Video Processing using Volunteer Computing

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INTRODUCTION

Nowadays, with the increase in the quality of videos in terms of resolution (1k,2k,4k) and frame rate (30 fps[frame per sec], 60 fps, 120fps), it is challenging to the data on a few computers. Even for big tech giants (such as Google, Facebook, Microsoft) , sometimes their available computing power is not enough to match the 2.5 quintillion bytes of data produced every day. To counter their lack of computing power and saving themselves from buying more and more hardware (which will also cause demand in space), they use the concepts of Volunteer Computing. They utilize the unused resources of their users' devices to keep up with the increasing demand for computation power.

Challenges faced by Volunteer Computing:

- User Consent
- Proper Utilization of all resources
- Network throughput
- Security standards
- Power consumption

Composition of Implementation

The Implementation model has 5 tiers:

- Client tier(users' devices):
  It refers to users' devices that will provide us with unused resources.

- Communication tier:
  It comprises all communication between the main server end and all the client end devices.

- Application tier:
  Used to separate business logic from presentation logic.

- Video Processing server tier:
  It provides video processing and necessary analytics.

- Data-tier:
  Composed of server and local database servers.

Objectives:

The purpose is to get a thorough understanding of how volunteer computing works and also experiencing the technicalities that are faced when constructing a cluster of devices to compute the solution to large-scale problems. It will also aid in enhancing our coding skills.

References

[1] https://en.wikipedia.org/wiki/Volunteer_computing

[2] https://www.watelectronics.com/cluster-computing-architecture-its-types/#:~:text=A%20cluster%20is%20a%20kind,as%20a%20single%20standalone%20system.