

Enhanced Soft Decoding of Multi-Carrier Systems for Delay Sensitive Applications

Houcem Gazzah and Qassim Nasir

Department of Electrical and Computer Engineering, University of Sharjah, Sharjah, UAE

hgazzah,nasir@sharjah.ac.ae

Abstract—Bit interleaving, often used to combat frequency selective fading over multi-carrier channels, can introduce long processing delays, unpractical for a number of real-time applications. When such delays cannot be afforded, the performance gain of soft decoders is more attractive. Unfortunately, even if bit interleaving is not considered, adaptive bit allocation allows only sub-optimal soft decoding. This is a bit-wise processing technique originally proposed for bit interleaved coded modulation. In this paper, an enhanced decoder is proposed. It avoids unnecessary intermediate bit metrics. Instead, it directly and more efficiently computes code metrics, which are what is actually required by the Viterbi decoder.



Qassim Nasir is currently an associate professor in University Of Sharjah since 2009. In his current position, Dr. Nasir teaches under graduate and graduate courses in random signals, mobile computing, analogue and digital telecommunications, computer networks, network programming, and programmable logic controllers. Dr. Nasir received his B.Sc., M.Sc., and Ph.D. degrees from the University of Baghdad, Iraq, in 1977, 1984, and 1994 respectively. Prior to joining the University of Sharjah, UAE in 2001 and for six years, Dr. Nasir was working with Nortel Networks, Canada, as a senior system designer in the network management group for OC-192 SONET. He later moved to work with the DSL group, at the same company, as a senior firmware system designer, for GLite Nortel Modems. He was adjunct part time assistant professor at Ottawa University, for the period 1999 to 2001, teaching telecommunication software engineering. Dr. Nasir was visiting professor at Helsinki University of Technology, Finland, during the summers of 2002 to 2009, and GIPSA lab, Grenoble France to work on a Joint research project on “MAC protocol and MIMO” and “Sensor Networks and MIMO” researches. He also worked as an assistant professor at Amman University during the academic year 1995 to 1996. Dr. Nasir has contributes in the research in digital communications, DPLL, Security/Power/Quality/Direction aware MAC and Network protocols, and haptic data transmission protocols. Dr. Nasir has published over 60 as conference publications and journal articles, two book chapters in the areas of Digital communications and Networking.