CLOUD BASED MOBILE SOCIAL TV
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Abstract
The rapidly increasing power of personal mobile devices is providing much richer contents and social interactions to users on the move. This trend however is throttled by the limited battery lifetime of mobile devices and unstable wireless connectivity, making the highest possible quality of service experienced by mobile users not feasible. The recent cloud computing technology, with its rich resources to compensate for the limitations of mobile devices and connections, can potentially provide an ideal platform to support the desired mobile services. Tough challenges arise on how to effectively exploit cloud resources to facilitate mobile services, especially those with stringent interaction delay requirements. In this paper, we propose the design of a Cloud-based, novel Mobile social TV system.

Literature survey
Literature survey is the most important step in software development process. Before developing the tool it is necessary to determine the time factor, economy and company strength. Once these things are satisfied, then next steps are to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support. This support can be obtained from senior programmers, from book or from websites. Before building the system the above consideration are taken into account for developing the proposed system.

INTRODUCTION
Thanks to the revolutionary “reinventing the phone” campaigns initiated by Apple Inc. in 2007, smart phones nowadays are shipped with multiple microprocessor cores and gigabyte RAMs; they possess more computation power than personal computers of a few years ago. On the other hand, the wide deployment of 3G broadband cellular infrastructures further fuels the trend. Apart from common productivity tasks like emails and web surfing, smart phones are flexing their strengths in more challenging scenarios such as real time video streaming and online gaming, as well as serving as a main tool for social exchanges.

Although many mobile social or media applications have emerged, truly killer ones gaining mass acceptance are still impeded by the limitations of the current mobile and wireless technologies, among which battery lifetime and unstable connection bandwidth are the most difficult ones. It is natural to resort to cloud computing, the newly-emerged computing paradigm for low-cost, agile, scalable resource supply, to support power-efficient mobile data communication. With virtually infinite hardware and software resources, the cloud can offload the computation and other tasks involved in a mobile application and may significantly reduce battery consumption at the mobile devices, if a proper design is in place. The big challenge in front of us is how to effectively exploit cloud services to facilitate mobile applications. There have been a few studies on designing mobile cloud computing systems, but none of them deal in particular with stringent delay requirements for spontaneous social interactivity among mobile users.

In this paper, we describe the design of a novel mobile social TV system, CloudMoV, which can effectively utilize the cloud computing paradigm to offer a living-room experience of video watching to disparate mobile users with spontaneous social interactions. In CloudMoV, mobile users can import a live or on-demand video to watch from any video streaming site, invite their friends to watch the video concurrently, and chat with their friends while enjoying the video. It therefore blends viewing experience and social awareness among friends on the go. As opposed to traditional TV watching, mobile social TV is well suited to today’s life style, where family and friends may be separated geographically but hope to share a co-viewing experience. While social TV enabled by set-top boxes over the traditional TV systems is already available, it remains a challenge to achieve mobile social TV, where the concurrently viewing experience with friends is enabled on mobile devices. We design CloudMoV to seamlessly utilize agile resource support and rich functionalities offered by both an IaaS (Infrastructure-as-a-Service) cloud and a PaaS (Platform-as-a-Service) cloud. Our design achieves the following goals:

- **Encoding flexibility**: Different mobile devices have differently sized displays, customized playback hardware’s, and various codes. Traditional solutions would adopt a few encoding formats ahead of the release of a video program. But even the most generous content providers would not be able to attend to all possible mobile platforms, if not only to the current hottest models. CloudMoV customizes the streams for different devices at real time, by offloading the transcoding tasks to an IaaS cloud. In particular, we novelly employ a surrogate for each user, which is a virtual...
machine (VM) in the IaaS cloud. The surrogate downloads the video on behalf of the user and transcodes it into the desired formats, while catering to the specific configurations of the mobile device as well as the current connectivity quality.

- **Battery efficiency**: A breakdown analysis conducted by Carroll et al. indicates that the network modules (both Wi-Fi and 3G) and the display contribute to a significant portion of the overall power consumption in a mobile device, dwarfing usages from other hardware modules including CPU, memory, etc. We target at energy saving coming from the network module of smartphones through an efficient data transmission mechanism design. We focus on 3G wireless networking as it is getting more widely used and challenging in our design than Wi-Fi based transmissions. Based on cellular network traces from real-world 3G carriers, we investigate the key 3G configuration parameters such as the power states and the inactivity timers, and design a novel burst transmission mechanism for streaming from the surrogates to the mobile devices. The burst transmission mechanism makes careful decisions on burst sizes and opportunistic transitions among high/low power consumption modes at the devices, in order to effectively increase the battery lifetime.

- **Spontaneous social interactivity**: Multiple mechanisms are included in the design of CloudMoV to enable spontaneous social, co-viewing experience. First, efficient synchronization mechanisms are proposed to guarantee that friends joining in a video program may watch the same portion (if they choose to), and share immediate reactions and comments. Although synchronized playback is inherently a feature of traditional TV, the current Internet video services (e.g., Web 2.0 TV) rarely offer such a service. Second, efficient message communication mechanisms are designed for social interactions among friends, and different types of messages are prioritized in their retrieval frequencies to avoid unnecessary interruptions of the viewing progress. For example, online friend lists can be retrieved at longer intervals at each user, while invitation and chat messages should be delivered more timely. We adopt textual chat messages rather than voice in our current design, believing that text chats are less distracting to viewers and easier to read/write and manage by any user.

- These mechanisms are seamlessly integrated with functionalities provided by a typical PaaS cloud, via an efficient design of data storage with BigTable and dynamic handling of large volumes of concurrent messages. We exploit a PaaS cloud for social interaction support due to its provision of robust underlying platforms (other than simply hardware resources provided by an IaaS cloud), with transparent, automatic scaling of users’ applications onto the cloud.

- **Portability**: A prototype CloudMov system is implemented following the philosophy of “Write Once, Run Anywhere” (WORA): both the front-end mobile modules and the backend server modules are implemented in “100% Pure Java”, with well-designed generic data models suitable for any BigTable-like data store; the only exception is the transcoding module, which is implemented using ANSI C for performance reasons and uses no platform-dependent or proprietary APIs.

- The client module can run on any mobile devices supporting HTML5, including Android phones, iOS systems, etc. To showcase its performance, we deploy the system on Amazon EC2 and Google App Engine, and conduct thorough tests on iOS platforms. Our prototype can be readily migrated to various cloud and mobile platforms with little effort. The remainder of this paper is organized as follows. In Sec. II, we compare our work with the existing literature and highlight our novelties. In Sec. III, we present the architecture of CloudMoV and the design of individual modules.

### SYSTEM ARCHITECTURE

- Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective.

- The implementation stage involves careful planning, investigation of the existing system and it’s constraints on implementation, designing of methods to achieve changeover and evaluation of changeover methods.
MODULE DESCRIPTION:

1. Transcoder
2. Social Cloud
3. Messenger
4. Gateway
5. Subscribe

Transcoder
- It resides in each surrogate, and is responsible for dynamically deciding how to encode the video stream from the video source in the appropriate format, dimension, and bit rate. Before delivery to the user, the video stream is further encapsulated into a proper transport stream. Each video is exported as MPEG-2 transport streams, which is the de facto standard nowadays to deliver digital video and audio streams over lossy medium.

Social Cloud
- Social network is a dynamic virtual organization with inherent trust relationships between friends. This dynamic virtual organization can be created since these social networks reflect real world relationships. It allows users to interact, form connections and share information with one another. This trust can be used as a foundation for information, hardware and services sharing in a Social Cloud.

Messenger
- It is the client side of the social cloud, residing in each surrogate in the IaaS cloud. The Messenger periodically queries the social cloud for the social data on behalf of the mobile user and pre-processes the data into a light-weighted format (plain text files), at a much lower frequency. The plain text files are asynchronously delivered from the surrogate to the user in a traffic-friendly manner, i.e., little traffic is incurred. In the reverse direction, the messenger disseminates this user’s messages (invitations and chat messages) to other users via the data store of the social cloud.

Gateway
- The gateway provides authentication services for users to log in to the CloudMoV system, and stores users’ credentials in a permanent table of a MySQL database it has installed. It also stores information of the pool of currently available VMs in the IaaS cloud in another in-memory table. After a user successfully logs in to the system, a VM surrogate will be assigned from the pool to the user. The in-memory table is used to guarantee small query latencies, since the VM pool is updated frequently as the gateway reserves and destroys VM instances according to the current workload. In addition, the gateway also stores each user’s friend list in a plain text file (in XML formats), which is immediately uploaded to the surrogate after it is assigned to the user.

Subscribe
- In this module user can download the video. Subscribe module download video in high speed and clear video streaming. Authorized user every one download and watch the videos.

Transcoding mechanism
- It resides in each surrogate, and is responsible for dynamically deciding how to encode the video stream from the video source in the appropriate format, dimension, and bit rate. Before delivery to the user, the video stream is further encapsulated into a proper transport stream. Each video is exported as MPEG-2 transport streams, which is the de facto standard nowadays to deliver digital video and audio streams over lossy medium.

- Only one high quality compressed video is stored
- No/Much less computations on motion estimation
- Can produce comparable video quality with direct encoding

CONCLUSION
- We conclude results prove the superior performance of CloudMoV, in terms of transcoding efficiency, timely social interaction, and scalability. In CloudMoV, mobile users can import a live or on-demand video to watch from any video streaming site, invite their friends to watch the video concurrently, and chat with their friends while enjoying the video.

REFERENCES


