Supporting Automatic Word Stretches for Nastaliq Font in LaTeX

Kimiya Mohammadtaheri

Overview

- Introduction

- Letter Stretch

- Nastaliq

- Project

- Future work

Introduction to Arabic/Persian/Urdu Writing system

- In this system, certain letters change their shape and connect to the next

  letter when appearing in a word:

Introduction to Arabic/Persian/Urdu Writing system

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  letter when appearing in a word:

$$س + ل + ا + م = سلام$$

Letter stretch

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كيميا

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كيــميـا

Nastaliq calligraphy

Nastaliq is a classical Persian calligraphy style characterized by its flowing and slanted script.

نستعلیق

Nastaliq calligraphy

- Unlike typical writing styles, where characters are arranged in a horizontal line, Nastaliq calligraphy places characters along a slanted line.

نستعليق

نستعليق

Nastaliq typefaces

- There are several different Nastaliq typefaces.

- Some of them support word stretch by inserting the stretch character. My package can work with any typeface that supports stretch.

Word Stretch in Nastaliq

Existing word stretch algorithms

Most algorithms are not suited to work with calligraphic typefaces. Bellow is the

result of using the stretch option in latex:

این پروژه در مورد ایجاد کشیدگی در متونی است که از فونت
نستعلیق استفاده می‌کنند.

این پروژه در مورد ایجاد کشیدگی در متونی است که از فونت نستعلیق
استفاده می کنند.

Why not use pre-existing algorithms?

- Dividing the stretch across the word causes problems.

نســــــــــتعليق   نســتــعــليق

Why not use pre-existing algorithms?

● Dividing the stretch across the word causes problems.

نســــــتعليق ✗   نســـتــعــليق

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نســـــــتعليق ❌   نســـتـعـــليق

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    - No two consecutive letter should be stretched
    - No stretch allowed before و
    - No stretch allowed before the last ن
    - No stretch allowed for ک and گ in the middle and beginning.
    - No stretch allowed for ب-پ-ت-ث-ی in the beginning.
    - And more!

Why not use pre-existing algorithms?

- Dividing the stretch across the word causes problems.

- Calligraphy imposed limitations

پــــــسر ❌

مکــــــرر ❌

نگیــــــن ❌

Calligraphy Rules

- The following rules are extracted from the Nastaliq font documentation:

    - No two consecutive letter should be stretched
    - No stretch allowed before و
    - No stretch allowed before the last ن
    - No stretch allowed for ک and گ in the middle and beginning.
    - No stretch allowed for ب-پ-ت-ث-ی in the beginning.
    - If ف-ق-ع-غ are in the middle, they can only be stretched if the next letter goes downward.
    - Only certain letters can be stretched as first or last letter.

Rule classification

- Positional rules

- Sequential rules

- Positional and Sequential rules

Rule classification

- Positional rules:

  - Stretchable as first letter:

    ف، ق،ج، چ، ح، خ

  - Stretchable as middle letter:

    ب، پ، ت، ث، م، ن، ی،ج، چ، ح، خ، ص، ض، ط، ظ، ع، غ، ق، ه

  - Stretchable as last letter:

    ب، پ، ت، ث،ک،گ

Rule classification

- Sequential rules:

  - No two consecutive words can be stretched.

  - Don't stretch before الف

  - Don't stretch before و

Rule classification

- Positional and Sequential rules

  - Don't stretch before the last ق

  - Don't stretch before the last ن

  - If ف-ق-ع-غ are in the middle, they can only be stretched if the next letter is one of ر-ز-ژ

Which letter to stretch?

- Start from the first letter and go forward until we reach a stretchable letter.

- Start from the last letter and go back until we reach a stretchable letter.

- Start from somewhere in the middle.

- Look for specific letters based on the word.

Which letter to stretch?

- Start from the first letter and go forward until we reach a stretchable letter.

- Start from the last letter and go back until we reach a stretchable letter.

- Start from somewhere in the middle.

- ~~Look for specific letters in order.~~ Too time consuming

Which letter to stretch?

- **Start from the first letter and go forward until we reach a stretchable letter.**

  - Easier to implement.

- Start from the last letter and go back until we reach a stretchable letter.

- Start from somewhere in the middle.

Auto Stretch Algorithm

Stretch(Amount):

for each character(c) in the word:

 if(c in stretchables and not c.next in forbidden_next_letter):

    add "amount" number of stretches after the letter.

    break

else

    continue

Stretch justification across the line

- Current algorithms focus on dividing the stretch value across different words in a way that the least change is felt in the overall text.

این پروژه در مورد ایجاد کشیدگی در متونی است که از فونت نستعلیق استفاده می‌کنند.

Without Stretch

این پروژه در مورد ایجاد کشیدگی در متونی است که از فونت نستعلیق استفاده می‌کنند.

With Stretch

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- But in Nastaliq, inserting stretch introduces a notable change in the length of the word, and it is not possible to insert a fraction of a stretch, so we need to use different methods to determine the stretch amount

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- Current algorithms focus on dividing the stretch value across different words in a way that the least change is felt in the overall text.

- But in Nastaliq, inserting stretch introduces a notable change in the length of the word, and it is not possible to insert a fraction of a stretch, so we need to use different methods to determine the stretch amount

- This would mean that the line combination would change after each insert, which means that we might have to make several passes across the text

Future Work

- Extend support for other calligraphy fonts.

- Use more complicated rules for auto stretch to achieve better results.

- Allow the user to specify which words to prioritise for stretch.

Thank you