**Raport z postępów projektu**

**Digit recognizer**

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Od ostatniego punktu kontrolnego udało nam się:

* ustalić modele sieci konwolucyjnych, które będą brane pod uwagę w raporcie końcowym przy porównywaniu wyników;
* zaimplementować metodę SVM.

Poniżej przedstawiamy wstępnie uzyskane przez nas wyniki:

* Metoda CNN

Obliczenia zostały przeprowadzone dla modeli sieci znajdujących się w załączonym pliku *NetworkModels.py*. Zostały one odpowiednio sparametryzowane. Każdy wariant sieci był uczony przez jedną iterację (każdym obrazem ze zbioru uczącego dokładnie raz). Tabela poniżej przedstawia rezultaty oraz czas (w sekundach), przez jaki trwały obliczenia.

Oznaczenia:

m-model;

k-kernel;

p-pool;

d-dropout.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | accURACY | loss | model | time | val\_acc | val\_loss |
| 0 | [0.9258833333015442] | [0.2419550352136294] | model1, k: (2,2), p: (2, 2), d: 0.1 | 192.12085008621216 | [0.9746] | [0.07744126126542687] |
| 1 | [0.9283166666984558] | [0.2337361595372359] | m1, k: (2,2), p: (2, 2), d: 0.2 | 193.24924659729004 | [0.9802] | [0.06077338801622391] |
| 2 | [0.9240166666984558] | [0.24867945099075636] | m1, k: (2,2), p: (2, 2), d: 0.3 | 194.0993914604187 | [0.977] | [0.07285374941006303] |
| 3 | [0.9220333333651225] | [0.25193157212932904] | m1, k: (2,2), p: (2, 2), d: 0.4 | 191.6640386581421 | [0.9777] | [0.0743542521841824] |
| 4 | [0.9247] | [0.24591454521814982] | m1, k: (2,2), p: (2, 2), d: 0.5 | 199.50263714790344 | [0.9758] | [0.07665438005328179] |
| 5 | [0.9434000000317891] | [0.18298239670693875] | m1, k: (7,7), p: (2, 2), d: 0.1 | 351.700865983963 | [0.976] | [0.06769504258036614] |
| 6 | [0.9410666666348775] | [0.18731714405417443] | m1, k: (7,7), p: (2, 2), d: 0.2 | 333.7001028060913 | [0.9794] | [0.060144694592803714] |
| 7 | [0.9366333333333333] | [0.2064599924047788] | m1, k: (7,7), p: (2, 2), d: 0.3 | 310.60807037353516 | [0.9827] | [0.05211424103863537] |
| 8 | [0.9381833333015442] | [0.19779315280914306] | m1, k: (7,7), p: (2, 2), d: 0.4 | 293.8299994468689 | [0.9844] | [0.0463412002062425] |
| 9 | [0.9301166666666667] | [0.22584140187501908] | m1, k: (7,7), p: (2, 2), d: 0.5 | 293.3596901893616 | [0.9731] | [0.08070229730298743] |
| 10 | [0.6694166666348775] | [0.9879058744430542] | m1, k: (12,12), p: (2, 2), d: 0.1 | 188.4207100868225 | [0.862] | [0.44213487052917483] |
| 11 | [0.6225666666348775] | [1.125994278939565] | m1, k: (12,12), p: (2, 2), d: 0.2 | 183.55514192581177 | [0.7902] | [0.6301823787212372] |
| 12 | [0.5784166666666667] | [1.2652527097066244] | m1, k: (12,12), p: (2, 2), d: 0.3 | 182.80659866333008 | [0.6809] | [0.9810790771484375] |
| 13 | [0.11655000000397364] | [2.301372591908773] | m1, k: (12,12), p: (2, 2), d: 0.4 | 180.64974188804626 | [0.1135] | [2.30129451713562] |
| 14 | [0.32681666666666664] | [1.8529357978185017] | m1, k: (12,12), p: (2, 2), d: 0.5 | 183.14613842964172 | [0.5074] | [1.4848622144699097] |
| 15 | [0.8980500000317891] | [0.3422334395011266] | m2, k: (2,2), p: (2, 2) | 70.62892079353333 | [0.9603] | [0.14006354368627072] |
| 16 | [0.9402166666984558] | [0.19891578945716223] | m2, k: (7,7), p: (2, 2) | 62.401798248291016 | [0.9772] | [0.0733047493211925] |
| 17 | [0.9317500000317891] | [0.22118996316790582] | m2, k: (12,12), p: (2, 2) | 51.19911193847656 | [0.9776] | [0.06865470027700067] |
| 18 | [0.9195000000317891] | [0.2654389654437701] | m2, k: (17,17), p: (2, 2) | 39.72964692115784 | [0.9666] | [0.10250331590473652] |
| 19 | [0.9153499999682109] | [0.2909650502363841] | m3, k: (2,2) | 221.24755907058716 | [0.9628] | [0.123010359890759] |
| 20 | [0.9411999999682109] | [0.1924640418688456] | m3, k: (7,7) | 156.3766644001007 | [0.9792] | [0.06636061710342765] |
| 21 | [0.9409833333333333] | [0.19925558050175507] | m3, k: (12,12) | 116.23541307449341 | [0.9781] | [0.0704270778046921] |
| 22 | [0.92935] | [0.22928646569649377] | m3, k: (17,17) | 76.50468945503235 | [0.9689] | [0.09608234402984381] |
| 23 | [0.9241166666348776] | [0.25780194922685623] | m4, k1: (2,2), k2:(2, 2) | 147.91311025619507 | [0.9718] | [0.09716129463016987] |
| 24 | [0.95] | [0.17012586853901546] | m4, k1: (2,2), k2:(7, 7) | 831.366845369339 | [0.9809] | [0.058372145760245624] |
| 25 | [0.9455666666348775] | [0.1778390663653612] | m4, k1: (2,2), k2:(12, 12) | 947.0625576972961 | [0.9812] | [0.05875631914865226] |
| 26 | [0.9332833333333334] | [0.21617869889736174] | m4, k1: (2,2), k2:(17, 17) | 999.4644794464111 | [0.9765] | [0.07431546127796174] |
| 27 | [0.9461666666666667] | [0.18073468161622683] | m4, k1: (7,7), k2:(2, 2) | 130.04126405715942 | [0.9727] | [0.08472202308755368] |
| 28 | [0.9478666666348775] | [0.1755321985155344] | m4, k1: (7,7), k2:(7, 7) | 345.2796506881714 | [0.9817] | [0.056817872134875505] |
| 29 | [0.9122833333651225] | [0.287589048119386] | m4, k1: (7,7), k2:(12, 12) | 496.6273765563965 | [0.9515] | [0.14662040708661078] |
| 30 | [0.8320499999682108] | [0.5696127211888631] | m4, k1: (7,7), k2:(17, 17) | 402.8572475910187 | [0.9214] | [0.2943360980272293] |
| 31 | [0.94185] | [0.18990177346765996] | m4, k1: (12,12), k2:(2, 2) | 95.32921123504639 | [0.9815] | [0.05636122696194798] |
| 32 | [0.8914166666666666] | [0.3698987820784251] | m4, k1: (12,12), k2:(7, 7) | 182.30417728424072 | [0.9367] | [0.22210068472623826] |
| 33 | [0.79005] | [0.6769600798765818] | m4, k1: (12,12), k2:(12, 12) | 228.11729216575623 | [0.8703] | [0.4197707142829895] |
| 34 | [0.10950000000397364] | [2.3370184874216715] | m4, k1: (12,12), k2:(17, 17) | 111.10067939758301 | [0.1135] | [2.3012284172058104] |
| 35 | [0.9215166666348775] | [0.25495086659590405] | m4, k1: (17,17), k2:(2, 2) | 87.86022973060608 | [0.9701] | [0.09952779012173414] |
| 36 | [0.9186999999682108] | [0.25663968537052473] | m4, k1: (17,17), k2:(7, 7) | 85.05405712127686 | [0.9722] | [0.0880797733567655] |
| 37 | [0.11153333333730697] | [2.3060155696868896] | m4, k1: (17,17), k2:(12, 12) | 75.79316353797913 | [0.1135] | [2.301197388458252] |

* Metoda SVM

Obliczenia zostały przeprowadzone dla różnych parametrów C i G.

Oprócz dokładności klasyfikacji podany jest też czas (w sekundach), przez jaki trwały obliczenia.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | VAL\_Accuracy | C | G | Time |  |
| 0 | 0.8144 | 0.2 | 0.001 | 11.51756739616394 | |
| 1 | 0.8773 | 0.2 | 0.004 | 7.477960109710693 | |
| 2 | 0.8947 | 0.2 | 0.007 | 6.977910995483398 | |
| 3 | 0.903 | 0.2 | 0.01 | 7.194631814956665 | |
| 4 | 0.9052 | 0.2 | 0.014 | 7.945363283157349 | |
| 5 | 0.8528 | 0.4 | 0.001 | 8.52756142616272 | |
| 6 | 0.9017 | 0.4 | 0.004 | 5.63733983039856 | |
| 7 | 0.9135 | 0.4 | 0.007 | 5.315030574798584 | |
| 8 | 0.9223 | 0.4 | 0.01 | 5.678451299667358 | |
| 9 | 0.9271 | 0.4 | 0.014 | 6.516554117202759 | |
| 10 | 0.8689 | 0.6 | 0.001 | 7.030480146408081 | |
| 11 | 0.9103 | 0.6 | 0.004 | 4.808864116668701 | |
| 12 | 0.9211 | 0.6 | 0.007 | 4.753647327423096 | |
| 13 | 0.9275 | 0.6 | 0.01 | 5.161912202835083 | |
| 14 | 0.9328 | 0.6 | 0.014 | 6.091821670532227 | |
| 15 | 0.878 | 0.8 | 0.001 | 6.216352701187134 | |
| 16 | 0.9135 | 0.8 | 0.004 | 4.312225580215454 | |
| 17 | 0.925 | 0.8 | 0.007 | 4.396961688995361 | |
| 18 | 0.9304 | 0.8 | 0.01 | 4.896858215332031 | |
| 19 | 0.9353 | 0.8 | 0.014 | 5.902392387390137 | |
| 20 | 0.8833 | 1.0 | 0.001 | 5.682172536849976 | |
| 21 | 0.9174 | 1.0 | 0.004 | 4.036596298217773 | |
| 22 | 0.9262 | 1.0 | 0.007 | 4.177034854888916 | |
| 23 | 0.9324 | 1.0 | 0.01 | 4.765060901641846 | |
| 24 | 0.9356 | 1.0 | 0.014 | 5.863624811172485 | |
| 25 | 0.8892 | 1.2 | 0.001 | 5.240586519241333 | |
| 26 | 0.9191 | 1.2 | 0.004 | 3.8259365558624268 | |
| 27 | 0.9271 | 1.2 | 0.007 | 4.042573928833008 | |
| 28 | 0.9337 | 1.2 | 0.01 | 4.7119410037994385 | |
| 29 | 0.9365 | 1.2 | 0.014 | 5.826249361038208 | |