Agha Ali Raza

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EDUCATION			
Carnegie Mellon University, Pittsburgh, PA, USA PhD Computer Science/Language Technologies	CGPA: **3.97**	*Aug 2010 –May2015*
National University of Computer & Emerging Sciences - FAST, Lahore, Pakistan Master of Science in Computer Science (MS CS)	CGPA: **3.96**	*Aug 2006 – Jul 2009*
National University of Computer & Emerging Sciences - FAST, Lahore, Pakistan Bachelor of Science in Computer Science (BS CS)	CGPA: **3.45**	*Aug 2001 - Jul 2005*

RESEARCH INTERESTS & DOCTORAL RESEARCH

Viral Entertainment as a Vehicle for Disseminating Core Development Services: My research focuses on the use of Speech and Language Technologies to aid socio-economic development all around the world by enabling dissemination of speech-based, development-related information and communication services to low-literate telephone users; without the benefit of explicit user training. My work shows that speech-based simple entertainment services can be used as powerful motivators to induce self-training and viral spread among low-literate masses. Such services can further be used as vehicles for delivering core development services and as experimental test-beds for performing randomized controlled trials and demographic studies.

My doctoral thesis: *Polly* (www.cs.cmu.edu/~Polly) employs voice-based viral entertainment to familiarize low-literate and non-tech savvy people to telephone-based speech interfaces. Polly acts as a viral conduit for disseminating telephone and speech based development-related services to masses and to implicitly train the general population in the use of such services. In 2012 the use of Polly spread virally in Pakistan from five initial users to 165,000 users who participated in 636,000 calls, over a year. At its peak it was spreading at the rate of 1,000 new users every day. It also attracted 34,000 of its users to *Polly-Jobs*, a job-audio-browser.

In 2014, Polly became viral in India where it was launched in Bangalore collaboration with *Babajobs* and *Microsoft Research India* to spread information about jobs appropriate for low-skilled workers. Polly was also successfully used in Jharkhand and Bihar in collaboration with *Jharkhand Mobile Vaani* to cross-sell their citizen radio-over-phone platform.

In **March 2015**, Polly was launched in Guinea in collaboration with the *US Embassy in Conakry* to spread authoritative and reliable information about ***Ebola.*** Polly and its new variant Polly-Sante' (Polly-Health) are currently live in Guinea and are receiving a sustained daily call traffic.

MS THESIS

Automatic Speech Recognition system for Urdu: Designed and developed a medium vocabulary Automatic Speech Recognition system for read and spontaneous Urdu speech (Lahore suburban accent) and trained it for microphone and telephone channels. My thesis was a part of a funded project (*Telephone-based Speech Interfaces for Access to Information by Non-literate Users*) being done by the *Center for Research in Urdu Language Processing* (CRULP, now CLE) in collaboration with *Language Technologies Institute* at *Carnegie Mellon University, USA.*

BS FINAL PROJECT

Event Locator: Designed and developed an embedded system for detecting and geo-locating ground impact events using an array of sensors (geophones), employing DSP techniques. I used *Delay Estimation* for *Direction of Arrival* estimation.

EXPERIENCE

1. **Information Technology University, Punjab** — *Jun 2015 – now*
   Assistant Professor, Computer Science Department
2. **Lahore University of Management Sciences (LUMS), Lahore, Pakistan** — *Sep 2011 – Dec 2011*
   Teaching Assistant of *Advanced Operating Systems*
3. **Carnegie Mellon University, Pittsburgh, PA, USA** — *Dec 2010 – May 2011*
   Teaching Assistant of *Fundamental Data Structures and Algorithms*
4. **FAST NU (National University of Computer & Emerging Sciences) Lahore, Pakistan** — *Aug 2009 – Jul 2010*
   Lecturer (permanent faculty), Computer Science department
5. **FAST NU (National University of Computer & Emerging Sciences) Lahore, Pakistan** — *Jul 2005 – Jul 2009*
   Instructor (permanent faculty), Computer Science department
6. **SSI (Strategic Systems International) LAHORE** — *Feb 2005 – Sep 2005*
   Integrated the blood and urine analysis system with the medical database using PC serial port.
7. **FAST NU (National University of Computer & Emerging Sciences) LAHORE** — *Jan 2005 – Jun 2005*
   Lab Instructor for the undergraduate course of *Computer Logic and Design*
8. **FAST NU (National University of Computer & Emerging Sciences) LAHORE** — *Jan 2004 – Jun 2004*
   Teaching Assistant for the under-graduate Course of *Physics*-II

TEACHING EXPERIENCE

Courses Taught	Labs Taught
• Computer Architecture	• Embedded Systems
• Advanced Computer Architecture	• Microprocessor Interfacing
• Computer Organization & Assembly Language	• Computer Organization & Architecture
• Data Structures & Algorithms	• Computer Logic & Design

Compiled lab manuals for the Electrical Engineering Department at NUCES-FAST for the following courses:

• Computer Logic and Design	• Embedded Systems
• Computer Organization and Architecture	• System Programming
• Microprocessor Interfacing	

PUBLICATIONS

[1]. **Agha Ali Raza**, Rajat Kulshreshtha, Spandana Gella, Sean Blagsvedt, Maya Chandrasekaran, Bhiksha Raj, Roni Rosenfeld, *Viral Spread via Entertainment and Voice Messaging Among Telephone Users in India*. In Proceedings of the International Conference on Information and Communication Technologies and Development (ICTD '16), Jun 03-06, 2016, Ann Arbor, Michigan, USA.

[2]. Aditya Vashistha, **Agha Ali Raza**, Umar Saif, Roni Rosenfeld, Richard Anderson, *Changing Perceptions of Citizens of India and Pakistan*. In *Development Consortium: HCI Across Borders* and Proceedings of the 2016 ACM SIGCHI Conference on Human Factors in Computing Systems. May 07-12, 2016, San Jose, USA.

[3]. Nikolas Wolfe, Juneki Hong, **Agha Ali Raza**, Bhiksha Raj and Roni Rosenfeld, *Rapid Development of Public Health Education Systems in Low-Literacy Multilingual Environments: Combating Ebola Through Voice Messaging*, in SLaTE (Workshop on Speech and Language Technology in Education), Satellite Event of INTERSPEECH 2015, September 4-5, 2015, Leipzig, Germany.

[4]. Yibin Lin, **Agha Ali Raza**, Jay-Yoon Lee, Danai Koutra, Roni Rosenfeld and Christos Faloutsos, *Influence Propagation: Patterns, Model and a CaseStudy*, in PAKDD2014, the 18th Pacific-Asia Conference on Knowledge Discovery and Data Mining, May 13-16, 2014, Tainan, Taiwan.

[5]. Haohan Wang, **Agha Ali Raza**, Yibin Lin and Roni Rosenfeld, *Behavior Analysis of Low-literate Users of a Viral Speech-based Telephone Service,* in Proceedings of the 4th Annual Symposium on Computing for Development, ACM DEV-4. December 6-7, 2013, Cape Town, South Africa.

[6]. **(CHI Best Paper Award) Agha Ali Raza**, Farhan Ul Haq, Zain Tariq, Mansoor Pervaiz, Samia Razaq, Umar Saif and Roni Rosenfeld, *Job Opportunities through Entertainment: Virally Spread Speech-Based Services for Low-Literate Users*, in Proceedings of the 2013 ACM SIGCHI Conference on Human Factors in Computing Systems. April 27-May 2, 2013, Paris, France.

[7]. **Agha Ali Raza**, Farhan Ul Haq, Zain Tariq, Umar Saif and Roni Rosenfeld, *Spread and Sustainability: The Geography and Economics of Speech-Based Services*. In Proceedings of ACM DEV, January 11-12, 2013, Bangalore, India.

[8]. **Agha Ali Raza**, Mansoor Pervaiz, Christina Milo, Samia Razaq, Guy Alster, Jahanzeb Sherwani, Umar Saif, and Roni Rosenfeld. *Viral entertainment as a vehicle for disseminating speech-based services to low-literate users*. In Proceedings of the Fifth International Conference on Information and Communication Technologies and Development, March 12-15, 2012, Atlanta, Georgia, USA.

[9]. **Agha Ali Raza**, Sarmad Hussain, Huda Sarfraz, Inam Ullah, Zahid Sarfraz, *An ASR System for Spontaneous Urdu Speech*, in the Oriental COCOSDA 2010 conference, Nov. 24-25, 2010, Katmandu, Nepal.

[10]. Huda Sarfraz, Sarmad Hussain, Riffat Bokhari, **Agha Ali Raza**, Inam Ullah, Zahid Sarfraz, Sophia Pervez, Asad Mustafa, Iqra Javed, Rahila Parveen, *Speech Corpus Development for a Speaker Independent Spontaneous Urdu Speech Recognition System*, in the Oriental COCOSDA 2010 conference, Nov. 24-25, 2010, Katmandu, Nepal.

[11]. Huda Sarfraz, Sarmad Hussain, Riffat Bokhari, **Agha Ali Raza**, Inam Ullah, Zahid Sarfraz, Sophia Pervez, Asad Mustafa, Iqra Javed, Rahila Parveen, *Large Vocabulary Continuous Speech Recognition for Urdu,* in International conference on the Frontiers of Information Technologies, December 21-23, 2010, Islamabad, Pakistan.

[12]. **Agha Ali Raza**, Sarmad Hussain, Huda Sarfraz, Inam Ullah, Zahid Sarfraz, *An ASR System for Spontaneous Urdu Speech*, NU Graduate Colloquium on Computer Sciences (GCCS), 30 Jan 2010, Department of Computer Science, FAST National University, Lahore, Pakistan.

[13]. **Agha Ali Raza**, Master of Science (Computer Science) thesis on *Design and Development of an Automatic Speech Recognition System for Urdu*, June 2009.

[14]. **Agha Ali Raza**, Sarmad Hussain, Huda Sarfraz, Inam Ullah, Zahid Sarfraz, *Design and development of phonetically rich Urdu speech corpus*, Proceedings of O-COCOSDA'09 and IEEE Xplore; O-COCOSDA'09, 10-13 Aug 2009, School of Information Science and Engineering of Xinjiang University, Urumqi, China.

[15]. **Agha Ali Raza**, Awais Athar, and Sajid Nadeem, *N-GRAM Based Authorship Attribution in Urdu Poetry*, Proceedings of the Conference on Language and Technology 2009 (CLT09), Lahore, Pakistan, Jan 2009.

[16]. **Agha Ali Raza**, Zulfiqar Habib, Manabu Sakai *Interpolation with rational cubic spirals*, Proceedings of the 4th IEEE International Conference on Emerging Technologies (IEEE Catalog No. CFP08617, ISBN: 978-1-4244-2211-1, Library of Congress: 2008901427), Rawalpindi, Pakistan, Oct. 2008.

[17]. **Agha Ali Raza**, Asma Zaib, Sana Altaf, Zulfiqar Habib, *On a Special case of path planning*, Proceedings of the 7th CIIT Workshop on Research in Computing (ISBN: 978-969-8779-18-4), Lahore, Pakistan, June 2008.

HARDWARE PROJECTS

- **Chip Programmer/Burner:** Hardware and software of the flash code-memory programmer for AT89S52 microcontroller, using PC parallel port interface; compatible with other variants of 8051/52 series having SPI and Serial Programming facility

- **Infrared Communication Protocol:** Implemented the receiver for the RC-5 Infrared Protocol (Philips) using AT89S52 and developed remote interface for home electrical appliances' control (lights, fans etc.)

- **Various projects using Atmel® 8051/52 series and Microchip® PIC series of microcontrollers including:**
  - EEPROM (93C66, I^2C mode programming) interface
  - Keypad and 7-segment decoder (x 4) interface
  - LCD (HD44780) interface
  - DC motor speed control using Pulse Width Modulation
  - *Triac* based AC voltage control
  - Sine wave Synthesis
  - Dual slope volt meter and A-D converter
  - Bipolar stepper motor control
  - SPI, I^2C and USART based communication interfaces

LANGUAGES AND TOOLS

C/C++, Java, Assembly Language (Intel x88, x386, Intel 8051/52 MC series, PIC MC series), PHP, LUA, VERILOG, PROLOG, CMU Sphinx, FreeSwitch, Voxeo Tropo, MATLAB, Mathematica, National Instruments' Multisim, LogicWorks, Proteus.

HONOURS AND AWARDS	• CHI 2013 Best Paper Award • Fulbright 2010 Doctoral scholarship • Highest CGPA of 3.96 in Master of Computer Science at NUCES FAST
EXTRA CIRRICULAR SERVICES	• Member of *Technical Program Committee* (papers) for ICTD2016. • Member of *Technical Program Committee* (papers and posters) for ACM DEV2015. • Faculty Advisor to the SOFTEC student society of FAST-NU. Supervised the SOFTEC 2008 and SOFTEC 2009 events. SOFTEC (SOFTware Exhibition & Competition) is the largest international student-arranged IT extravaganza in Pakistan • Faculty Co-Advisor to the Interface society of FAST NU, which publishes the annual university magazine • Faculty Advisor to the DRAM@F society (dramatic society) of FAST-NU. The society arranged the annual drama festival 2008 under my supervision • Faculty Advisor to the CREATIVE society of FAST-NU, which arranges academic and recreational student events
EXTRA CURRICULAR ACTIVITIES	• Athletics • Debates • Participated in the 1998 Annual Parade in Garrison Academy as a pilot/escort