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Software architecture - Applications practicing DevOps and Artificial Intelligence.

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Abstract**—***AI plays an important role in optimizing DevOps performance, it can enhance performance by offering instant creation and operating cycles and providing a positive experience for customers. Machine learning systems can make it easier to acquire data from different DevOps system pieces. This involves speed, errors, and burn rate, which are more conventional methods of production. Also, a component of DevOps is data generated by seamless tool integrations. Metrics such as number and time of integration, overall success, and deficiencies per integration are only useful when correctly measured and correlated. This paper will explore the different applications that practice Artificial Intelligence and DevOps*

Keywords-*, DevOps, Artificial intelligence, DevOps Automation, Software architecture*

I. INTRODUCTION

The way DevOps is thought modified is fundamentally by the utilization of artificial intelligence (AI) and machine learning. In particular, it delivers a new DevOps format that acknowledges the need for intelligent systems designed and supported by full security (DevSecOps) [1]. In several ways, this is the next key phase in shortening the software development cycle for all integrated intelligent systems so that the secure, high quality of software can be provided continuously. The capabilities of today's software systems are improved by artificial intelligence (AI), machine learning (ML) technologies: automated assistants, photo captioning, face recognition tools, financial services, and product recommendations [2]. The challenging task with AI is to ensure that the model is implemented, operational, and supportive within a production environment. The developers of software know-how to produce cloud and business applications. AI teams can create templates for a company to be transformed. However, more time will be needed when it comes to bringing them together to incorporate an AI-specific application process, to automate and assemble it into good implementation practices [3].

II. LITERATURE REVIEW

The remote monitoring and maintenance of DevOps data are extremely complex. The sheer scale of this data has forced the DevOps teams difficult to efficiently absorb and use data in today's, complex, and distributed applications for solving customer problems [4].

DevOps will be powered by AI in the future. As people are not prepared to control mass data volumes and machines in their day-to-day enterprise, artificial intelligence is the essential tool to compute, evaluate and transform teams' application creation, distribution, implementation, and management. But let's first understand how AI and DevOps are interrelated before we discuss how AI / ML transforms DevOps [5].

As there is so much data, DevOps teams seldom display the entire dataset and evaluate it. Rather, thresholds are specified as a prerequisite for action, like 'X measures above a defined watermark. They simply discard the vast majority of the data they collect and concentrate on outliers [6]. The problem is that the outliers can warn, but they do not inform [7].

Credit scoring processes can be accelerated by artificial intelligence, taking into consideration alternative data (e.g. online activity trends or mobile clothes) and relationships between often invisible variables for traditional approaches [8]. The use of AI can mean lower assessment costs for financial institutions, more rigorous evaluation, and lower default risk. The tools can provide credit access for clients, particularly those with low or non-existent credit history [9].

In late 2019 Fujitsu grabbed a chance by creating a cloud-based AI platform that screened prospective borrowers, credit analysis specialists in Japan were missing [10]. The platform uses machine learning to create bank and company credit ratings. Although some human interaction is still needed, many of the repetitive and work-intensive elements in the credit scoring process are automated [11]. Applications for machine learning may do more. You will train them on all the data and once these programs are in production you can look at it to conclude. This helps with theoretical forecasts.

III. Software architecture – Applications

A. Electronic Virtual Assistant: Banking

AI develops faster than expected in the banking industry. Many banks have already used AI systems to help their clients, detect irregularities and credit card fraud [12]. HDFC Bank is an example of this. The HDFC Bank developed a chatbot, EVA (Electronic Virtual Assistant). Eva has been handling more than 3 million service requests since its launch, engaging with more than half a million active users while hosting over a million chats. Within a period of fewer than 0.4 seconds, Eva will acquire information from multiple sources.

B. Finance

Computers can also learn to interpret trends in previous data and to predict how patterns can happen again in the future [13]. Financial companies used AI during the era of ultra-high frequency trading to boost their stock trading efficiency and increase profits. The largest brokerage house in Japan, Nomura Securities, is one example of such an organization. The organization has cautiously followed one goal: to evaluate with the aid of computers the experiences of seasoned stock traders. Nomura would launch a new stock exchange system after years of research [13].

A large number of price and trade data are stored on a computer. By applying this knowledge source, it can determine, for instance, that current market conditions are identical to those of two weeks ago and forecast how share prices are going to adjust within minutes [14]. This helps to make informed trade decisions based on the market prices predicted.

C. *See & Spray Application: Agriculture*

AI will help farmers to get more out of the land while making more productive use of resources. Issues including global warming, growing population, and food security have forced the industry to explore more creative ways to increase crop yield [14]. Blue River Technology built a robot referred to as See & Spray, that utilizes computer vision technologies which is object detection to effectively spray weeds on cotton plants. It requires robot systems for the control of weeds and the control of the plants.

Spraying precisely can help in preventing resistance to herbicides. In addition, Berlin-based agricultural technology start-up PEAT has created a Plantix application that pictures potentially deficient soils and nutrient deficiencies. Possible defects are found in the images taken by the user's smartphone camera [15]. Users shall then have the methods, suggestions, and other potential strategies for soil regeneration. The company maintains that its software has an average accuracy of up to 95 percent for pattern recognition.

D. *Gaming*

In recent years, the gaming industry has been an important part of Artificial Intelligence. Indeed, one of AI's greatest achievements is in the world of gaming. One of the most critical achievements in AI is DeepMind's AI-based AlphaGo software, renowned to beat Lee Sedol, the world champion in GO game [15]. DeepMind produced AlphaGo's upgraded version, AlphaGo Zero, which beat the predecessor on AI-AI face-up. AlphaGo Zero learned to master the game in comparison with the original AlphaGo, which DeepMind has long learned by using a large volume of data and monitoring [16]. Another example of game-based artificial intelligence is the First Encounter Assault Recon, which is a first-person video game called F.E.A.R.

E. *Space Exploration*

Space missions and experiments often require a great deal of data to be analyzed. The best way to manage and process data on this scale is artificial intelligence and machine learning. Artificial Intelligence was also used for NASA's next rover expedition on Mars 2020, the Mars 2020 Rover. The Kepler telescope was used by artificial intelligence to classify distant eight solar systems for years after a thorough study. AEGIS an AI-based Mars rover has been on Mars. The rover is equipped with autonomous cameras to research Mars [16].

Some important examples of the application of AI to DevOps:

'DevOps tools,' which provide visibility in the delivery process, are Jira, SonarQube, Git, Jenkins, Puppet, Open, etc.). Applying AI can detect anomalies in such data — high quantities of code, long development times, sluggish updates, late-code checks — that define many of software development's 'wastes,' which include gold positioning, partial work, inadequate resourcing, unnecessary task switching, or process slowdown.

F. *Jenkins*

Jenkins which is open-source software with a Continuous Integration server can orchestrate a sequence of activities that leads to automated continuous integration. Jenkins has been written in Java fully free. Jenkins is a worldwide widespread application with approximately 300 thousand, which grows day by day. It is software that is on a computer and needs a web server such as Apache Tomcat. It's because he tracks repetitive activities during the production of a project that became very popular with Jenkins [18]. For instance, Jenkins will constantly test the projects and display all the errors in the initial stages of the project. Software businesses can boost their software development by using Jenkins, as Jenkins can automate fast build and test. Jenkins promotes the full development of software through

construction, testing, documentation, implementation, and other phases.

G. JIRA

This application is used to monitor bugs, track issues, and manage the project. Currently, the word "JIRA" is taken from "Gojira" meaning "Godzilla." The fundamental use of this method is the monitoring of software and mobile application issues and errors [19]. It can also be used for the management of programs. This JIRA dashboard features a wide range of helpful features and features that make it easy to manage the problems. It contains a range of levels of protection that can be delegated to users or classes. When creating or editing a problem users can define the level of protection for problems.

H. Git

Git is a free, open-source software version control as well as code management framework, released under version 2 of the GNU General Public License. Git can be used for other purposes as well as software version control, such as continuous integration and content management.

Git was developed and published in 2005 by Linus Torvalds, the Linux developer. The project was initially carried out because the open-source version control systems available at the time did not meet Linux kernel development specifications [19]. Firstly, with such a large-scale collective project, version control demands better performance than current systems can do — a patch, for example, three seconds versus 30. Git promotes its automated workflow and protects against corruption, in addition to its superior efficiency.

IV. CONCLUSION

Artificial intelligence (AI) is becoming a growing part of the finance world as it progresses [20]. The implementation of this system is already underway in areas such as value investing (Euclidian Technologies), customer care, and different computational trading systems. All these implementations are great and should completely happen, even if they fall within the lower to mid-range order of thought. A.I apps can and are predicted to fall into the higher-order thought group in the investment industry 10 - 15 years from now. These are AI which is capable of recognizing the effects of lower government spending on the rates of export of a country despite the current market constraints, or of a lower pricing policy rate because of the state of the economy. An automation company needs to determine whether to purchase or create a customized AI / ML layer [20]. The first move, however, is to build a strong DevOps infrastructure. AI / ML can be implemented for enhanced efficiency when the foundation is established. By removing inefficiencies throughout the operational life cycle, AI / ML will aid DevOps teams to focus on innovation and creativity, enabling teams to handle the volume, speed, and variability of data. In turn, this can lead to automated improvement and an increase in productivity of the DevOps team.

REFERENCES

[1] Laan, S.2011, “IT infrastructure architecture: Infrastructure building blocks and concepts,” U.S.A: Lulu Press.

[2] Bottou, L., 2013, "From machine learning to machine reasoning", Machine Learning, 94(2), pp. 133-149.

[3] Pozdnoukhov, A., Purves, R., and Kanevski, M., 2008, "Applying machine learning methods to avalanche forecasting", Annals of Glaciology, 49, pp. 107-113.

[4] Virmani, M.,2015, “Understanding DevOps & bridging the gap from continuous integration to continuous delivery. *Fifth International Conference on Innovative Computing Technology (INTECH 2015)*. DOI:10.1109/intech.2015.7173368

[5] Riungu-Kalliosaari, L., Mäkinen, S., Lwakatare L. E., Tiihonen, J. and Männistö, T.,2009, “DevOps Adoption Benefits and Challenges.

[6] Ron, D., 2007, "Property Testing: A Learning Theory Perspective", Foundations and Trends® in Machine Learning, 1(3), pp. 307-402.

[7] Humble, J. and Farley, D., 2010, "Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation (Adobe Reader). Pearson Education.

[8] Limoncelli, T., Chalup, S., Hogan, C., and Limoncelli, T., 2014, The practice of cloud system administration.

[9] Hüttermann, M, 2012, "Building Blocks of DevOps. DevOps for Developers," 33-47. DOI:10.1007/978-1-4302-4570-4,3.

[10] Kim, G., Love, P., and Spafford, G., 2014, Visible Ops Security: achieving common security and IT operations objectives in 4 practical steps, Eugene, OR: IT Process Institute.

[11] Gill, A.Q., Loumish, A., Riyat, I., and Han, S.,2010, "DevOps for information management systems," VINE Journal of Information and Knowledge Management Systems, vol. 48, no. 1, pp. 122–139.

[12] Gregory, J., and Crispin, L., 2015, More Agile Testing: Learning Journeys for the Whole Team, Addison-Wesley, Upper Saddle River, N.J.

[13] Bell, T. E., and Thayer, T. A.,2006, "Software requirements: Are they a problem," in Proceedings of the 2nd international conference on Software engineering, pp. 61–68.

[14] Huttermann, M., 2012, "DevOps for developers. Apress.

[15] Smeds, J., Nybom, K., and Porres, I.,2015, "DevOps: a definition and perceived adoption impediments," in International Conference on Agile Software Development, pp. 166–177.

[16] Boehm, B.,2006, "A view of 20th and 21st-century software engineering," in Proceedings of the 28th international conference on software engineering, pp. 12–2

[17] Wettinger, J., Vasilios, A., and Leymann, F.,2015, "Automated Capturing and Systematic Usage of DevOps Knowledge." Proceedings of the IEEE International Conference on. IEEE Computer Society.

[18] Hneif, M., and Lee, S.P.,2011, "Using Guidelines to Improve Quality in Software Nonfunctional Attributes", *IEEE Software*, vol. 28, no. 6, pp. 72-77. Available: 10.1109/ms.2010.157.

[19] Herring, M,2015, "Continuous everything in DevOps," Accenture. Retrieved from: https://www.accenture.com/us-en/blogs/software-engineering-blog/hering-continuous-everything-in-devops

[20] Tessem, B., and Iden, J.,2008, "Cooperation between developers and operations in software engineering projects," in Proceedings of the 2008 international workshop on Cooperative and human aspects of software engineering, pp. 105–108.