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We introduce the notion of recognizability by a finite automaton for sets of two sided infinite words. It extends the corresponding notion for one sided infinite words studied by R. Büchi and R. McNaughton. Our main result is a generalization of McNaughton's theorem about determinism of automata on infinite words. The result states that the family of recognizable sets of two-sided infinite words is the Boolean closure of the family of sets recognized by deterministic automata.

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[68Q45](#) Formal languages and automata

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