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Online Cloud Based Image Capture Software for Microscope

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Abstract:
As it is a competitive world and very fast world, all the things are online. So we created software called Online Cloud Based Image Capture Software for Microscope. Microscope work can be very straining on both the musculoskeletal visual and systems. Workers are sit in one fixed position with their bodies conformed to the machine for extended time. Worker feel uncomfortable coupled with less advanced optical and digital technologies have made traditional microscopes limiting and ineffective in many applications. This software provides a comprehensive imaging solution. This software is aimed at providing users with the ability to view live stream captured from camera attached to a microscope .This setup is used in biomedical science field, With this application ,users can place slides under a microscope lens and view the contents on their computer screens via cloud .Time, cost and quality plays very important role to satisfy demand of the market, So the aim of this project is to create the Online Cloud Based Image Capture Software for Microscope which helps to reduce the problems of portability and storage space by making use of the concept of cloud computing which will give users various image processing options to view and manipulate images captured with the microscopic cameras.

Keywords: *Cloud computing, Microscope, Middle layer, Camera SDK, GUI, Deployment, Digital image processing, SaaS.*

I. INTRODUCTION

In today's world of fast growing technology which expects good reliability, performance, scalability, cost, agility, security and few other important characteristics, Cloud computing builds on decades of research in virtualization and more recently networking, web and software services .Cloud computing is a model for providing software, data access and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. This image capture software enables microscopists to create capture effective pictures easily. The live image screen provides a preview of the image capture so you can see how the image will look before you capture it. The live image screen is ideal for panning through slides to locate areas of interest; detail magnifier and its focus gauge enable fast and precise focusing. Contrast, Color temperature and automatic white balance options create excellent color fidelity. Acquiring effective images or image sequences is as effortless as a single mouse click. After image capture, panorama, measurements, reticles, calibration marks, Z-stacking and other enhancements can be applied. Further sequences of captured images can be played back as a movie. Further Images can be saved in several different file formats for printing. This software makes effective way to enhance your professional image. Registered users who log on to the Cloud software-as-a-service (SaaS) system receive immediate access to the latest version of entire suite of image software through a centralized remote server-based account. This software will support a wide variety of research applications in fields as varied as respiratory research, oncology research, neuroscience and skeletal research. It is browser independent and easy to access. Users can pay as they go for storing data and doing analysis only for as long as they need it, with complete security and full data backup. The need for local software installation and support is eliminated, and user authentication is secure. The application can handle analysis on virtual slides that either reside locally or are uploaded to the Cloud.

Fig1.Sample Overview of microscope with camera and image capture software

II. NEED FOR PROJECT

The main advantage of cloud computing over the other non-network methods is of faster processing. Also, many processors can be used remotely, without the knowledge of the user(s), in order to expedite the processing. Thus the main reason for creating the project is to provide a centralized Image Capture Software scheme for biological medical field. Also, it will act as a centralized repository for all the captured images from microscope. The other major advantage that this system will have over the others is that it will make the users system lightweight i.e. there will be no need to maintain application at the client-side. Thus, for medical researchers this will prove to be highly efficient. The process of maintenance and distribution of dynamic usernames, passwords will be simplified and also authentication and personalized task distribution will be made possible.

Fig2. Cloud Computing

III. SOFTWARE ARCHITECTURE

Online Cloud Based Image Capture Software for Microscope is digital image processing software which enables end-users to view and process live/recorded images on the computer screen via cloud. These images are captured from a camera connected to a microscope. The GUI connects to camera using SDK (software development kit) named Camera SDK and Kernel. The camera SDK provides access to camera features like image output format (color or grayscale) exposure time, image resolution, etc. and image processing features like varying color filters manipulating brightness, contrast of image,. The Kernel is a middle layer between GUI and camera SDK. All communication between GUI and camera SDK exist through kernel.

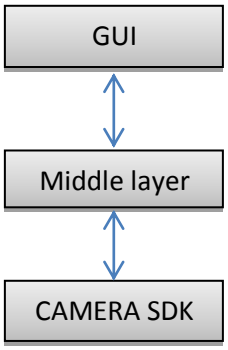

Fig3. Software Architecture

1. GUI: Graphical user interface is a type of user interface that allows users to interact with electronic devices through graphical icons and visual indicators as opposed to text-based interfaces, text navigation or typed command labels.
2. Middle layer: Middle layer is a collection of frameworks which allows quick and efficient development of 2D graphics and media processing applications. The multiple utility frameworks provided by middle layer which supports different operations of application.
3. Camera SDK: Camera SDK is a software development kit, which provides the mechanism along with required drivers to connect a microscopic camera to a computer system and helps to capture images from the camera. By means of different drivers it provides required channel between the camera and the computer system

IV. SYSTEM ARCHITECTURE

Technology is applied to generate Online Cloud Based Image Capture Software for Microscope in 3 tier architecture.
A. Data Layer (Back End): Available in the Web Server which contains account information about the user
B. Business Layer (Middle End) Decision making layer from the application layer
C. Application Layer (Front End) User Interface which shows user interface to the user and getting input from the user.
D. Login Option: Using this option user can login into the cloud for Cloud Vendor and user is provided with login id and password, by using these details he can login to that cloud from any network.
E. Display option: This would take the GUI to the server side for to display the GUI and at the server side, middle layer and camera SDK packages has been imported to communicate with the GUI.

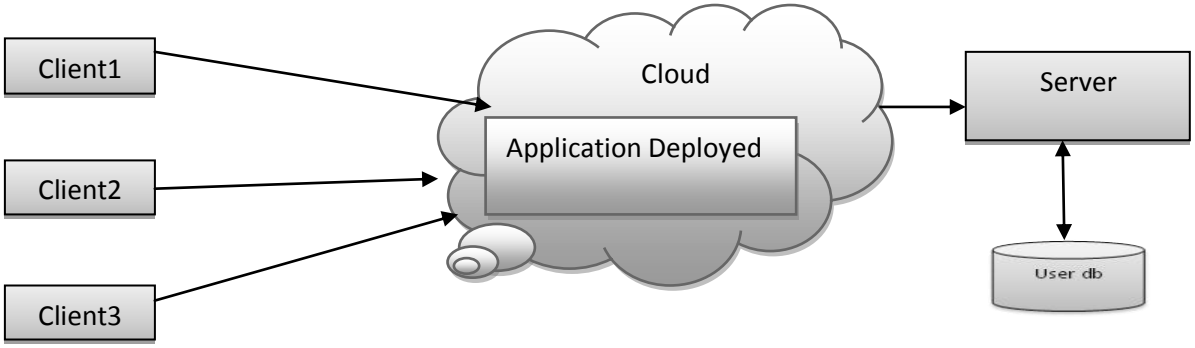

Fig4. Software Architecture

V. DEPLOYMENT DIAGRAM

A Deployment diagram shows the how the application is deployed over the private cloud to serve the users and also shows how different components are connected to each other.

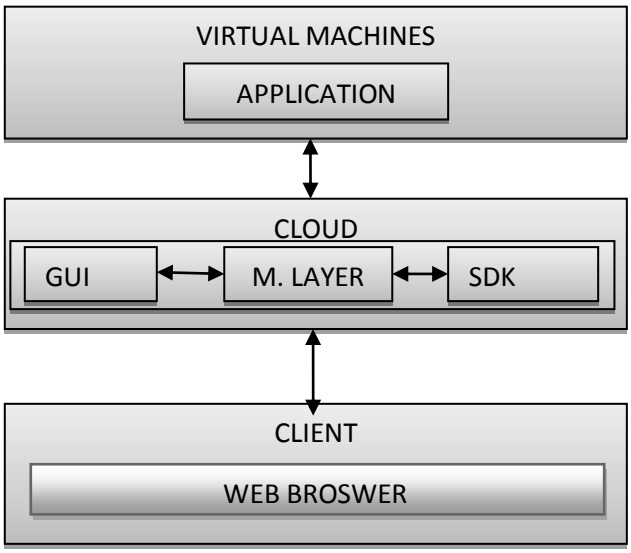

Fig5. Deployment Diagram

VI. IMPLEMENTATION

Whether you are a beginner in digital microscopy or an imaging expert, this software will guide you to reproducible results with the aid of structured workflows. With this digital image processing software, you can control essential parts of your imaging system. All of the processing steps and microscope settings are adjusted quickly and easily in a single user interface. This application allows visualizing and captured images in several dimensions. The functionality of this effective imaging toolbox expands constantly with a wide range of different modules that are tailored to specific applications or microscope accessories. Now and in the future, for your lab, you need only one microscope software.

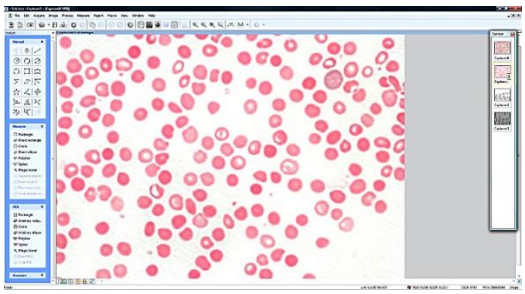

Fig6. Overview of GUI

VII. CONCLUSION

By making the use of characteristics of the Cloud computing, we have presented architecture to build an Online Cloud Based Image Capture Software for microscope. It would basically be a platform for researchers in biological science field. This would eliminate for researchers to install application separately on each computer. Currently, there are a large number of commercial software packages available, some produced by camera manufacturers or microscope, others by third parties. Unfortunately, in current automated imaging world there is no such thing as the complete solution for online and many researchers are faced with the incompatible software packages. Sometimes, due to some technical incompatibilities have to use two different software packages within the same hardware setup. Advantage of this project is that whenever the application is to be upgraded it can be done easily without installing it on each and every machine.

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REFERENCES

[1] Online C/C++ Compiler using Cloud Computing Aamir Nizam Ansari, Siddharth Patil, Arundhati Navada, Aditya Peshave, Venkatesh Borole , Pune Institute of Computer Technology, Pune, University of Pune.

[2] Shuai Zhang Shufen Zhang Xuebin Chen XiuzhenHuo, ―Cloud Computing Research and development Trend, Future Networks, 2010.ICFN '10' Second International Conference.

[3] Cloud Documentation and Centralized Compiler for Java & Php Namrata Raut Darshana Parab Shephali Sontakke, Sukanya Hanagandi Department of Computer Engineering, JSPMs BSIOTR(W)

[4] Yogesh Bhanushali, Dwij Mistry, Shraddha Nakil, Sharmila Gaikwad, "Centralized C# Compiler Using Cloud Computing", Advanced Computing & Communication Technologies(ICACCT-2013). 7th International

[5] JunjiePengXuejun Zhang Zhou Lei Bofeng Zhang Wu Zhang Qing Li, "Comparison of Several Cloud Computing Platforms", Information Science and Engineering (ISISE), 2009 Second International Symposium "Cloud Audit,".

[6] A.RABIYATHUL BASARIYA and K.TAMIL SELVI, Computer Science and Engineering, Sudharsan Engineering College-centralized C# compiler using cloud computing, 2nd march 2012

[7] Chunye Gong Jie Liu Qiang Zhang Haitao Chen Zhenghu Gong, "The Characteristics of Cloud Computing",Parallel Processing Workshops (ICPPW), 2010 39th International Conference

[8] Grobauer, B. Walloschek, T. Stocker, E., "Understanding Cloud Computing Vulnerabilities", Security & Privacy, IEEE March-April2011

[9] Ogawa, N.; Oku, H.; Hashimoto, K.; Ishikawa, M. "Single-cell level continuous observation of microorganism galvanotaxis using high speed vision", Biomedical Imaging: Nano to Macro, 2004. IEEE International Symposium on, Vol. 2, 15-18 April 2004, Page(s): 1331 - 1334.

[10] M. Nakajima, H. Akimoto, T. Hirano, M. Kojima, N. Hisamoto, M. Homma and T. Fukuda, "Biological specimen viability analysis by hybrid microscope combined optical microscope and environmental- SEM", IEEE Int. COnf. Nanotechnology Materials and Devices, California, USA, 2010..

[11] Olympus BHS/BHT System Microscope, Olympus, pp 17. Available at: http://www.alanwood.net/downloads/olympus-bh-2-brochure.pdf, 01 Feb, 2012.

[12] R.C. Gonzaleze, and R.E. Woods, Digital Image Processing. New Delhi: Pearson Education; 3rd edition, 2009..

[13] G.J. Arjan, B.G. de Grooth, I Greve, G.J. Dolan, L.W.M.M. Terstappen, "Imaging technique implemented in cell tracks system", Cytometry, No. 7, Wiley-Liss, Inc., 2002, pp. 248-255.

[14] G. Peretti et al. "Narrow-band imaging: a new tool for evaluation of head and neck squamous cell carcinomas.Review of the literature",Acta Otorhinolaryngol Ital 2008; 28:49-54.

[15] G. Dagnino, L. S. Mattos, G. Becattini, M. Dellepiane, and D. G. Caldwell, "Comparative evaluation of user interfaces for robot- assisted laser phonomicrosurgery", EMBC 2011, Boston, MA, USA.

[16] "Imaq Vision Concepts Manual", available from: http://www.ni.com/pdf/manuals/322916b.pdf

[17] James Ambras and Vicki O'Pay, Hewiett-Packard Laboratonies, "Microscope : A Knowledge-Based Programming Environment," IEEE Software,1998,pp.50-58