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Edgenius Customer Delight Using AI Manager

¹Dhananjay Kumar, ²Nilesh T Dhone, ³Jayakumar GM

¹IA-PCP (Release Owner), ²IA-PCP (R & D Engineer), ³IA-PCP (R & D Engineer)

¹IA-PCP,

¹ABB Ability Innovation Center, Bangalore, India

Abstract:

The Fourth Industrial Revolution (4IR or Industry 4.0) is the ongoing automation of traditional manufacturing and industrial practices, using modern smart technology. Large-scale Machine-to-Machine communication (M2M) and the Internet of Things (IoT) are integrated for increased automation, improved communication and self-monitoring, and production of smart machines that can analyze and diagnose issues without the need for human intervention.

There are four design principles identified as integral to Industry 4.0:[28]

Interconnection — the ability of machines, devices, sensors, and people to connect and communicate with each other through the Internet of things, or the Internet of People (IOP).

Information transparency — the transparency afforded by Industry 4.0 technology provides operators with comprehensive information to make decisions. Inter-connectivity allows operators to collect immense amounts of data and information from all points in the manufacturing process, identify key areas that can benefit from improvement to increase functionality.

Technical assistance — the technological facility of systems to assist humans in decision-making and problem-solving, and the ability to help humans with difficult or unsafe tasks.

Decentralized decisions — the ability of cyber physical systems to make decisions on their own and to perform their tasks as autonomously as possible. Only in the case of exceptions, interference, or conflicting goals, are tasks delegated to a higher level.

Globally managing customer relationship, maintaining and retaining old customers and getting new customers from the marketplace are very much necessary. Achieving customer satisfaction and delight is a major challenge that companies are facing. It is very much desired for a firm to adapt new technologies that helps to optimize the pricing of products and services. AI chatbot provides 24/7 secured, productive service and support to end customers to achieve Installation, Configuration, Update system, Upgrade system and effective maintenance of ABB Digital Edgenius products and services.

This application could be designed using advanced Industry 4.0 concepts and applied for ABB Digital Edgenius 2.0 (IA Digital offering) products and services, to provide end to end support to ABB Digital customers. Support can be achieved with minimal human intervention using leading-edge AI suites or advanced algorithms within open-source scripts using Python, we can have Machine learning algorithms to extract the relevant context and provide information to ABB control system to perform certain customer support activities such as installation, configuration, upgradation and technical service and support for troubleshooting and rectifying problems in Edgenius system.

Depending on customer requirement, support can be further hosted on Intranet, Internet Website (compatible with IE Edge / Google Chrome) using Microsoft Service Fabric or ABB Ability Edgenius platform to make it available on Tab or Mobile.

Keywords—Edgenius, AI manager, customer delight, ABB

INTRODUCTION

Industrial sector is growing vastly to meet demands of growing human population. Industrial sectors such as Solar power generation, Oil and natural gas, Metal industries, Cement, Vehicle manufacturing and many more. Not only industry is changing but also the environment that affects the business continuity is changing rapidly and unpredictable. One such example is the introduction of COVID-19 pandemic which created a lot of issues to business continuity and many businesses across the world was almost shutdown for around 2 years. To recover the business back to normal state it could take huge time and resources, as many resources are now not completely available, and many human resources have degraded their work skills due to long break without work. Both business environment and business needs are now almost uncertain. Satisfying the customer, engaging profitable customers, capturing the value from customers is always a major challenge to industries with rapidly changing the business environment. With all the above problems, there is a very strong need for a proactive automated system that can still support the customer to drive their business and maintain business continuity with high productivity. The need for an automated system is that it could still support the customer drive business and get productivity even if manpower is not available due to uncertainties. As maintenance, upgrade, service-related tasks are very common in software driven industries, this idea of automated service and support system serves, as the best alternative to the convention manpower driver activities. Edgenius customer delight using AI manager is an idea that is aimed to serve the ABB digital Edgenius customers seamlessly without any problems as stated above.

PROPOSED METHOD TO ACHIEVE SOLUTION:

ABB DIGITAL EDGENIUS SOLUTION

Utilize existing ABB ability Edgenius platform along with and apply machine learning model to manage AI based customer support and services activities seamlessly.

Method: Edgenius Integration with AI Manager

- Digital Edgenius system has edge management portal for end users to install, configure and troubleshoot Edgenius apps and edge health. It is possible to integrate the AI based customer support and service plugin within edge management portal.

With AI based plugin in edge management portal it is possible to provide support and solutions to end customers. A customer will log in to secure authenticated Multi-tenant edge management portal and request the support from chatbot support. The chatbot shall interact with end user and collect the information about the service or support to be provided and then provides appropriate support without any intervention of ABB support personnel. It is capable of installing, configuring, diagnosing and rectifying the problems found in the edge device. User shall be able to get the support from AI manager 24/7. It is also capable to support configuration of many industrial communication protocols such as Modbus, OPC UA and ABB's world class distributed control systems such as ABB Symphony Plus and ABB 800XA. A software-based mechanism could be adopted within edge management portal to serve selected customers based on the Paid service option selection. When customer pays and opts for AI based service and support option, customer will be eligible to utilize AI manger to solve the requirements. Different tariff could be made available for customer to serve and satisfy specific needs.

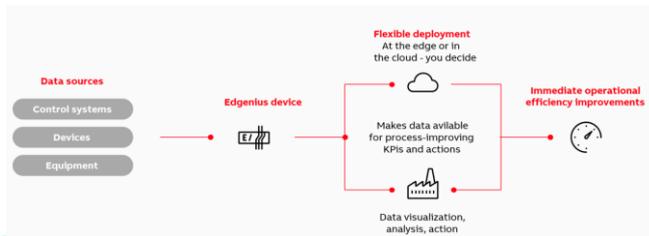


Fig 1: - integration of Edgenius AI manager with system ABB control and Edgenius system

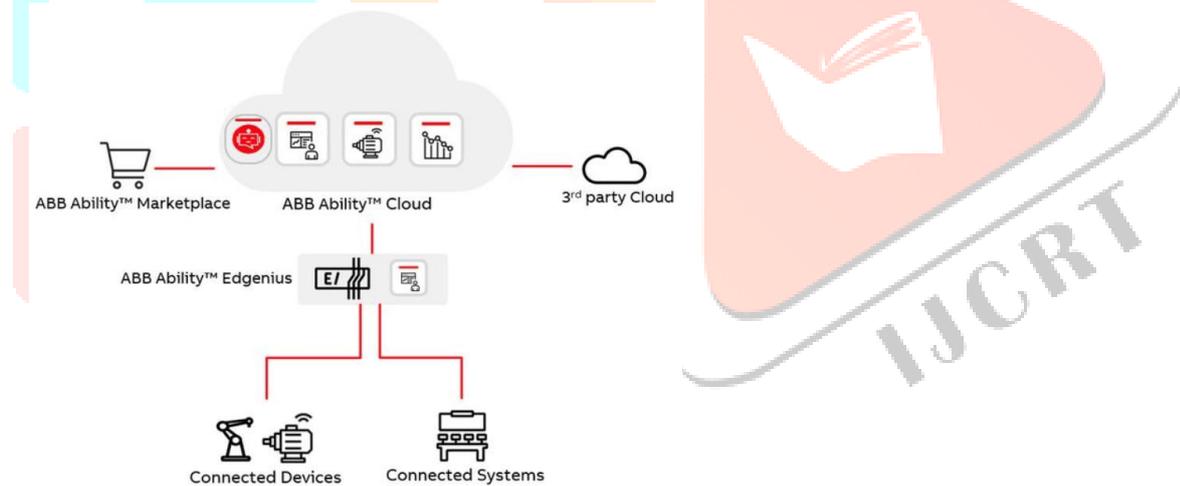


Fig 2: - integration of Edgenius AI manager with system 800xA and Edgenius system

1. INDUSTRY 4.0

With the advent of Industry 4.0, digitalization and digital transformation have emerged as core drivers for industry. ABB digital Edgenius system comes with many cloud and local applications to handle the data in industrial plants that are specifically designed using ABB control systems. Edgenius consists of edge device which is a device that collects data from control system through different sources such as OPC UA, System 800xA Symphony plus, Modbus, Cpmplus. It allows user to filter the collected data and then move the important data from edge device to cloud platform. There are many applications to collect data from control systems such as OPC UA, Modbus utility, control system connects for 800xA and Symphony Plus.

For filtering the useful data, **Streaming calculations engine** is available which efficiently handles the filtering of data that arrives at edge device. Edge management portal is dedicated to installation, configuration, upgradation, troubleshooting of Edgenius apps as well as for system health check.

It is very common scenario in software industry to have repetitive software upgrades, installation, configuration, reconfiguration, diagnosis of system health, ensure system security requirements. Edgenius customer delight using AI manager helps customer to achieve all above with 24/7 support without any need of support engineers.

Edgenius customer delight using AI manager could be provided as a plugin in Edge management portal. Customer shall avail this excellent feature as a paid service. Using this feature, customer shall interact with the intelligent chatbot and get all the support and services for their Edgenius systems.

Technology Used:

AI based chatbot which is designed and developed using python, AI/ML algorithms and chatbot.

Chatbot SupportLine functional workflow

Flowchart:

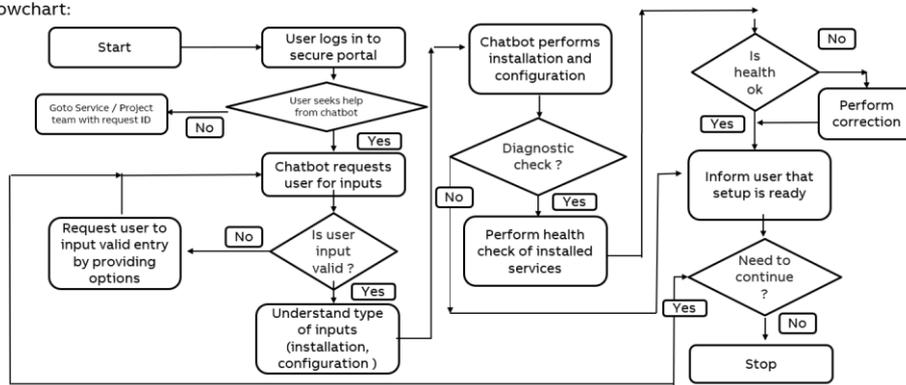


Fig 3: Chatbot support line functional workflow

The paid customer shall login to secure authenticated edge management portal. User then clicks on AI Chatbot feature and seeks for support and services. Chatbot shall interact with user by requesting for information. when user enters valid information, the information will further be processed by chatbot and performs various tasks as per request from user. The task could be installation and configuration of an application such as OPC-UA streaming calculations engine, Modbus, control system connects. The tasks performed is not just installation but also an end-to-end configuration and setup activity. For example, when user request for installation and configuration of 800xA control system connect app by providing the extended details such as IP address, login credentials of 800xa and edge, AI manager feature shall install control system connect app on edge device, verify whether app is successfully installed and diagnose for any errors. It will auto correct the errors by taking necessary actions. AI manager will also copy the 800xa key from control system app in edge management portal, install trusted digital certificates by auto generation and then perform the configuration in 800xa and also a test deploy is performed. It will also ensure that all the desired 800xa services for control system connect app functionality works fine without any issues.

AI assistant shall also interact with user if there are any new updates and provides appropriate information to the user. It guides user on benefits of new updates and takes approval from the user. AI manager will then investigate the Edgenius edge device intelligently and analyze the installed applications and their working condition. It intelligently predicts the risks of upgradation with the new upgrade and then interacts with the end user. The AI assistant will then take approval again for upgradation and completes the procedure. It will also ensure that the system is stable after upgradation and ensures the system is not disturbed.

AI manager will inform user that the installation configuration, diagnostic activity and upgradation activities are successful and it will collect feedback from user and exits the task.

There could be certain situations where it is not possible to resolve the customer queries, in this situation the AI manager will automatically create ticket after collecting the necessary details from end user and then assign ticket to responsible team. It will then request the concerned team to take the ticket forward for resolution of customer query.

IV. REFERENCES

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- <https://www.python.org/>
- <https://numpy.org/>
- <https://matplotlib.org/>

DECLARATION:

The hacking instances mentioned in the paper are carried out only with intension of verifying the cyber security compliance of those solutions. There were no other intensions\gains\ill-effects intended. All the vulnerabilities found during these activities were reported to concerned or higher authorities.