CSCI-3202

Assignment 6

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4/17/2019

AI Applications

Spam filtering is an application that everyone knows and have already benefited from it. It's a program or a future in whatever email you are using that put junk emails that are spamming and completely useless in a category. Since it's so annoying to get a notification of something that's not important and sometimes it's a virus that harms your computer. There's one way to solve this problem that using Bayesian spam filters calculate the probability of a message being spam based on its contents. Unlike simple content-based filters, Bayesian spam filtering learns from spam and from good mail, resulting in a very robust, adapting and efficient anti-spam approach that, best of all, returns hardly any false positives[1]. This method was used becuase it's more accurate than any other method. By dividing the content of the message into words and compute the probability of being a spammed message by the conditional probability of each individual. So that Bayesian Network will be the right choice here since it's more accurate and find the spam email that was prepared to fool you. This is pretty similar to what we have discussed in class.

Speech recognition is now widely used in many application that can convert what you said into text mode. This is something that's been really helpful especially when sometimes we are unable to type a long sentence in a short time. Modern general-purpose speech recognition systems are based on Hidden Markov Models. These are statistical models that

output a sequence of symbols or quantities. Hidden Markov models are the right choice here becuase it will tend to have a mixed statistical distribution of diagonal covariance Gaussians in each state, which will give the possibility of each observation vector. Each word and each phoneme will have a different output distribution; made by using a separately trained Hidden Markov Model into separate words and phonemes for a series of words Hidden Markov model[2]. This is a lot more complex than what we discussed in class since this is only a part and needs a lot more to finish this application.

Hearing aids are now being widely used for those who had hearing loss and can't hear others clearly the majority of the time and help them to do the best performance in hearing as normal people do. The method was used here is neural networks, a type of algorithm that you train by feeding it examples of the signals it will encounter in the real world[3]. This algorithm suit to this application becuase it learns how to process noisy signals to get a clear speech signal. You have provided thousands of examples for the web, in the process, it will learn how to handle a given voice in a real-world environment. This is the right choice becuase The applicability of this algorithm is much stronger than the technology we are currently seeing, and it can solve the complex sound environment in daily life. The key to the success of this algorithm is its ability to learn from the data and then build powerful statistical models that represent complex listening scenarios. Also, this is more complex than what we discussed in class, becuase it also requires a lot more than the training such that the technique to adapt voice.

Smart reply on Gmail from Google is also an AI application that used neural networks that reply eamils in a single click. It's extremely useful for someone who had to deal with a lot of emails in a day and could potentially save a lot of time for them. The encoding

network will process the words of the received email in turn, and generate a vector, which Geoff Hinton calls a "thinking vector" that captures the core points of the speaker's wording - for example, the vector "Are you free Tomorrow?" should be similar to the vector "Does tomorrow work for you?", the second network starts with this kind of thinking vector and synthesizes responses that conform to the standard syntax as if it were typed literally[4]. Surprisingly, the detailed operation of each network is fully learned, just by training the model to predict possible responses.

References

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[2] Anon. 2019. Speech recognition. (April 2019). Retrieved April 18, 2019 from https://en.wikipedia.org/wiki/Speech_recognition#Hidden_Markov_models

[3] Science X. staff. 2019. Artificial neural networks make life easier for hearing aid users. (January 2019). Retrieved April 18, 2019 from https://phys.org/news/2019-01-artificial-neural-networks-life-easier.html

[4] Anon. 2017. The Machine Learning Technology Behind Gmail Smart Reply. (November 2017). Retrieved April 18, 2019 from https://betsol.com/2017/11/the-machine-learning-technology-behind-gmail-smart-reply/