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IMPROVING HUMAN INTERACTION WITH INTELLIGENT PERSONAL ASSISTANTS AND THEIR DEDICATED DEVICES

i. Introduction

The problems the Alexa and its Echo devices are facing are problems that face every other IPA (Intelligent Personal Assistant) today on the market. The limited domain of speech commands that allow the products to communicate with humans as well as humans would prefer is plaguing the industry. Speaking in a manner that is predefined is not something that is ideal and does not sound very human-like to users. We have no problem recognizing speech in electronic devices today, as is the case with the Amazon Echo, but what do the devices do with these words? Why aren't we having the successful interactions we desire?

Regardless of what people think, AI are as intelligent as the developers' anticipation is, and with that anticipation comes many hurdles that need to be overcome: Transparency; the idea that you are talking to a bot is very obvious, you certainly want your bot to feel as human as possible. Context; AI usually loses context over a few conversational turns, not remembering anything that was said earlier in the conversation. Human Reliability; When technology fails, users want to be able to talk to a human to solve their problems, but that isn't the case, having to separately contact customer support for help is not ideal. The last and final hurdle is that of cost, the cost of research and development of these former problems is not cheap. The following suggestion is a crowd-powered conversational assistant known as Evorus, which will be considered throughout this document.

ii. Transparency and Human Reliability

The reason I put Transparency and Human Reliability into one section is due to the fact that they go hand in hand. Knowing that you are talking to AI versus a human are quite easily discernable considering those are the only two possibilities. The thing that stands out when it comes to Evorus and the problem with improving human interaction with AI (Artificial Intelligence) is the fact that it is a crowd-powered assistant, meaning that it combines computation (computation being chatbots in this situation) with human interaction.

A. **Humans and AI Working Together**

Evorus integrates chatbots or task-specific dialogs from other companies or third-party developers into its response system and reuses or generates responses based on previous conversations it had with the workers and chatbots. Crowd workers are compensated through voting and contribution. This compensation is only given when responses that were offered by the workers successfully made it through a voting system mentioned in the next section and are sent to the user. Any users that had voted on the contributed response are also compensated as well. Since the system is based on AI learning, chatbots are also allowed to respond, given that the rating of the response is a high enough rating to be sent to the current conversation. Workers can watch as chatbots respond to users and can vote on those responses as well, helping the chatbots to learn, and ultimately those understandings and responses are what is needing improvement today. The Amazon Echo and devices like it today do not use any form of human to human interaction whatsoever, meaning that the user is stuck trying to communicate with an AI and never loses the mindset that they are speaking with said AI and won't be able to get help from humans easily if needed.

B. **Automatic Voting**

The overall goal of the Evorus system is to reduce the amount of worker responses and increase the amount of bot responses. Automatic voting is another feature which Evorus implements to help with the voting process. Evorus requires a certain number of response upvotes before the automatic voting bot will accept a message in general. Once that response is in the system it will continue to be used as response candidates by the system and also still receive votes from users. When chatbots are sending candidate responses, the automatic voting bot will look at the votes for each response and also the vote counts. These responses that are sent to be chosen are ones that the internal chatbots would use regularly. Evorus learns which chatbot response is best to use and ends up building its own response system built upon previous responses; the chatbots themselves learn as well based on their own systems. The automatic voting system is also smart enough to detect the reuse of responses and vulgarity that were offered by workers as well, dismissing them and ensuring quality. While many services today may have voting systems, none are based on the idea of allowing bots to vote on the quality assurance of humans as well as their own bot counterparts. The reason this works is due to the fact that humans vote on bot responses, which, over time get voted on by another bot that is literally built from these human votes.

In summary, the underlying issue of Human Reliability and Transparency is resolved using the Evorus system. Since the Amazon Echo is much like a chatbot in itself and has access to the web at all times (it literally requires internet access), turning it into a chat server and allowing it to be implemented into the Evorus system would allow both human to human and human to AI interaction, eventually leading to the latter.

iii. Context and Cost

As per the previous section, the reason I put Context and Cost together is due to the fact that they also go hand in hand. These two criteria may be what makes the decision for Evorus a little harder to make, but weighing the difference, you will see that the benefits outweigh the cons.

A. Requirement of Systems

Although the Evorus system may help with context, it does not necessarily do this on its own, it requires the integration of other AI systems to function. Choosing the right AI comes down to a matter of credibility and quality. The Amazon Echo would be an example of an AI system that could be integrated within it, and if you are partnered with other companies already that share the same type of technology you can improve the speed and efficiency of the system, making it faster to reach the goal of a fully automated system that can interact with its users in both a social and task-oriented manner. This also allows the possibility of new business partners and opportunities as a whole.

B. Integration Cost and Cost Reduction

The biggest downfall of a crowd-powered conversational assistant (Evorus) is that it is costly. It requires the compensation of its workers, as well as the cost of integrating a large system into another one. Although this may not sound ideal, the fact that the Evorus system is built to fully automate its responses, reduces the usage of workers and can be a large benefit. Cost of getting Evorus running with the Amazon Echo or any other IPA device would be the most crippling part, but once Evorus gets going, hire the right workers, and partner with the right

companies, the cost is substantially worth the outcome. amount of investment put into these resources are all your decision, which is what makes Evorus a great system to use.

iv. Conclusion

Being a firm supporter of the Evorus system, I truly believe that it could help fully automate a system revolved around the communication between humans and AI. I personally do not believe that the company would have any issues integrating sophisticated response systems into Evorus, for Alexa is a robust, intelligent AI already, and I'm sure you are already partnered with other companies that share the same technology. The question, however, is whether Amazon and its research and development team is willing to take the risk of cost to pursue this viable option.

Because Amazon is such a large company already, and the fact that IPA devices are growing in market, it would be well worth the risk of pursuing this business opportunity. Turning your device into a global chat service and allowing human to human, as well as AI communication, would help to expand the knowledge base of your IPA Alexa, and its own dedicated devices. Furthermore, the quality of the product and future products would skyrocket, making your devices obsolete.