MAX INDEPENDENT SET is a paradigmatic problem in theoretical computer science and numerous studies tackle its resolution by exact algorithms with non-trivial worst-case complexity, both in the general case and in the case of bounded degree graphs. Here, we improve several of these results. We first get an algorithm in $O^*(1.0854^n)$ for graphs of average degree 3 based upon a detailed case analysis using several reduction rules. Then we propose a generic method showing how improvement of the worst-case complexity for MAX INDEPENDENT SET in graphs of average degree $d$ entails improvement of it in any graph of average degree greater than $d$ and, based upon it, we tackle MAX INDEPENDENT SET by improving its complexity in graphs of average degree 4, 5 and 6. Finally, we combine this method with measure and conquer techniques to get improved running times for general graphs. The best computation bounds obtained are $O^*(1.1571^n)$, $O^*(1.1918^n)$ and $O^*(1.2070^n)$, for graphs of maximum degree 4, 5 and 6 respectively, and mainly, $O^*(1.2125^n)$ for general graphs. These results improve upon the best known results for these cases.