President's Technology Award 2013

Professor Li Haizhou
Dr. Ma Bin
Ms Aw Ai Ti
Dr. Su Jian
Institute for Infocomm Research
Agency for Science, Technology and Research

For their outstanding contributions to human language technology that have empowered the industry and benefited the Asian society

Professor Li Haizhou, an internationally-renowned scientist, and his team Dr. Ma Bin, Ms Aw Ai Ti, and Dr. Su Jian have made a remarkable breakthrough in human language technology that transforms the interface of mobile applications and breaks down the language barriers for Asian society.

Among the 7,105 living spoken languages that Ethnologue documented in 2013, 2,304 are spoken by Asians, representing more than half of the world's population. However, traditional human language technologies were developed using English and other major languages as the benchmark, which cannot be applied to many Asian languages. Over the past nine years, Professor Li and his team pioneered new approaches to speaker recognition, multilingual speech recognition, tonal language processing, as well as lexical, syntactic, semantic and discourse analysis. These novel inventions now serve as the foundation of the Abacus language engine, a commercial grade technology solution for the Bahasa Indonesian, English, Malay, Mandarin Chinese, Thai, and Vietnamese languages. Abacus accurately converts continuous speech into text, identifies the accents, dialects, and languages being spoken, establishes a speaker's identity by his/her voice, and translates languages between one another.

The technological breakthrough is significant. The Abacus engine achieved a leading performance in US National Institute of Standards and Technology (NIST) international benchmarking competitions, including NIST Language Recognition Evaluation 2007, NIST Speaker Recognition Evaluation 2008

and 2012, and NIST Text Analysis Conference 2011, representing the state-of-the-art in academia and industry. In developing the Abacus engine, the team addressed the unique research problems that Asian languages face, such as multilingual speech and tonal language processing, and translation between Asian languages. The team also formulated a novel industry process for rapid technology deployment that has been adopted widely by the industry.

The team's recent achievements have put Singapore on the world map. Professor Li was elected as a Board Member of the International Speech Communication Association (ISCA) in 2009 and the Vice President of ISCA in 2013. He was named one of two Nokia Visiting Professors 2009 by the Nokia Foundation. Dr. Su Jian was elected as an Executive Committee Member of the Association for Computational Linguistics (ACL) in 2012. Their work has also been published as an 'Invited Paper' in the *Proceedings of the IEEE* in 2013, the most highly-cited general interest journal in electrical engineering and computer science, and honoured as 'The Most Cited Article' in Elsevier Speech Communication during 2008-2013. One major outcome of the team's research is the establishment of the Baidu-I^2R Research Centre (BIRC) in Singapore. In 2012, the internet giant Baidu and I^2R set up BIRC as Baidu's first overseas joint laboratory to further the research of speech information processing and Asian language processing. The establishment of BIRC is an endorsement of the team's technological achievements.

The Abacus language engine has become one of the most sought after solutions internationally for text input, question and answering, spoken dialogue, and voice biometrics in mobile applications. For the past three years, the Abacus engine has been licensed to more than 15 leading international companies to enable many innovative products. In particular, the Abacus engine was adopted in 2012 to power the Lenovo A586, the world's first voiceprint smartphone. The team also contributed to ITU-T F.745 and H.625 international standards for network-based speech to speech translation in 2010.

For their outstanding contributions to human language technology that have empowered the industry and benefited the Asian society, Professor Li Haizhou, Dr. Ma Bin, Ms Aw Ai Ti and Dr. Su Jian from the Institute for Infocomm Research (I^2R) are awarded the 2013 President's Technology Award.