ENHANCED VIDEO STREAMING ARCHITECTURE USING CLOUDLETS

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DECLARATION

I declare that this is my own work, and this thesis/dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

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The above candidate has carried out research for the PhD/MPhil/Masters thesis/dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of the supervisor: Eng. Prof. Indika Perera

Signature of the supervisor: Date: 26/06/2023

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This research has been made with the intention of deriving a solution in the video streaming world which is improving day by day with the efforts of different fields of expertise. For the enhancement of this research, there were a number of people who spend their time and helped with their capabilities. I would like to offer my heartful gratitude to all of them including my supervisor Eng. Prof. Indika Perera, Department of Computer Science & Engineering, University of Moratuwa. And special thanks to my parents and my colleagues who encouraged me all the time.

ABSTRACT

As mobile computing and cloud computing work together to provide new technologies and capabilities to end users, clouds are overloading with data-intensive and compute-intensive processes. Video streaming is such an application trending in the technology world. Video content has been a significant form of communication as well as media for entertainment. With the cloud's potential, editing, and processing video streams can be easily done. Even so, while watching a real-time video stream, a single buffering situation can be distracting to most users. Real-time stream processing is a computationally and memory-intensive operation that is also latency sensitive. Standalone clouds cannot handle such latency.

Cloudlets are important and new architectural components in mobile and cloud architecture, representing the intermediate stage of the Cloudlet-mobile device hierarchy. This thesis investigates to resolve live video stream processing which is computer & memory intensive and can be done smoothly using Cloudlets. Cloudlets can provide a platform for developing and deploying new video editing algorithms and applications, which can be executed on the same video stream to produce different outputs. This approach can provide users with a new level of flexibility and control over their video content, enabling them to create customized streams that match their preferences. The prototype of the system was developed using agile development methods, Java and Python programming languages, and the Google Cloud platform.

The software system is evaluated based on maintainability, usability, and sustainability. The system's architecture has the potential to open up new business models and gain market share in the future. The system can be further improved by making it more automatic and internally running.

The system has the potential to improve the field of video streaming architecture by improving the user experience, and the ability to use resources more efficiently. Its plug-and-play capability will make it easier for users to access and use the platform, which will increase adoption rates and user satisfaction. The system is planned to have certain security elements that will assist in the protection of users' personal information and the prevention of unauthorised access to their accounts. This can help to build trust with users and reduce the risk of data breaches.

Keywords: Cloud Computing, Cloudlets, Video Streaming

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