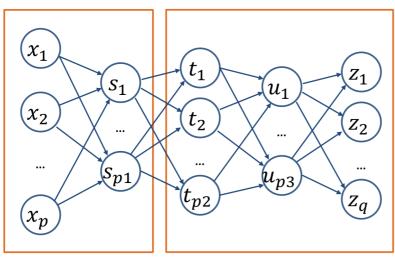
‡Xì rấṭXì 'Hì XXḤ B\ Ḥeṭān jib ÔÔn2ốm Xeì" I XḤi

k XXH ËX Hęāęnj

- 2ÔÔk ṬātŪ kāṣnjĒX Ūā I Xẹ Ë ÜXJH JX ốṣāṭ XJṣk Ë ḤḤḍr Ūãn nhiệk
 t m̂jn̂ Ėn̂2Ôk nô K

ĖXḤḤKķXẹṁmā'ę BX Ḥe¸āenj

- b" ęķX (ố mậ X Ề üX th Ni th th th th k X e m mā ' ę ķ " Nob X ē th ố m ' Nē th k ē n j \" ň th X Čē to
- 2ÔÔ ốkāạnj \" h ḤBXŰę" eőlā̄ęX ḤḤXHḤXkXemrāt e
- 2 ŪĀ I Xẹ Ề Ա̈XỊ-Ո ẹ 6 X rbŪ' ốn jŪ" NJỊ
k rbŪX Í ຂ̀' Î Φ̄ ເขิ Ā̄ ਧੌ ' ਕਿੰਘੋ ຂ̀ ਤਿੰ $^{\prime}$ T IX
h Ȳ m̂ j̈ n u = $\phi(\mathbf{x})$ r
- ĒḤŇ XmXĻlķ "NĻĀố ŲŪ nţhl ęķ N¾Ļlhň nā ę ĻXK DX Ļlę XINĶllhň I mi
- 2ÔÔ È ÜXҢ ki minhi ek Ni Hi ma e'H



pre-processed data

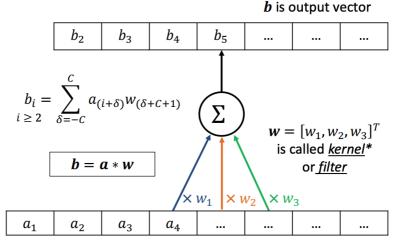
the model

k XḤnb̈̈ ṭ r͡kĥṬ ā nb̈̈

- ŶālnŪHķāṣnjĒXāṣNāḍānXĒĎŢālXĔÜXĻhnjāļXķ őṣāļXĻtķĒĻĻĻĻďŰŁň m'h Ḥ
- kXḤnṺHu˙āXËķň"ţX \\őḤnXh"lXB¸
- gXXáerň híðníði ÈlüXHXI \"híHBXŰÞnönða; çXmī," He
- § " Ț Xṭ Xḥ Ḥ ẹ ṃ ṭ Ū āenjn Ḩ I ā Kep ṁ Ḥ H 6 BX M NNXO nḥ B K ḥ ḥ āenj Ṭ ā dū ṭ Xḥ ti I XX Ḥ h " I XB K

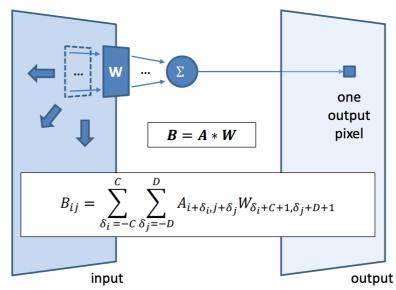
b"eţ"liŏmā'e libûxóf libûxof "Hek

- AEEntüläk XŰ ň ḤEX
 - ο b 'l ⁵ημθ b "l⁵ ɪ āk nb ÏX Na ma X [Hķā/İX]

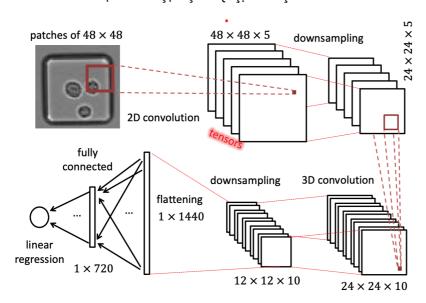


o gn∱alX'I⁵

a is input vector



- ô" H⁴k atn njXk,
- ô" Ḥ\" h ḤốnXḤṭ ā̄ṣā̄ e
 - ońķX⁺Noomandin kilytik lightik lighti
 - ∘ k"Ţęķň Ḥlẫęnj \"ốÈ 6XÎ ŰĒ"" Ḗęnj
 - o ńķX⁵⁰ Nammandrik NiJHk l"eț" börate



b"h Ḥ"ę Xẹnḥ "Nb ÔÔ

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- o b"ň ḤBXÚāṣḤốmḤXNḤXk;Xẹmmāēek,6 kXI"e,1"eţ"Bồmāe"ḤXŲ māe
- ŶXāṇÜrḥa,"NddÖXNĀmDXḤk, ḤXKÈX Ḥe,XINĶEJh nḤnlāṣaāṣnjImi
- k"ŢęķňḤĒāęnj
 - ĖXỚk) Đừk rh kh Đừ HHXk," Bồ nữ ệ hẫn ảnh H H h XnXHXÚ HỀ kử ệ
 - ∘ níķố ⊞hiţāÎ ŰĒ""Beenj
- ôố multiplication người thinh thin
 - ∘ Î Xţ+h)Xk, ţ-XX; ţ-XX; X-ç m'r-ta ek r*nn)Xrh-ta Xţ-

k"Ţęķň Ḥlaēenjţā ň ŰḤ"" Bēenj

• gḤX\ā Ē˙α̈ḤX "NΗΨ' \XķkāenjĒ α̈XإΜ̂ô" Ḥm imes m Ḥ nħŪ ¯

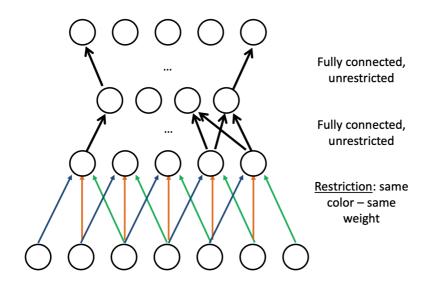
$$v = max(u_{11}, u_{12}, ..., u_{mm})$$

- Î ŰḤ""Ēāen¡H

 - \circ ANG u_{ij} āķ h \H Üṭ BĂX ப̂rāṣ tầ \ \H Ģ njX kạ āṣ th \H th TÀX \ \H Ģ njX V Baş X \r Hầ \r
 - o ńķ ${\sf X}rac{\partial v}{\partial u_{ij}}=1$ āNu $t_{ij}=v$ ἡ ẹl $rac{\partial v}{\partial u_{ij}}$ "n็ ${\sf I}$ X ${
 m I}$ Τ̄ ā ${\sf X}$ X
- ô" ḤT Ḥ Ḥ ḥkṣk ḤX(" Ḥ ḥ h ʿŒh āṣāṣṇj XĐXh Xẹmn̂ Ṭ Üā(Üāṣ nbɔXẹ ớḥ XIāṣ nbɔX6 læ) Ḥ Ḥ ḥ kṣk I ớḤāṣnj 6 læa; Ḥ Ḥ ṇ rā e

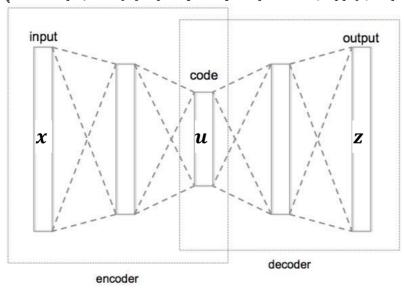
b"eț"bonā'e k (Knpobe lakX)

Convolution as a regulariser



2ốở Xẹl "I XḤ

- õāṭXẹI mɨṬātṺ'őm̈Ë6XÏ̀̀ $x_1,...,x_n$
 - o g Xử $y_i \equiv x_i$ Hời Hì Nhữ ố nhiế ở liệt tại Hố nh
 - \circ nң lāę ę $2\hat{\mathrm{O}}\hat{\mathrm{O}}$ nh HHXI aļ m $lpha(x_i)pprox x_i$ н ННН ÚTÁ nX āę Но́ло



^"minokeX(æ

- Î e njX rh n¦n lạe e Xmī, " lạtenh mì mì Xk ni," l $m{H}$ Kinh lị $m{n}$ e " Nưới X" lạt lặc $m{E}$ cán lạ $m{E}$ $(x_i) pprox x_i$
- KŪ mi X ek mu min in knjón min knj

kan Xeka e Emü HXI ő (nai e

 $\pm X (\mathring{m}_{H}^{n} \mathring{H}) \mathring{h}_{H}^{n} \mathring{h}_$

‡āęX HŪ H ďň Hhjāe gųÎ

- ^āę ļti\EķķāNāXļH
 - $\circ \ s = b + \sum_{i=1}^m x_i w_i$
 - \circ Ēļ \mathcal{M} āļ $\dot{\mathcal{A}}$ miļ $\ddot{\mathbb{E}}$ ķķ 2 ā \mathcal{M} ≥ 0
 - \circ ĒļXI $ar{a}$ m), $\ddot{\mathbb{E}}$ ķķ \wedge $ar{a}$ Nsl < 0
- ‡āęX Ḩ(ËķķāNĀKŅ
 - $\circ s \bar{a}_{k}$ Eaş X H Nobe | mar e "Nabe H ố nhi ng e l nh X k X H. H mag nj 6 "ố e l H hi a k Eas X H
- Î " I XËTÜX I m k BEÇX HÜİ KXH H 6 BX
 - ∘ ĶÜXŲ—X XŰāķrnķi Üül, PXŲ—HŽe, X ĻXŲ—HXQindā ķXL, Hināęn jndūX ∫ÈķķXķi
- K्Hāṣāṣnjốķāṣnj ⊞ ṁ ṁ ę\X

gul tkhĒXH XḤnh e

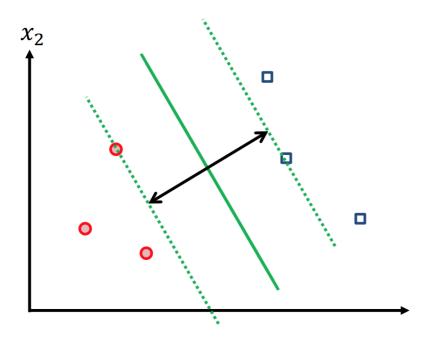
- õā, Xẹ BX ḥe, XI Ḥ, H ḥ Yr) Xṛ, Hỗ Xṣ ẹ gụ Î h æ Kk ḤĻKI ā, mā e, k XỐ l mb de la HXḤ, XḤnḥ e,
- ka**MM,X**kçmiŢük,miÈX, kpţH, H, hi XmX,H
 - ogųl̂'Hň ÜãníāķXň إ+hjāe,
 - ĒXJ-ŢXJ-ŋŋ-Ĭţġ'Hh āġ ḤXJ-ŢXJ-ŋŋ-Ĭţġ Ëķķ

gXH H mā'ę 6" ố ę l Hü

- bŪ"" ķāṣnjḤ Ḥ hǐ XmXḤk hǐ X ek lŪ"" ķāṣnj ķXḤ Ḥ māṣnj6" ốel Ḥti HŪtiḤKḤHË eXt
- ô" Ḥgu î njāmān m Najel nb X k XḤ Ḥ mā e 6" ốẹ l Ḥu nb m th Úān āk Xk nb X h Ḥ jāe 6 Xm X Xe nb X) Ëkk Xk
- Î ţhpāg āķ I XNāg XI 6 ü nb X Ё î mā 'ç нб г ç l "ţā Xç m mā 'ç н Т г " Nd ÜX ķ X Ḥ Ӈ māg n j 6 " ố ç l ţt n î
 Ţ Ü ā Ü ţ X I XNāg XI 6 ü g ų î Ḥ Ӈ ň Xn X ţ ķ
 - ogḤ ĮX6XmīįXXémīj" IķŪXIĒbęXķ

Î Ḩhjāe ṬāimbÜ

- kāķmeļX6XmīXXe nblīX Ülli HXļHE eX el nblīX eX HXķmi mi Hi āşniķi
 - o ng X H, Y ng X H, Y ng X H, Y ng X H, Y ng X H, Y ng X H, Y ng X h X
- Ē"āṣnḥ"ę ȟ [hhjāṣ 6"ốṣl [ĐĀkk] ÈÈXl kiố ḤḤ" [Ḥit X1 nhi [Ḥk



gụÎ Ē Ḩ ȟ XmXŅķ

- KÜX kXH, Hmāle 6" ốẹl Họu đại lXN đại XI 6 üH, H h\ Xn XIH, ${f w}$ el b
 - o wo∵hịXm³He,"Hỷ ÈHHXHHXelq(ốÈHam nbbX6...óel Hự
 - ∘ *b*"Holāķıāe,mX(ҢXHmi
- ô" Ḥ Ḥ'āṣṁṣ ຖິ່ມັXṁ X_n I Xẹ" ເช่ เก็บ HḤ' Å 🎝 ເຄົ້າ e " Nẹl " ẹrǐ ເก็บ ÜÜḤXḤË ẹ X
- kāķmelXŊijh Haaemin ÜüHXJHEeX

$$\circ ||r|| = \pm rac{w'x+b}{||w||}$$

- Æξτηπ āṣāṣnj I mɨŋŋ; \"ḤЖκḤ" el k m 6āṣ Ḥti Ë6 Χιμα" "Ḥ¹ι
 - $\circ y_i X_e$ \" | X nh $\ddot{\mathbb{D}}$ X ka $\ddot{\mathbb{A}}$ X " Nh $\ddot{\mathbb{D}}$ X 6 " $\acute{\mathbb{O}}$ e | H $\ddot{\mathbb{D}}$ X \ $\ddot{\mathbb{D}}$ \ddot{x}_i $\ddot{\mathbb{A}}$ " e
- KŪŚĸĥ**I āķmel X NJ h āʾơnŪḤ"āẹm**m ḤXḤNXI mŪʿŪḤXQḤĒ eXH

$$\circ \ ||r_i|| = rac{y_i(w'x_i+b)}{||w||}$$

gul HobāşlāşnjķXḤ Ḥ māşnj6"ốşl Ḥti

• Î Ḥhjāe Ṭāindil Ilākme l X Nļalh ndil X ÜÜ ḤXḤHÈ e X m ndil X l Ë ķ Xķm Ḥ aēm

- gul ˙ 6 Å (nāṭ X`H
 - o Î Űdhīāķ X $\min_{i=1,\dots,n} rac{y_i(w'x_i+b)}{||w||}$ ı ki Müdeş \ln ë e "Nootve el b
 - ĒĻH 6 ĒXh 'He'" eöőeāñóX ĻXHŢŢXķXemirā e "NkJXH H rāēnj6" őel ţti HÜÜHXŢŢĒ eXt
 - ullet aົ້ $ar{eta}$ ຖິ້ງ e ốkX eü $lpha(w'x+b)= ilde{w}'x+ ilde{b}=0$
 - Æ∏NāḍānX ẹốȟ 6 XḤ" Nຝ" Bồnā ek
 - ∘ Ē"ķķāsĒXķ"Ēbrātę m" **ĻKķ"Ē; X ȟ 6ānjóānö**"H
 - oÎX kố ├X nŪX lāķm e l X nằ nŪX l Èk Xķm Ḥ aēm t e l ├Xk l ÈX Ḥ Ḥ h knằn l
 - lacksquare Ť $rac{1}{|w|}$ Ť $rac{y_{i^*}\left(w'x_{i^*}+b
 ight)}{||w||}=rac{1}{||w||}$
 - н2 իճ āḥh իեն kXm tuồ k ẹốh X h m h h n k mố çãn ốX t lỗ X k " Naw el bī
- gụl ˙ 6 kất nữa X Ṭ ān Đ X Űn ἡ H ḤK hố đị K h Xẹn H
 - \circ t $\mathring{\mathbf{U}}$ ḥl ḥXhố đạXh Xẹ nhệ Xnh thiệ Tạ thiữ l $rac{y_{i^*}\left(w'x_{i^*}+b
 ight)}{||w||}=rac{1}{||w||}$
 - o i* l Xe" nìXk āel XŰ" NŲË kXkmìXŰ ň ḤBX m 6" ốel Ḥti
- ĶÜXļ¾KňJļ¾KήнÜ ļH ň ļhhjāepīgų Î āniķmi Nāeļl 'H
 - $\circ rg \min ||w||$ kɨঀ৾ঀ৾য় $y_i(w'x_i+b) \geq 1$ NLHi=1,...,n
 - \circ Î āṣān ố h ||w|| ' l ǐ h $\mathring{\mathrm{L}}$ L ā Ā X h H hā L
 - o b" ęķn†nl ā́ęmhHXĻNXO, mkXH H mā̇́ ę" NH" ā́ęmķ

gyî k **¦ K**njố E ţ ĒķXI t Ė Î

- gųl̃ "6Åx(mā̄,X
 - o $rg \min ||w||$ 'Hı möğəşl Xİ-İXəşl Xəri}-İXnı́p Eİ-İskı marə mixləli
 - $\circ y_i(w'x_i+b) \geq 1$ NĻi=1,...,n'Ң" çkri=1,...,n'Ң" çkri=1,...,n'Ң" çkri=1,...,n'Ң" çkri=1,...,n'Ң" çkri=1,...,n
 - bę6XāęrmXJHJXrmXI ķËķķ
 - $lacksquare l_{\infty}=0$ āNlacksquareXIā́nā́e l' lacksquareVi lacksquare
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