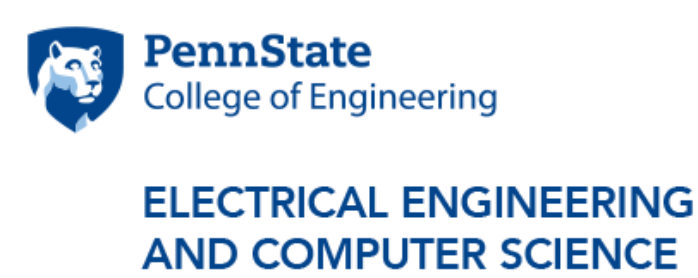


Using Speech Recognition to Control the Home Environment

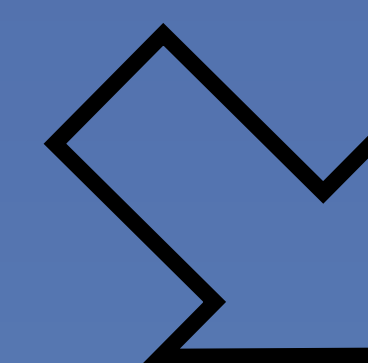
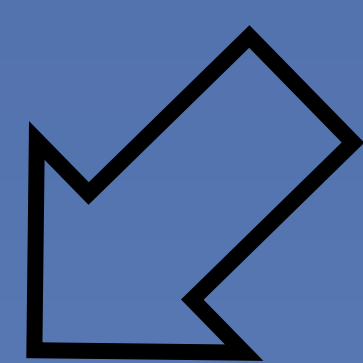
David Harrington • Ryan Henderson • Peter Mason • Dhruva Seelin



https://images-na.ssl-images-amazon.com/images/1/61kf5cN0gL_SL1000.jpg

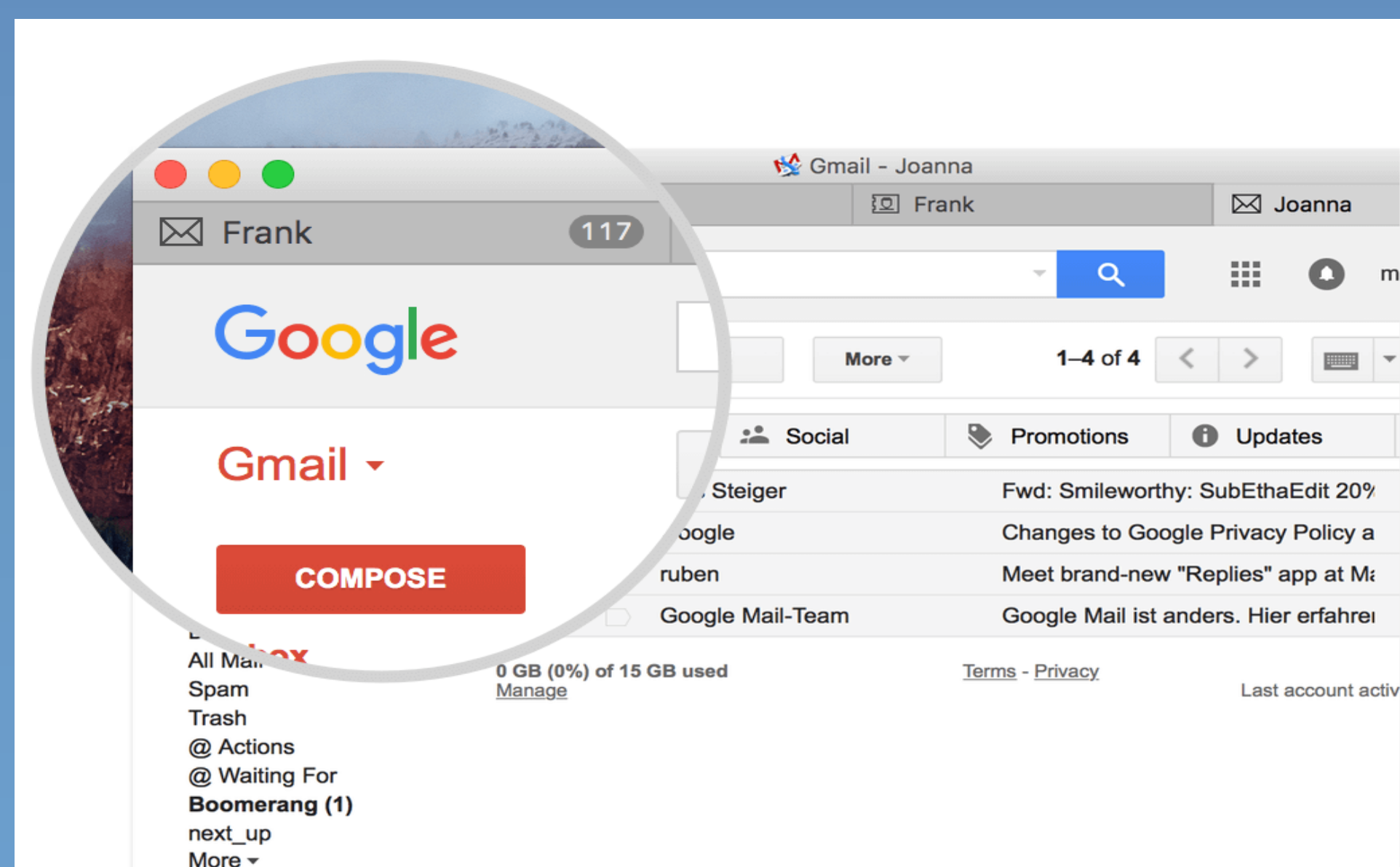
Introduction

Our project aimed to utilize intelligent home assistants, such as the Amazon Alexa, to help those with severe physical disabilities. We collaborated with a person with a severe physical disability, Anthony Arnold, who uses augmentative and alternative communication (AAC) technology to communicate; he provided suggestions and tested results to ensure we were headed in the right direction. To tap into the full potential of Alexa, we created an Alexa Skill and an Alexa-triggered Raspberry Pi prototype.



Alexa Skill Development

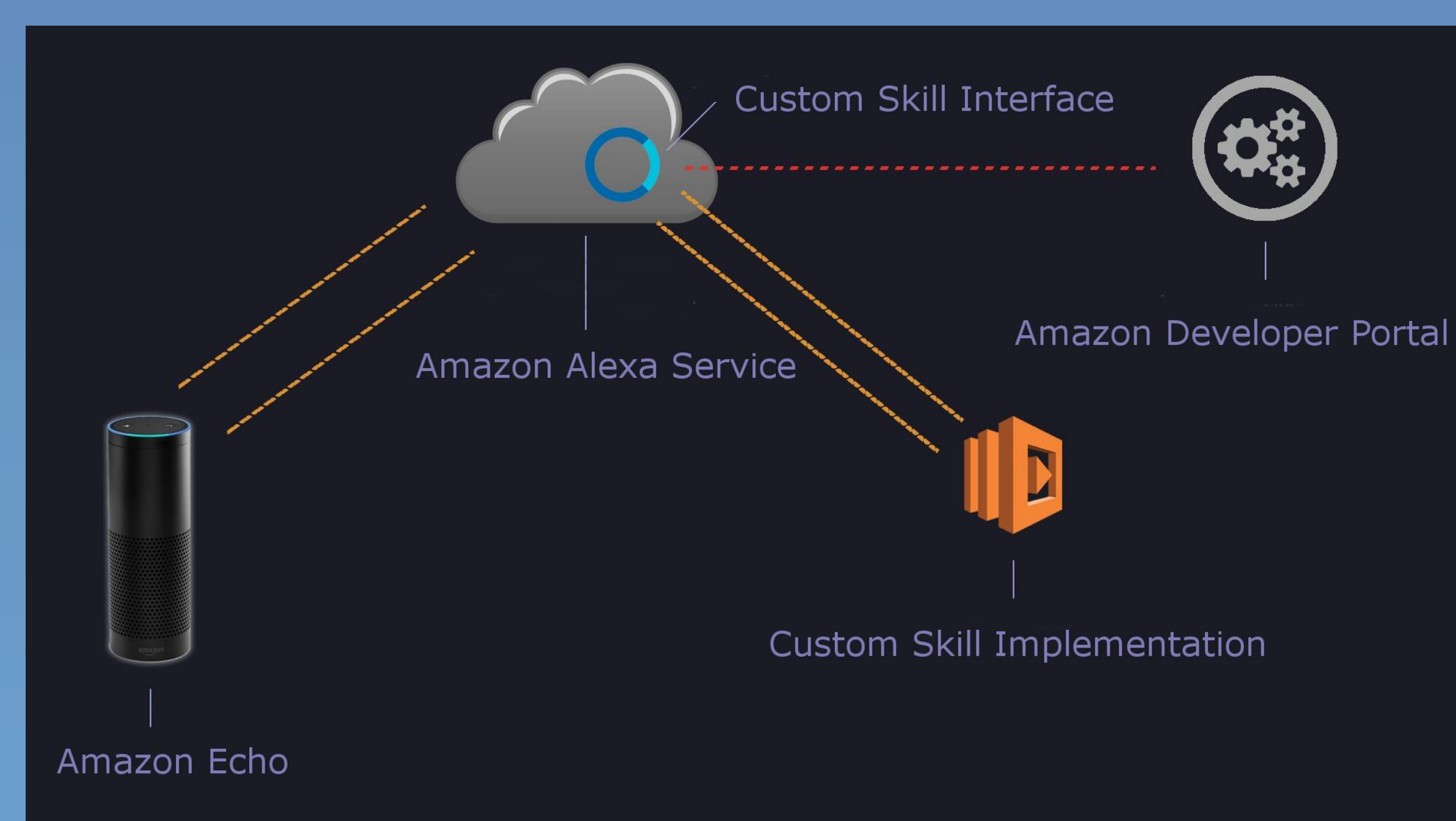
The Alexa Skill we developed is a Gmail Hub. This allows Anthony to interact with his Gmail inbox, reading and deleting any unread emails without the need to go to his computer. Anthony can use his AAC device to call to Alexa using the phrase “Alexa, Gmail...” and navigate through the intuitive audio menu option. We were able to create this Skill through AWS Lambda.



http://mailplaneapp.com/assets/images/tour_gmail_calendar_contacts@2x.png

Raspberry Pi Prototype

The Raspberry Pi microcomputer offers an enormous number of opportunities for automating mundane or time-consuming household tasks. We developed a proof of concept for controlling the Pi through Alexa, in the form of using spoken commands (or an AAC device) to turn an LED on and off.



<https://i.ytimg.com/vi/zt9WdE5kR6g/maxresdefault.jpg>

Conclusions and Future Work

We finalized our development and research by making all of our work publically available on Penn State’s RERC on AAC website. By documenting the details of the Gmail skills, how to create AWS Lambda skills, and how to interface with the Raspberry Pi, we leave the door open for future teams to build upon our work and further automate household tasks for those with severe disabilities. We would like to thank Anthony Arnold, our sponsor Dr. David McNaughton, and Tom Jakobs and Ethan Williams from Invotek for their help throughout the project.

We also wish to thank our sponsors, The Hintz Endowment for Communicative Competence at Penn State University, and the Rehabilitation Engineering Research Center on Augmentative and Alternative Communication (RERC on AAC). The RERC on AAC is funded under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant #90RE5017). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this poster do not necessarily represent the policy of NIDILRR, ACL, HHS, and you should not assume endorsement by the Federal Government. We also wish to thank Anthony Arnold, Tom Jakobs and Ethan Williams (Invotek) and David McNaughton (Special Education, Penn State) for their assistance with this project).