 kbps
- H264 Profile: Main
- x264 Preset: veryfast / superfast (estimated)
- Stream Uptime: 0h 2m 28s

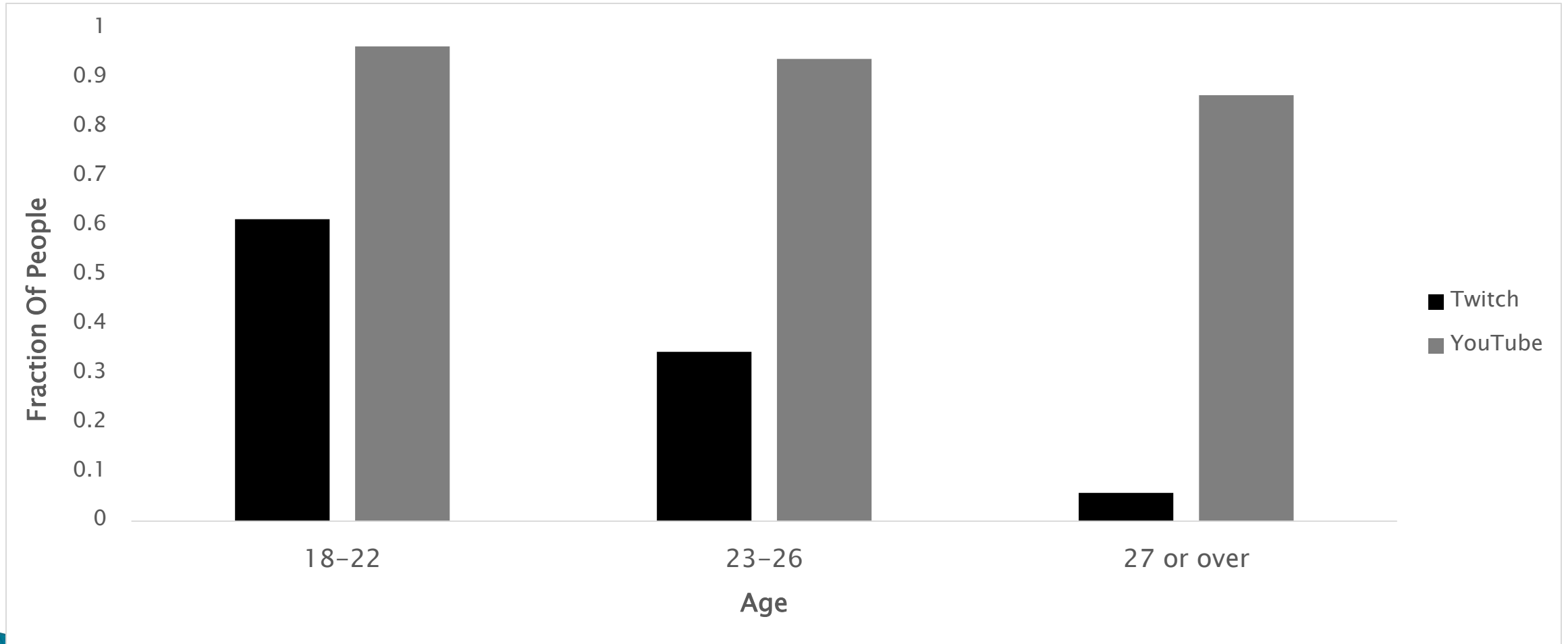
Analysis

- ▶ Survey
 - Age vs Usage of Twitch and YouTube
 - Device Usage for Twitch and YouTube
 - Preferred Viewing Length for Twitch and YouTube videos
- ▶ Crawler
 - VoD Length CDF
 - VoD Viewer CDF
 - Total Streamers CDF
 - Game Volatility
- ▶ Twitch Analyzer
 - CDF Most and Least Popular Bitrate
 - CDF Most and Least Popular Streaming Resolutions
 - Audio Levels of Twitch Broadcasts

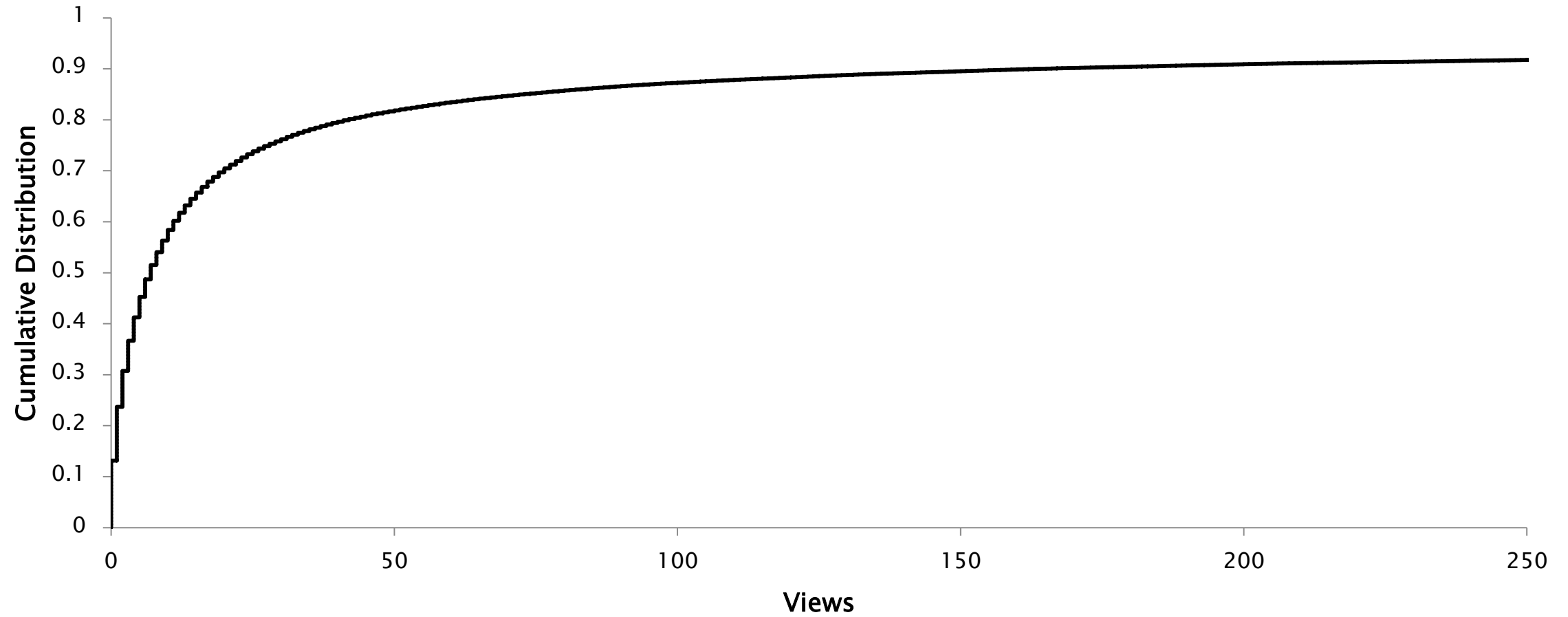
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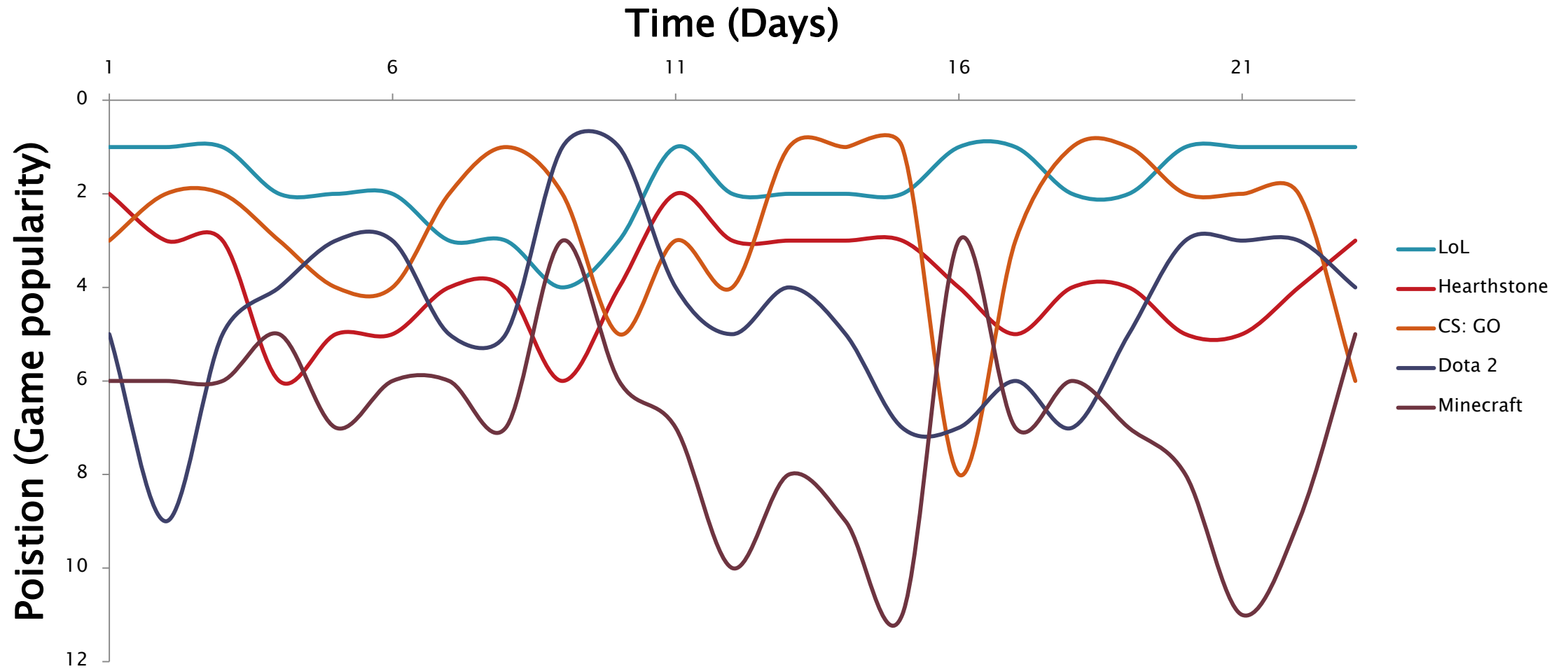
Age vs Usage of Twitch and YouTube



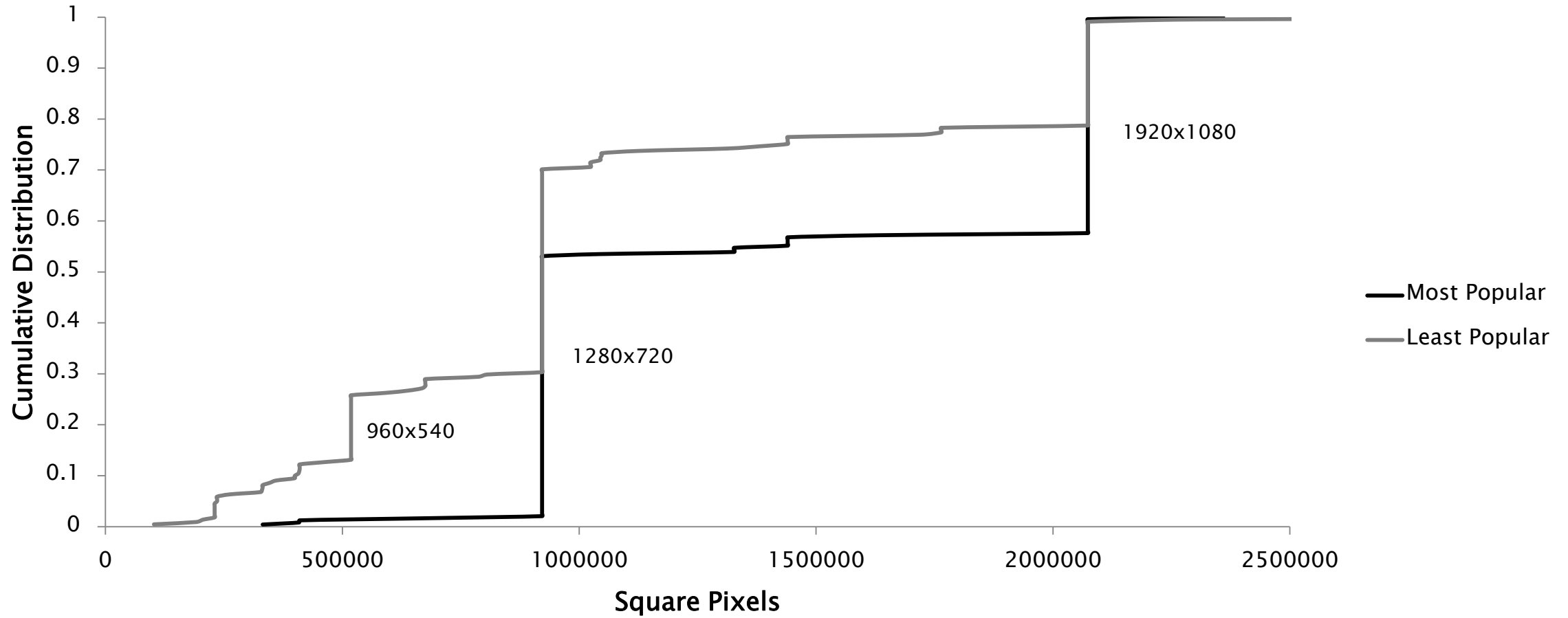
VoD Viewer CDF



Game Volatility



CDF Most and Least Popular Streaming Resolutions



Conclusion

- ▶ Twitch is much less known than YouTube
 - Younger generation knows Twitch better than old
 - Both young and old generation know YouTube
- ▶ Most Twitch VoDs are largely unnoticed
 - 50% of VoDs have less than 8 views
- ▶ The popularity of games changes unpredictably
 - E.g. Minecraft fluctuates between 3rd and 11th most popular game
- ▶ There are 2 common resolutions
 - 1280x720
 - 1920x1080

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