Title: Wideband Temporal Spectrum Sensing for Opportunistic Spectrum Access

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Abstract: As demand for wireless services grows exponentially, spectrum resources become ever more precious. Opportunistic spectrum access (OSA) has been proposed to increase spectrum efficiency. In an OSA system, a band which has been allocated to licensed primary users (PUs) can also be utilized by unlicensed secondary users (SUs). If a PU is not using its allocated spectrum efficiently, and is leaving time, frequency, or space resources unused, a SU may use those unused resources to transmit. A SU is required to perform accurate spectrum sensing to ensure minimal interference to the PU. In wideband spectrum sensing, an unlicensed SU determines which frequency resources are left idle by the PU. A historical deficiency of wideband spectrum sensing, the inability to detect signals with low duty cycle, is addressed. A spectrum sensing algorithm referred to as wideband temporal spectrum sensing is proposed as a solution for detection of PU signals with low duty cycle. Spectrum sensing performance is shown over a range of duty cycles. An improved wideband temporal sensing algorithm, based on frequency-domain edge detection, is presented, and improved performance in high levels of noise is shown.