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Precise radiation dose delivery to a moving tumor requires accurate, real-time 3D tumor localization during treatment. Using diagnostic x-ray fluoroscopy, the position of radio-opaque markers implanted near the tumor can be located in real-time, and respiratory-gated treatment can be delivered. The process of locating and tracking the position of the marker is a high-speed, repetitive task, and is performed fully automatically by pattern recognition software. While the tracking software works well in most cases, tracking errors do occur, usually when the visibility of the marker is poor relative to patient anatomy or imaging noise. This work examines the occurrence of tracking errors during 43 treatments of lung cancer using a prototype real-time tumor tracking system. Two classes of errors are examined: soft errors that could be automatically recovered within 1.5 seconds, and hard errors that persist past 1.5 seconds. Several error detection methods for soft and hard errors were evaluated using data available in the treatment log files. It was found that soft errors could be detected 82% of the time with a false alarm rate of 5 %. Hard errors could be detected 72% of the time with a mean time to false alarm of 3 minutes. Including manual initialization, hard tracking errors, and manual recovery from tracking errors, the total loss of efficiency was 13.6% of the total kV beam-on time. Soft errors were found to comprise 3.1% of the total kV beam-on time.