



AT&T DirecTV Video Quality Rating and Analysis Tool



Team Members: Deanna Thomas, Daniel Ramirez, Ponaroth Eab, George Beltran, and Nelson Huynh

Faculty Advisors: Mark Sargent and Dr. Eun-Young Elaine Kang

AT&T DirecTV Liaisons: Harrison Hays, Pesh Pahalawatta, Ross Castillo

Department of Computer Science · College of Engineering, Computer Science, and Technology · California State University, Los Angeles

The Motivation:

How can we minimize cost while maximizing video quality?

As DirecTV transitions from providing satellite services to streaming services, the cost for serving each customer changes as well. Improving some video features, such as bitrate, can increase the cost of the stream whereas some do not. The motivation is to determine what features a typical customer notices to provide the best video quality at the lowest cost for DirecTV.

The Objective:

Determine user preference

- Does higher frame rate look better than higher resolution?
- Can we predict user preference according to bit-per-pixel value?
- Can users tell the quality difference between bitrate variants?
- According to HTTP Live Streaming protocol, it is recommended to use 50% more bitrate than needed (in Adaptive Bitrate Ladder). Is video quality noticeably better?
- In low bitrate, does HEVC still provide better quality than AVC?

The Solution:

A Comprehensive Software System



Data Collection

Two apps were created to collect data on user preferences. The **Comparison App** shows the user two videos and they can rate which video quality was better (shown above). The **Absolute Rating** app shows the user one video and asks them to rate the quality on a scale from 1-5. Both apps were created for Android, AndroidTV, iOS, and tvOS.



Data Management & Analysis

A web app was created to manage and analyze the collected data. The app allows the user to add, edit, and delete videos and video collections that are shown to users in the data collection apps. In addition, the user can view the rating results and see how different video settings compare to each other to determine user preferences.

Communication

A cloud API hosted on Heroku receives all requests from the data collection and data management and analysis applications and communicates directly with the database to retrieve the requested data.

Data Storage

A MySQL database hosted on a live web server securely stores all data for the system, including videos, user accounts, and ratings.

Results

- Applications are complete, tested, and ready to be installed on any device
- API and database are live and ready to handle any amount of users
- Satisfies the requirement to allow AT&T to collect data and accurately determine user preferences
- Implementation goals and stretch goals were met