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Evaluating the Effectiveness of Offering Personalized Employee Virtual Assistant (EVA) in the Employee Assistance Program (EAP)

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Abstract: ***Employee Assistance Programs (EAPs) are critical resources provided within organizations with the objective of providing support for employees facing professional and personal - related issues. Health Insurance providers like Elevance Health offer integrated EAP services as part of their insurance plans to enterprises. However, the challenges that the traditional EAPs often face are lower engagement and utilization rates resulting in delayed response times for varying reasons including stigma and lack of employee awareness. [1] Artificial Intelligence (AI) technologies provides a potential to enhance traditional EAPs by integrating personalized employee virtual assistants (EVA) [2]. Unlike Chatbots, which are often used as information acquisition interface, a cognitive - based virtual assistant will provide personalized recommendation to employees based on data collected from various sources including wearable devices, employee organization and personal data [3]. By analyzing employee engagement, satisfaction and outcomes, this research investigates weather personalized EVAs enhance the effectiveness of existing Employee Assistance Programs (EAPs). The study also explores the solution to develop and integrate EVA into EAP and examines the potential benefits, challenges, and ethical considerations of integrating EVAs into existing EAP frameworks.***

Keywords: Employee Virtual Assistant (EVA), Employee Assistance Program (EAP), Artificial Intelligence (AI), Machine Learning (ML), Natural Language Processing (NLP), Application Programming Interfaces (API), Health Care

1. Introduction

Employee Assistance Programs (EAPs) have long served as a cornerstone of organizational support systems, providing confidential counseling, resources, and services to help employees navigate personal and professional challenges. Despite their importance, EAPs often suffer from underutilization, partly due to stigma, lack of awareness, and the one - size - fits - all nature of many programs. [4] With advancements in artificial intelligence and machine learning technologies, there is an opportunity to transform EAPs by integrating personalized Employee Virtual Assistants (EVAs) to provide tailored and accessible support [5]. However, there is limited research on effectiveness of integrating personalized virtual assistants with EAPs in terms of employee engagement, satisfaction, and overall organization productivity.

This paper explores the solution for developing and integrating a personalized EVAs within EAPs and focuses on evaluating the effectiveness of these programs by offering personalized, real - time support to employees. The research aims to assess the potential impact of EVAs on employee engagement, satisfaction, and overall well - being.

2. Literature Review

The Current State of EAPs:

Employee assistance programs (EAPs) have evolved substantially over the past few decades, expanding their scope from fundamental counseling services to wide - ranging programs addressing diverse issues such as mental health, financial guidance, legal support, and workplace dispute mediation. However, research suggests that despite their comprehensive nature, EAPs encounter low participation rates, as many employees remain either oblivious to the available services being offered or just reluctant to utilize them due to stigma associated with seeking support for personal issues [4].

The Role of AI in Workplace Support Systems:

Artificial Intelligence (AI) has seen increasing adoption across various workplace functions, including recruitment and performance evaluation. Within employee assistance programs, AI can be applied to develop intelligent virtual agents capable of delivering personalized support tailored to individual employee needs [6]. Through natural language processing, these AI - powered virtual agents would interact with employees conversationally, offering prompt responses and guidance while preserving strict confidentiality [7]. The agents could help address challenges that may impact work performance or wellbeing, empowering employees with round - the - clock access to supportive resources. When designed and applied judiciously, virtual tools incorporating the latest advances in AI may help enhance the impact of established employee programs.

Benefits of Personalization in Employee Support

Personalization has proven effective at increasing engagement and satisfaction across various domains such as healthcare and customer service [8]. Within employee assistance programs, a tailored approach can directly meet the distinct needs of everyone, rendering the support more applicable and impactful. Virtual assistants may be designed to learn from every exchange, consistently optimizing the aid furnished contingent on the evolving needs of the employee.

3. Solution

1) Development and Deployment of Employee Virtual Assistant (EVA) Prototype

The Employee Virtual Assistant (EVA) was developed using the Node - Red environment and software stack based on Node. JS. Node - Red is an open - source visual programming tool developed by IBM for connecting hardware devices, APIs, and online services [9] [10]. As such, integration modules exploit available online data sources and periodically import employee activity data and signals from devices and applications through their public APIs. EVA is linked to each individual employee and collects information from five sources. Machine learning techniques such as classification, random forest, deep neural networks, along with cognitive computing (text and voice), are used to identify patterns and trends to provide personalized recommendations and coaching to employees [11]. Based on the predefined logic, EVA determines whether an employee requires intervention or coaching.

To develop hybrid healthcare recommendations for contact center employees, EVA assigns a virtual employee assistant and coach to each employee to collect relevant information and communicate accordingly. There are five principal data streams that feed into the EVA system, as depicted in Figure. and designated D1 through D5. These data sources power the EVA engine which then leverages defined algorithms to determine what, how, and when to engage with each employee. Representative samples of this data are shown in Tables 1 through 3, with each corresponding to one of the D1 to D5 data streams.

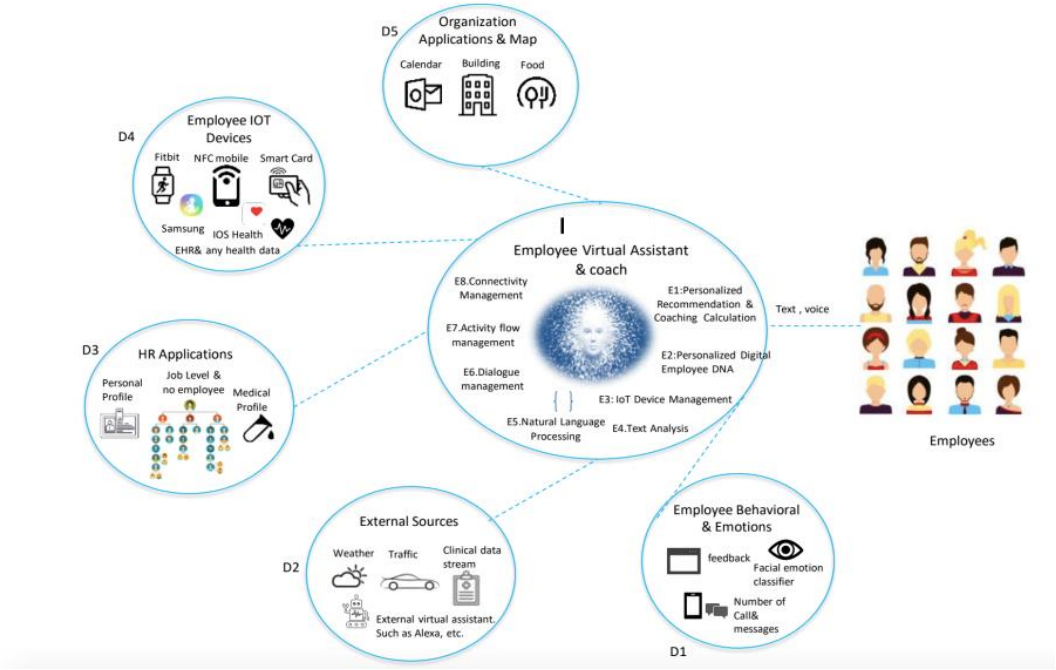

Figure: Reference Architecture for Personalized Employee Virtual Assistant (EVA)

The collected dataset includes approximately 1200 signal records from 35 contact center employees over a two - month period.

Table 1: Sample Employee Digital Profile

ID	Age	Gender	IoT Device	Medical Record	External Clinic data	Job Level	Weight (Lbs)
E1	Young	Male	Apple Watch	Obesity	No	Specialist	280
E2	Middle	Female	Samsung Watch	High Blood Pressure	Yes	Manager	176
E2	Elder	Male	Fitbit	Diabetes	Yes	Specialist	180

By collecting data from various mentioned sources that are linked to the physical and emotional attributes of employees, the Employee Virtual Assistant (EVA) seeks to provide personalized recommendations and coaching to call center employees to help them achieve their health goals based on physical targets and emotional well - being. EVA is an interactive virtual assistant that communicates with users via voice or text using natural language processing (NLP). EVA utilizes IBM Watson and Microsoft Azure cognitive APIs which are connected to the core platform. The platform is also capable of asking questions after each customer call to classify employee emotion. As shown in Table 3, EVA acts as an expert and decision support system to identify activity plans that align with objectives and offers personalized actions. The aggregation of these data in the EVA engine builds insights about employee health and emotions.

Table 2: Sample online data steaming for EVA for each employee.

ID	No of managed calls till now	Burnt calorie from morning	Device Average Heartbeat	Emotional feedback	Consumed food calorie from office lunch container	Meeting in next 30 min	Average stress level	Medication reminder
E1	29	340	High	Depressed	900	No	High	Yes
E2	12	190	High	Normal	800	Yes	High	Yes
E3	43	348	Low	Normal	1200	No	Medium	Yes

Various algorithms such as K - nearest neighbors and random forest have been used to classify employees from physical and emotional health levels.

Furthermore, table3 shows the actual versus target as the expected measurement of employee. The target of the available activity and emotional care plan are also presented. Letters denote increase (I) /decrease (D) /Stay (S) and emotional care needs to notify employee's supervisor (N) as their targets of plan. For instance, plan 4 is targeting to keep the blood pressure rate and decrease weight.

Table 3: Sample employee Target plan

Target plan	Heart rate (bpm)	Weight (Lbs)	Step count	Body Activity & movement times	Systolic blood pressure (mm Hg)	Potential Emotional impact by no of managed cells	Body temperature (/F)
Target Plan 1	D	D	I	I	D	D	S
Target Plan 2	S	D	I	I	D	S	D
Target Plan 3	D	S	I	S	S	N	S
Target Plan 4	S	D	S	I	S	S	S
Actual of E3		178		5	151	43	37
EVA Health Personalized Target	109	175 (D)		12 (I)	120 (D)	23 (N)	37 (S)

A simplified example of mentioned recommendation approach is given for employee 3 in table 3. When applying a content - based filtering - based approach, the recommended plan is determined by EVA based on the similarity of the employee's targets and availability plans. The simplified formula that supports the identification of our example for employee 3 shown below

Similarity (employee, Plan) = # (target (employee) intersect target (plan)) /
(target (employee) union targets (plan))

The above determines the similarity based on the target plans and targets of employee 3.

The core engine of the EVA built on NodRed open - source platform which is a programming tool for wiring together hardware devices, APIs, and online services. The EVA runtime is built on Node. js.

The solution handles input from employee wearable devices, selected meal for his/her lunch at the office plus his/her medical profile that was captured earlier via blood test. The other inputs are from various HR application such as employee department, job level and applications such as outlook to check schedules meetings. The EVA can check an employee daily target, schedules meeting and time left then recommend walking and using steps instead of elevator.

In summary, collected data related to employee physical activities and emotional events allows to optimize recommendation with a personalized motivational approach based on either fact extracted from collected data or an informed selection of the type of action. Based on the results of our first prototype, we will modify algorithms for both content and timing of the EVA messages for the employees and incorporated the necessary changes.

The proposed solution relies on NodeJS technology which we could program the engine and flow with integration to Microsoft Azure, google and IBM Watson API services for cognitive services an emotion, visual recognition, face, linguistics and more.

2) Studying the effectiveness of deploying the EVAs integrated with EAPs

To evaluate the effectiveness of the proposed solution, a pilot employee virtual assistant (EVA) program was deployed across three departments at a large health insurance provider that already had a traditional employee assistance program (EAP) established. A total of 35 employees participated in the two - month study. Surveys were administered to assess levels of employee satisfaction, engagement, and perceived effectiveness of the pilot EVA program. In - depth interviews were also conducted with eight study participants to gather qualitative insights into their direct experiences interacting with the EVAs. Data regarding EVA interaction frequencies, common inquiries, and resource utilization were collected to understand how effectively the solution addressed employee needs.

The results indicated that over 40% (16 out of 35) of participants were pleased to engage with the EVAs and felt the suggestions provided could help them improve their health and well - being. However, it was also observed that the EVAs had some limitations in fully understanding participants' questions and providing accurate and reliable responses. In fact, many participants (21 out of 35) specified in their survey feedback that increased response accuracy from the EVAs could potentially enable even greater levels of engagement.

The evidence from this study suggests that while EVAs may be able to increase employee assistance program engagement rates from the baseline of 7 - 10%, consistency and effectiveness depends upon the precision with which the EVAs can address inquiries. At present, the proposed EVA solution appears most suitable for basic information and assistance, as predictive models indicate accuracy will improve over time with increased usage data. Moreover, enhancing the EVAs with large language model technologies could allow for assessment and support services in the future, further raising engagement among employees seeking those higher levels of service.

Benefits of the Solution & Application to Various Organizational Processes

While this study focused on the health insurance industry, Employee Assistance Programs (EAPs) have much broader applications that can benefit various sectors. EAPs have been

successfully implemented across diverse industries including financial services, retail, manufacturing, high technology, education, and hospitality to support employee well - being and boost productivity [12] [13]. Government organizations also could leverage EAPs to care for their workers' mental health and maximize occupational output.

The deployment of personalized Employee Virtual Assistants (EVAs) within EAPs offers several potential benefits for organizations [14]. A personalized EVA - based solution can help increase EAP utilization rates by offering a more tailored and accessible service that may encourage more employees to proactively seek support for issues impacting their work or personal lives. Personalized support through EVAs can help address issues more effectively, leading to improved employee mental and physical health outcomes. This improved employee well - being in turn supports organizations through reduced absenteeism and presenteeism, as well as increased job satisfaction and retention [15] [16].

Automating routine parts of the EAP process using EVAs also provides a cost - effective solution. By reducing the need for human intervention in basic information provision, intake and referral activities, EVAs can help lower the operational costs associated with deploying a comprehensive EAP. The personalized nature of EVA support also allows organizations to scale EAP services to their entire employee population in a cost - efficient manner compared to traditional EAP models [17].

4. Challenges and Considerations

While virtual employee assistants hold promise for streamlining certain HR functions, several challenges must be addressed to ensure their successful adoption. First and foremost, protecting employee privacy will be critical to gaining trust in the new technology [18]. Strict protocols and oversight are needed to keep all interactions with the virtual agent confidential [19]. Relatedly, conscientious programming is required to avoid unintended biases that could disadvantage specific demographic groups. Employees from all backgrounds must feel equally supported by the virtual system [20].

Another consideration involves the agent's integration with human support staff. Although virtual assistants can autonomously handle routine queries, more complex issues may necessitate escalation to a live person [21]. The technology must be designed with safeguards to identify such situations and route them appropriately. Addressing data privacy, bias concerns, and human escalation will be key steps to help employees feel at ease with this new form of digital assistance. With diligence put toward navigating these challenges, virtual employee assistants hold promise for streamlining certain processes while still maintaining a human touch.

5. Conclusion

Based on the findings from the initial study, it can be concluded that implementing virtual assistant technology within an employee assistance program (EAP) has the potential to enhance employee engagement and satisfaction. The study indicated that over 40% of participants found value in interacting with the virtual assistants and believed the suggestions provided could positively impact their health and well - being. However, the study also highlighted the importance of response accuracy and reliability, as many participants noted the need for improved response precision to further increase engagement.

The evidence suggests that while virtual assistants can elevate EAP engagement rates above the baseline of 7 - 10%, their success largely depends on the accuracy and relevance of the information provided. As the virtual assistants are currently better suited for addressing basic inquiries, it is anticipated that effectiveness will improve as more usage data is accumulated, allowing for more precise and tailored responses. Integrating advanced technologies, such as large language models, could further enhance the capability of virtual assistants to offer more comprehensive assessment and support services in the future, thereby fostering even higher levels of employee engagement.

In summary, while the initial virtual assistant program shows promise in increasing engagement with EAPs, continuous improvement in response accuracy and sophistication is necessary to realize their full potential in supporting employee health and well - being.

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