In fact, we could solve it in O(n2)O(n^2)O(n​2​​) time using only constant space.

We observe that a palindrome mirrors around its center. Therefore, a palindrome can be expanded from its center, and there are only 2n−12n - 12n−1 such centers.

You might be asking why there are 2n−12n - 12n−1 but not nnn centers? The reason is the center of a palindrome can be in between two letters. Such palindromes have even number of letters (such as ''abba''''abba'') and its center are between the two 'b''b' s.