AdViSE: Adaptive Video Streaming Evaluation Framework for the Automated Testing of Media Players

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ABSTRACT

Today we can observe a plethora of adaptive video streaming services and media players which support interoperable formats like DASH and HLS. Most of the players and their rate adaptation algorithms work as a black box. We have developed a system for easy and rapid testing of media players under various network scenarios. In this paper, we introduce **AdViSE**, the **Ad**aptive **Vi**deo **S**treaming **E**valuation framework for the automated testing of adaptive media players. The presented framework is used for the comparison and testing of media players in the context of adaptive video streaming over HTTP in web/HTML5 environments.

The demonstration showcases a series of experiments with different media players under given context conditions (e.g., network shaping, delivery format). We will also demonstrate the real-time capabilities of the framework and offline analysis including several QoE metrics with respect to a newly introduced bandwidth index.

CCS CONCEPTS

•**Networks** →**Network performance modeling**; **Network experimentation**; Network reliability; •**Information systems** →**Multimedia streaming**;

KEYWORDS

Evaluation framework; AdViSE; Adaptive streaming; Media players; MPEG-DASH; Network emulation; Automated Testing; Mininet; Selenium; Quality of Experience; Metrics

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1 INTRODUCTION

Adaptive video streaming over HTTP is becoming more and more the primary technology for video delivery in the open internet. For example, Netflix and YouTube alone account for more than 50% of the traffic [12] thanks to open, interoperable formats such as MPEG-DASH [14] or HLS [11]. In the past, we have witnessed many deployments in web environments implemented using Javascript by utilizing HTML5 and media source extensions (MSE) enabling a plugin free video streaming.

The technology behind adaptive video streaming over HTTP implies media representation switching (e.g., bitrate/resolution) depending on context conditions such as network characteristics and client device properties. An integral part of each player implementation is the usage of an appropriate rate adaptation algorithm which aims to follow dynamically changing context conditions. Thus, we are in a situation with many unknowns variables and the problem of choosing the appropriate media player for video streaming and playback arises.

In this demo paper, we introduce ***AdViSE***, an **Ad**aptive **Vi**deo **S**treaming **E**valuation framework which enables the automated testing of media players — and, thus, rate adaptation algorithms — under various context conditions (e.g., client devices/platforms, network characteristics/conditions). The main focus of AdViSE is the provisioning of tools for easy and rapid experimentation with media players and algorithms as they appear on the market including updates thereof which become available in relatively short periods.

The rest of this paper is organized as follows. Section 2 describes the underlying scientific problems leading to the development of AdViSE. In Section 3, we present the architecture of the designed system and its components. Section 4 provides a brief description about the demo itself and Section 5 concludes the paper.

2 UNDERLYING SCIENTIFIC PROBLEM

Nowadays, there exists a large number of different players/algorithms (including commercially available ones) and most of them have been implemented in JavaScript. However, no common performance evaluation framework/system

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