neither和nor表示“也不”

百度：当主语不是同一个人或物时，nor 和neither可互换，当主语是同一个人或物时，只能用nor

《英汉大词典》（第二版）

He couldn’t dance, neither could he sing.

I haven’t read the book; neither do I intend to read it.

(主语是同一个人或物时，用neither也可以)

《柯林斯》

neither用于否定句后引起另一否定句，与前句形成对照或对前句进行补充

I don’t wish to be rude to you but neither do I wish to be rude to the others.

关于词性

《牛津高阶》neither表示“也不”时是副词

He didn’t remember and neither did I.

《朗文当代》neither表示“也不”时是副词

Tom didn’t believe a word she said, and neither did the police.

《柯林斯》neither表示“也不”时是副词

I was not happy and neither were they.

《英汉大词典》neither连词和副词都有

John can’t swim, neither can I.

His father wouldn’t give him any money, and neither would he lend him any.

《朗文当代》nor连词和副词都有

They couldn’t understand it at the time, and nor could we.

结论:

neither常用做副词，nor连词和副词都常见

当主语是同一人或物时，neither有时候也可以用

办公室孙老师说这两个在倒装句里用法是一样的，其实都可以做连词，不过加and肯定不会错