How Pre-processing Improves Search Time

1. **Reduces Redundant comparisons:** The LPS array helps avoid re-evaluating characters that have already been matched, thus reducing the number of comparisons required.
2. **Efficient Mismatch Handling:** When a mismatch occurs, the LPS array allows the algorithm to skip to the next potential match position rather than re-checking characters that are known to be matched already.
3. **Linear Time Complexity:** Both the preprocessing step and the searching step run in linear time, making the KMP algorithm much more efficient than the naive approach for large text and pattern sizes.