

Personal Virtual Assistants *Art or Science?*



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Research***



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Explosion of Mobile Traffic and Devices



- ✧ Mobile phones are a central communication/multimedia hub
- ✧ There are 5.9 billion mobile subscribers worldwide.
- ✧ Over 1.5 mobile handsets sold in 2011, 1/3 are smart phones
- ✧ AT&T's total mobile data growth ~3000% over the past 3 years
- ✧ Global mobile data will increase by a factor of 18 from 2011 to 2016

The need for natural interaction with mobile devices is accelerating growth for Personal Virtual Assistants



Characteristics of a Personal Virtual Assistant



- Communicate with speech
- Reason and act
- Context aware
- Possess persona
- Learns from experience



Wildfire Virtual Assistant (1992)



Virtual Assistants, With Personality; Electronic Secretaries Can Be Charming, Funny and Frustrating

By DEBORAH CLAYMON
Published: December 17, 1998

THE REV. CHIP LEE, an Episcopal priest from Oakland, Md., assures his parishioners that he can be reached by telephone 24 hours a day, 7 days a week, even though he juggles two rural congregations (three in the summer) and puts more than 500 miles on his Buick each week.

Mr. Lee used to rely on a tangle of voice-mail systems, pagers and cellular phones to watch over his flock. But since August, he has combined everything into one electronic mailbox accessible through a toll-free number. All his calls are answered by an angelic female voice that quickly finds him wherever he roams. The voice goes by the name Portico, and "she" is one of a handful of computer-generated administrative assistants that use speech recognition to manage telephone, E-mail and fax communications for busy people.

"Having a virtual assistant has completely changed my life," Mr. Lee said with a kind of reverence that nearly suggested divine intervention.

Mr. Lee, who pays Portico about \$90 a month for 750 minutes, is one of the growing number of employers of virtual assistants. In principle, the idea is wonderful -- this assistant never turns on you when you fail to give a raise, never escapes on three-hour bathroom breaks or calls in faking the flu to take a day off. And unlike an answering machine, the virtual assistants like Portico, Wildfire and Webley -- the three that operate nationally -- have responsive voices that turn these services into humanlike appliances, complete with personality.



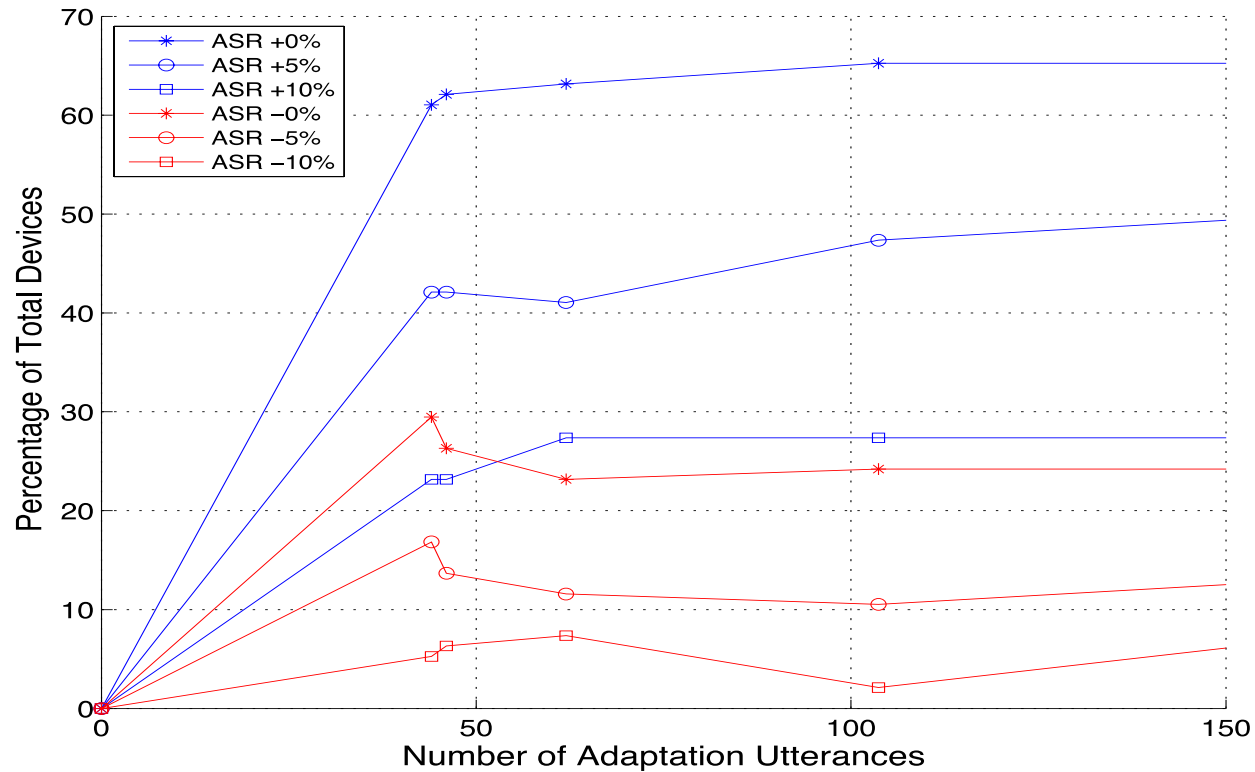
The Science



- Scalable and discriminative speech models
- Understanding and interpretation of speech (context aware and stochastic parsing)
- Recommendation and ranking of events
- Dialog and speech generation
- Learning without supervision
- Distributed computing using cloud infrastructure



Adaptive Learning (Interspeech 2011)



Over 65% of the devices experienced a gain in word accuracy

The Art



- Speech model development
- Application rules for speech interpretation
- Parsing webpage for information access
- Application design and persona



The Market Drivers



- Widespread adoption of smart phones
- Needs for personalized natural interfaces
- Availability of low cost computing and faster connectivity
- Federal and state laws and regulations
- Competition among device manufacturers



Samsung Galaxy II



New markets for Personal Virtual Assistants



- Connected car
- Connected home
- Customer care
- Enterprise help desk
- Entertainment