

Ultra-Low Cost Vehicle Data Acquisition and Transfer System from Analog and Digital Sensors to Audio Channel of a Phone

Ajinkya Bari ^a, Shraddhesh Bhandari ^a, Rajesh Krishnan ^b, Rohit Pandharkar ^c

^a *Department of Electronics & Telecommunication Engineering, COEP (College of Engineering, Pune), India*

^b *Department of Instrumentation & Control Engineering, COEP (College of Engineering, Pune), India*

^c *Mahindra & Mahindra, India*

barias10.extc@coep.ac.in, bhandarisl10.extc@coep.ac.in, rajeshk11.instru@coep.ac.in, pandharkar.rohit@mahindra.com

Abstract— The proposed system acquires and transfers data from a vehicle's analog and digital sensors to the user's very own mobile phone. The device uses a microcontroller to accept the sensor inputs and generate an audio signal indicative of the data acquired by the sensors and an audio jack which on inserting into the phone acts as a channel to transfer the data collected by the sensors to the cell phone. This data acquired from the sensors is fed to the microphone jack of the cell phone which is then processed by a mobile application and decoded sensor values are displayed on the cell phone. The ultra-low cost nature of the technology enables new additional applications like: On-The-Spot Soil Testing, Home Automation, Traffic Data Capture and Health Data Capture, etc. at disruptive prices.

Keywords— Data Acquisition, Digital Signal processing, Fast Fourier Transform, Spatio-Frequency Encoding, Time Division Multiplexing, 3.5 mm Audio jack.



Ajinkya Bari was born in Pune, India in 1992. He is pursuing his Bachelor of Technology (B. Tech) degree in electronics and telecommunication engineering as a senior year student in College of Engineering, Pune and will graduate in 2014.

In May-June 2013, he worked as a Summer Intern at Mahindra & Mahindra Ltd. Currently he is working as an In-House Project Intern at Tech Mahindra, Pune. He has published a paper titled 'Wireless Gesture Controlled Surveillance Robot' in the proceedings of the '7th International Conference on Advanced Computing and Communication Technologies (ICACCT), 2013', vol. 4, pp. 101-105. His current research interests include embedded systems design, parallel computing, computer architecture and robotics.

Mr. Bari is a student member of the Institution of Engineering & Technology (IET).



Shraddhesh Bhandari was born in Mumbai, India in 1993. He will receive the B. Tech degree in electronics & telecommunication engineering from College of Engineering, Pune in 2014. He is currently a final year student at the institution.

He worked as a Summer Intern at Mahindra & Mahindra Ltd. in 2013. He is currently working as an In-House Project Intern at Tech Mahindra, Pune. His research interests include embedded systems, computer architecture and parallel computing.

Mr. Bhandari is a student member of the Institution of Engineers & Technology (IET).



Rajesh Krishnan was born in Mumbai, India in 1992. He received his Diploma in Instrumentation engineering from Vivekanand Education Society's Polytechnic, Mumbai in 2011. He is currently pursuing his B. Tech degree in instrumentation and control engineering from College of Engineering, Pune and will graduate in the year 2014.

He worked as a summer intern at Mahindra & Mahindra Ltd. in 2013 and as summer intern at Indian Oil Corporation Ltd. in 2012. His current research interests include reconfigurable computing, embedded systems and computer architecture.



Rohit Pandharkar was born in Pune, India in 1987. He received his B. Tech degree in electronics and telecommunication engineering from College of Engineering, Pune in 2009 and received his Master's degree in Media, Arts and Sciences from Massachusetts Institute of Technology in the year 2011.

Currently he is a Manager, Business Development at Mahindra & Mahindra Ltd. in Mumbai. He was the Deputy CTO at CanvasM (Mahindra & Motorola JV) from July 2011- December 2012. He worked as a Graduate Research Assistant at MIT Media Lab from July 2009- June 2011. He was the VP External Affairs at MIT Media Lab India Initiatives from June 2009-2011. In May-July 2008, he worked as a summer intern at India Institute of Technology, Bombay. His subjects of research interest include signal processing, digital image processing, computer vision and optimizations.