НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ

Факультет компьютерных наук,
ОП Программная инженерия

ПРЕДИКАТИВНЫЙ ВВОД

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Москва, 2021

OBJECTIVE FUNCTION

Main metric – **KSPC** metric

Keystrokes per character (KSPC) is the number of keystrokes, on average, to generate each character of text in a given language using a given text entry technique

$$KSPC = \frac{\sum\left(K_w \times F_w\right)}{\sum\left(C_w \times F_w\right)}$$

where K_w is the number of keystrokes required to enter a word,
C_w is the number of characters in the word, and
F_w is the frequency of the word in the corpus

OBJECTIVE FUNCTION

Secondary metric – **Learning Performance** (LP)

Learning Performance (LP) is the numerical indicator of the learning rate (based on calculating the similarity of the proposed keyboard with the default)

$$\text{Similarity} = \sum_{i \in \alpha} \left(|k_{i_x} - q_{i_x}| + |k_{i_y} - q_{i_y}| \right)$$

where i is a letter in alphabet α,
the set of lowercase letters
from ‘a’ to ‘z,’ and kix
and qix
are the x-indices of the i key
on the given keyboard layout and default

ALGORITHM

METRICS

	kspc(exclude space)	kspc	lp(lexicographic order)	lp(qwerty)
baseline-layout.json	1.8306	1.9174	83	37
keyboard_prefix_1.json	1.5011	1.5879	82	132
keyboard_prefix_2.json	1.2876	1.3744	90	116
keyboard_prefix_3.json	1.2703	1.3571	80	122
keyboard_prefix_4.json	1.2653	1.3521	80	134
keyboard_prefix_5.json	1.264	1.3508	80	114
keyboard_prefix_6.json	1.2465	1.3333	72	108
keyboard_prefix_7.json	1.2465	1.3333	68	110
keyboard_prefix_8.json	1.2462	1.333	66	108
keyboard_prefix_9.json	1.2455	1.3323	66	114
keyboard_prefix_10.json	1.2455	1.3323	70	110
keyboard_prefix_11.json	1.2463	1.3331	64	124
keyboard_prefix_12.json	1.2463	1.3331	64	122
keyboard_prefix_13.json	1.2463	1.3331	64	122
keyboard_prefix_14.json	1.2463	1.3331	64	122
keyboard_prefix_15.json	1.2463	1.3331	64	122
keyboard_prefix_15.json	1.2463	1.3331	64	122
keyboard_prefix_16.json	1.2463	1.3331	64	122
keyboard_prefix_17.json	1.2463	1.3331	64	122
keyboard_prefix_18.json	1.2463	1.3331	64	122
keyboard_prefix_19.json	1.2463	1.3331	66	122
keyboard_prefix_20.json	1.2463	1.3331	66	122
keyboard_prefix_21.json	1.2463	1.3331	66	122
keyboard_prefix_22.json	1.2463	1.3331	66	122
keyboard_prefix_23.json	1.2463	1.3331	66	122
keyboard_prefix_24.json	1.2463	1.3331	66	122
keyboard_prefix_25.json	1.2463	1.3331	66	122
keyboard_prefix_26.json	1.2463	1.3331	66	122
keyboard_prefix_27.json	1.2463	1.3331	66	122
keyboard_prefix_28.json	1.2463	1.3331	66	122

CONCLUSION

Keyboard_prefix_10 is the best layout which was generated by algorithm

```
{
    "s": ["о", "л", "ы", "ш"],
    "d": ["а", "в", "г", "ю"],
    "f": ["е", "к", "б", "ж"],
    "g": ["и", "п", "я", "ц"],
    "h": ["н", "м", "ч", "ф"],
    "j": ["р", "у", "ь", "щ"],
    "k": ["т", "д", "й", "э"],
    "l": ["с", "з", "х", "ъ"]
}
```

	kspc(exclude space)	kspc	lp(lexicographic order)	lp(qwerty)
baseline-layout.json	1.8306	1.9174	83	37
keyboard_prefix_10.json	1.2455	1.3323	70	110

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