Adaptive Resource Management for Analyzing Video Streams from Globally Distributed Network Cameras

ABSTRACT

- There has been tremendous growth in the amount of visual data available on the Internet in recent years.
- One type of visual data of particular interest is produced by network cameras providing real-time views.
- Millions of network cameras around the world continuously stream data to viewers connected to the Internet.
- This data may be used by a wide variety of applications such as enhancing public safety, urban planning, emergency response, and traffic management which are computationally intensive.
- Analyzing this data requires significant amounts of computational resources.

CONTINUE

- Cloud computing can be a preferred solution for meeting the resource requirements for analyzing these data. There are many options when selecting cloud instances (amounts of memory, number of cores, locations, etc.).
- Inefficient provisioning of cloud resources may become costly in pay-per-use cloud computing.
- This paper presents a method to select cloud instances in order to meet the performance requirements for visual data analysis at a lower cost.

CONTINUE

- We measure the frame rates when analyzing the data using different computer vision methods and model the relationships between frame rates and resource utilizations.
- We formulate the problem of managing cloud resources as a Variable Size Bin Packing Problem and use a heuristic solution.

EXISTING SYSTEM

- The scientific analysis to solve real-world problems has been HE use of visual data such as images and videos for increasing significantly over the past decade.
- There has been tremendous growth in the amount of visual data available on the Internet in recent years.
- One type of visual data of particular interest is produced by network cameras providing real-time views.
- Millions of network cameras around the world continuously stream data to viewers connected to the Internet.

CONTINUE

- This data may be used by a wide variety of applications such as enhancing public safety, urban planning,
- emergency response, and traffic management which are computationally intensive.
- Analyzing this data requires significant amounts of computational resources.
- Cloud computing can be a preferred solution for meeting the resource requirements for analyzing these data.

PROPOSED SYSTEM

- This paper presents a method called Adaptive Resource Management for Video Analysis in Cloud (**ARMVAC**).
- ARMVAC determines the configurations (types, locations, and numbers) of cloud instances needed to meet the performance requirements at low costs.
- It is one of the first papers devoted to selecting the cloud configurations for analyzing large (GB) amounts of data from multiple video streams. The sources of the streams are globally distributed.

CONTINUE

- Our method considers both performance requirements and costs, modelling this problem as a bin packing problem and using a heuristic solution.
- The paper presents a prediction model based on CPU utilization for determining the number of streams that can be analyzed on different types of cloud instances for a given analysis program.
- We evaluate the solution using Amazon EC2 and demonstrate up to 62% cost reduction compared with four other strategies for selecting cloud instances.

HARDWARE REQUIREMENTS

- Processor - Pentium –III
- Speed - 1.1 Ghz
- RAM - 256 MB(min)
- Hard Disk - 20 GB
- Floppy Drive - 1.44 MB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS

- Operating System : Windows 8
- Front End : Java /DOTNET
- Database : Mysql/HEIDISQL

CONCLUSION

- This paper presents ARMVAC, an adaptive resource manager to select low-cost cloud instances for analyzing MJPEG data from globally distributed network cameras.
- Inputs to ARMVAC are the analysis programs, the required number of cameras, the locations of the cameras, the target frame rates, and the durations of the analyses.
- The outputs are the types, locations, and number of cloud instances to be launched to achieve the target frame rate on all the cameras.
- ARMVAC includes a model to predict the maximum number of streams that can be analyzed on different types of instances.

CONTINUE

- We evaluate ARMVAC using Amazon EC2 cloud instances and observe that the achieved frame rate on all cameras is equal to the target frame rate for different input scenarios thereby satisfying the performance requirements.
- We observe that ARMVAC lowers the overall cost up to 62% when compared with four other reasonable strategies (ST1- ST4) for selecting cloud configurations.
- Our evaluation demonstrates that our method is not ad-hoc and can be applied to different analysis programs.

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CONTINUE

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