

Jared Moore

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### Innovate Lab Summary

Answer the following questions. Provide a two-page written summary of your research.

1. What was your chosen technology and why was this your choice over the other technologies?
  - a. I chose to do the voice tech innovation lab, which meant using the api for amazon's alexa to build a chatbot that could ask a color, and a number, and give you a unique fortune based on those parameters. The reason I chose this lab compared to other types of labs, is that this one was something I had been wanting to learn more about and working on in my freetime for a while. Voice chat bots, and their use as a human interface, are often important for customer facing portals as well as employee facing portals. If you can make a chatbot with low depth that is easy and intuitive to learn and use, you can automate processing time and create workflows that are entirely independent from people. I had some familiarity with the other innovate lab activities, however voice chat was something I had only worked on with teams of other individuals, and I had no part in making the chat bot functions.
2. What are currently the top three biggest challenges for businesses using this technology?
  - a. This technology currently uses a lot of processing, meaning the voice data is not deciphered on your device, but rather sent to amazon for analysis and formulation of a response, and the response from amazon is what they give you. While this is useful for some applications, many users would prefer their data stay local to their household. Local processing of natural language using preformed packages and chatbots has the ability to reduce the processing power required to perform functions within the home. Their easy to use interface also makes it much easier for home users and everyone, not just software developers, to design programs and bots for use at home with their amazon alexa. The cost and quality of sensors and smart devices we can put in our homes is increasing at a fast rate, and so too is the development for these types of software products.
  - b. This technology is also finding new ways to collect data and use that data for sometimes nefarious purposes. As technologies get cheaper, and microphones and speakers are easier to put in every room of the house, these devices are starting to be able to talk to each other. Information can be encoded in hypersonic audio signals we cannot hear, but the microphones of the alexa can pick up. Whenever an alexa runs an ad, or is in the same room as a tv commercial or phone ad, it can hear the ads you're being displayed, and uses that information to further target you with advertising. Controls around this type of data collection have not caught up with the data being collected, as this could potentially pose serious privacy and security risks. Making devices that are helpful, but also secure and safe, and sometimes be a difficult task.
  - c. The third major problem with smart home devices is that they are oftentimes unable to work well or communicate with devices from different brands. Rather

than adopting an open protocol, many companies have developed their own private solutions, meaning devices from varying suppliers may not work well together. That may seem like a good thing for a company, however in times of supply chain issues, chip shortages, and other macroeconomic effects, interoperability standards would be a cheap way to allow for certain products to be integrated across company lines, potentially opening revenue streams in opposing customer bases.

3. What potential application does this technology have to your professional trajectory or personal life?
  - a. This application is similar to the project I have for an open source home assistant, which can borrow processing power from your main PC, or a server instance, and run all the functions of a “smart home” without sacrificing your data integrity or privacy. I believe once the models are trained, even machine learning can be accomplished simply at home, in a way that puts the user and their needs first, rather than the companies' need to collect data and increase profits. These types of more open source and free alternatives are important to me, as I feel technology has progressed to such an extent that high quality tools can be open sourced and given to the community for free for development. This type of development will only increase as time goes on, and more people are able to create and share software. I think tools that make development easy for individuals will be beneficial for the adoption of technology as a whole and help the community develop new solutions for home automation and assistant tasks.
  - b. When I was working in the lab, I made a fortune teller bot. Some pictures of the bot and the functions it runs are listed below:



