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Meta-Learner with Linear Nulling

- An <u>embedding network</u> is combined with a <u>linear transformer</u>.
- The linear transformer carries out <u>null-space projection on an alternative classification space.</u>
- The projection space M is constructed to <u>match the network output with a special set of reference vectors.</u>

Embedding network | Linear transformer

CNN (f_θ)

g M $d(\cdot,\cdot)$ Distance measures Softmax

M

Φ

Classification

Images from N_c novel classes

Support set images

CNN (f_θ)

$\bar{\mathbf{g}}_0$ $\bar{\mathbf{g}}_1$ $\bar{\mathbf{g}}_2$ $\bar{\mathbf{g}}_3$

$\mathbf{M} \leftarrow \mathrm{null}(\{\boldsymbol{v}_0, \boldsymbol{v}_1, \boldsymbol{v}_2, \boldsymbol{v}_3\})$

$\boldsymbol{v}_k = \boldsymbol{\phi}'_k - \bar{\boldsymbol{g}}_k$: error vector

$\boldsymbol{\phi}'_k = (N_c - 1)\boldsymbol{\phi}_k - \sum_{j \neq k} \boldsymbol{\phi}_j$

$\boldsymbol{\phi}'_0$ $\boldsymbol{\phi}'_1$ $\boldsymbol{\phi}'_2$ $\boldsymbol{\phi}'_3$

$\Phi = \{\boldsymbol{\phi}_0, \boldsymbol{\phi}_1, \boldsymbol{\phi}_2, \boldsymbol{\phi}_3\}$

Reference vectors

★: references

Embedding space

Alternative space M