

Development of an Anesthesia Information Virtual Assistant

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Introduction: Virtual assistants are becoming an integrated part of many people's daily life. An intelligent virtual assistant is a software agent that can perform tasks or services for an individual based on verbal commands or questions. Virtual assistants utilize artificial intelligence, machine learning, speech recognition and natural language processing technologies and connect them with knowledge banks to provide information that are useful to the end user. We have developed a proof-of-concept prototype to serve the role of an anesthesia information virtual assistant.

Methods: An initial proof-of-concept prototype was created on a hardware device platform currently available on the commercial market (Amazon Echo). We created an information system application to retrieve information from our knowledge bank. This system also provides response to incoming request submitted by the end user. The knowledge bank is an expanding dataset which includes information that are regularly updated and difficult to recall for an individual. Examples of such data include the recommendations for treating malignant hyperthermia, the ASA difficult airway algorithm, and other guidelines for numerous patient conditions. Speech recognition and natural language processing are handled by a cloud-based service interface provided by the hardware device manufacturer. We use a developer console to configure the interaction model and direct the information to communicate with our knowledge bank application. Responses to end user requests are transformed into human speech by using a speech synthesis engine native to the hardware device. Images can also be displayed based on the resulting content.

Results: Our proof-of-concept hardware device was successful in demonstrating a usable prototype by integrating a commercially available virtual assistant hardware with that of an anesthesia knowledge bank. Under ideal condition, the accuracy of the system exceeds 92%.

Conclusion/Discussion: We anticipate our prototype can be used as a teaching tool in learning about knowledge bank and virtual assistants. Future development may include integration with the hospital's electronic health information and the capability to retrieve patient information as well as to perform analyses on patient data. We also believe our method can be adapted for the development of virtual information assistant specific to other medical disciplines.

Diagram 1

