

**CHENNAI – PONDICHERRY**

**Efficient Multi-View 3D Video Multicast with Depth-Image-Based Rendering in LTE-Advanced Networks with Carrier Aggregation**

**Abstract:**

With the recent emergence of naked-eye 3D mobile devices and various 3D-enabled laptops, service providers now afford the opportunity to provide mobile 3D video streaming in LTE-Advanced networks. Differing from traditional single-view 3D videos, multi-view 3D videos allow users to choose preferred view angles and thus are promising for new applications, such as free-viewpoint television (FTV). Nevertheless, enabling multi-view 3D video services may overwhelm the network resource when transmitting all views of every video. Fortunately, Depth-Image-Based Rendering (DIBR) allows each mobile client to synthesize the desired view from a nearby left view and right view, so that not all views of a video are necessarily transmitted. A new challenge with DIBR, however, is to carefully choose the transmitted views to limit the video distortion and minimize the bandwidth consumption. In this paper, therefore, we first formulate a new optimization problem, called View and MCS Selection (VMS) Problem, tominimize the bandwidth consumption for multi-view 3D video multicast in LTE networks. An algorithm, called View and MCS Aggregation (VMAG) is proposed to find the optimal solution to VMS. For Carrier Aggregation (CA) in LTE-Advanced networks, we formulate a new View, MCS and Carrier Selection (VMCS) Problem and prove that the problem is NP-Hard. We first design a dynamic programming algorithm, called the View Assignment with MCS and Carrier (VAMC) algorithm, to find the optimal solution for small instances. We then propose the View and MCS Aggregation with Carrier (VMAGC) algorithm based on VMAG to effectively find the near-optimal solution to VMCS. The simulation results show that bandwidth consumption can be effectively reduced by over 30% in VMS and VMCS.

**Existing System:**

The base station multicasts each view to all users that subscribe the view. In this case, each view of a video only needs to be sent once to the users that desire the view, but every view still needs to be sent. Note that a typical multi-view video contains dozens of views, and therefore the approach still induces many times of bandwidth consumption compared with a traditional single-view 3D video with only one view. Multicast with DIBR. This approach aims to reduce the number of views to be sent for each multi-view 3D video by exploiting DIBR in users. The number of views can be effectively reduced because a view sent in the above two approaches no longer needs to be delivered here when two neighboring views have been multicasted. Each user in this case can synthesize the view from the two neighboring views with DIBR. In other words, only some of the views in a video needs to be sent, and each of the above views is delivered only once by multicast. Therefore, it is more bandwidth-efficient to adopt the third approach (as proposed in this paper) for multi-view 3D video services.

**Proposed System:**

To support CA in LTE-A networks, we extend VMS and formulate a new optimization problem, called the View, MCS and Carrier Selection (VMCS) Problem, to jointly minimize the resource block consumption to multicast a multiview video stream and maximize the QoE of watching the multi-view video. A delay constraint is also incorporated here for multi-view 3D videos. We prove that VMCS is NPhard. For small instances of VMCS, we present a dynamic programming algorithm, named the View Assignment with MCS and Carrier (VAMC) algorithm, to find the optimal solution with exponential time. Based on VAMC, we then propose the algorithm View and MCS Aggregation with Carrier (VMAGC) to effectively find the near-optimal solution to VMCS in polynomial time.