Practical No. 4

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Part 2

a)

$k_j^T q$ must be significantly greater then $k_i^T q$ for all $i \neq j$. In such a situation $\alpha_j \approx 1$ and $a_i \approx 0$ for $i \neq j$, so $c \approx v_j$.

b)

Let $q = t(k_a + k_b)$, where $t >> 0$. Then $k_1^T q = t$ for $i \in \{a, b\}$ and $k_1^T q = 0$ for $i \notin \{a, b\}$, so $\alpha_i = \frac{1}{2}$ for $i \in \{a, b\}$ and 0 for $i \notin \{a, b\}$. therefore $c = \frac{1}{2}v_a + \frac{1}{2}v_b = \frac{1}{2}(v_a + v_b)$

c)

- $q = t(\mu_a + \mu_b)$, where $t >> 0$. α is vanishingly small, so $k_i \approx \mu_i$, so $k_1^T q \approx t$ for $i \in \{a, b\}$ and $k_1^T q \approx 0$ for $i \notin \{a, b\}$, so $\alpha_i \approx \frac{1}{2}$ for $i \in \{a, b\}$ and 0 for $i \notin \{a, b\}$. therefore $c = \frac{1}{2}v_a + \frac{1}{2}v_b \approx \frac{1}{2}(v_a + v_b)$
- may cause stereotypes

d)

- $q = t(\mu_a + \mu_b)$, where $t >> 0$. α is vanishingly small, so $k_i \approx \mu_i$, so we have a situation from subsection b.
- may cause stereotypes

e)

Part 3

d)

Dev set accuracy - Correct: 5.0 out of 500.0: 1.0%
London baseline accuracy - Correct: 25.0 out of 500.0: 5.0%

f)

g)

h)

Part 3

a)

Pretrained model have more knowledge thanks to corrupted span strategy.

b)

- incorrect birthplaces are misleading, because looks like correct ones
- may cause stereotypes

c)

The model can produce the birthplace of some person with similar name, but similarity of names usually is not related with similarity of birthplaces.