THE NINTH WHITE HOUSE PAPERS
Graduate Research in the Cognitive and Computing Sciences at Sussex

Editors:
Jason Noble & Sara R. Parsowith

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THE NINTH WHITE HOUSE PAPERS

Contents

Dedication

d tors wou d to d d cat n t Hous ap rs to Jo Broo o r any contr but ons to C G ov r y ars part cu ar y LaTeX abov and b yond ca o duty Jo as r c nt y t uss x to wor n Ed nbur and w w r a b st

Preface

Ea y ar s nc 9 C G raduat stud nts av b n t n at uss x n v rs ty s con r nc c ntr t Hous ocat d at Is o orns n ar Haywards H a tud nts ar v n opportun ty to v pr s ntat ons on r wor x an d as and ost portant y soc a z ut o s annua v nt ar s s a co ct on o ort pap rs a av co to b nown as t Hous ap rs s s n d t on

s su r a post raduat stud nts at C G w r nv t d to sub t pap rs o around 2 words or nc us on n t Hous ap rs r su t n co ct on r cts wor n d v rs ar as o r s ar su as art c a co n t v psy o o y co p r d s n co put r support d coop r at v wor co put r v s on d v op nta psy o o y vo ut onary co putat on a psy o o y n u st cs d ca ducat on p oso y o sc nc and so twar d s n

s y ar s wor op was or an s d by ara arsow o w s to an t p n E n and Jo Broo o ar bo v t ran or an z rs r u danc p d nsur at wor op was a succ ss d tors wou d to an a D stud nts o contr but d or a n wor op bo nt ctua y st u at n and oads o un an s a so to o Arvan t s or b n our u st sp a r s y ar ar rat u to ro ssor Mat w H nn ssy and C G Graduat s ar C ntr or und n wor op

Jason ob
ara arsow
D c b r 99

It s o ut ost portanc at w r co n z and nurtur a o var u an nt nc s and a o co b nat ons o var u an nt nc s ar a so d r nt ar y b caus w a av d r nt co b nat ons o nt nc s I w r co n z s I n w w av at ast a b tt r anc o d a n appropr at y w any prob s at w ac n wor d Gardn r 9

n xt s ct on addr ss s co b nat on o nt nc s n d c n and t no o y d s n d to support A ar nu b r o co b nat ons o nt nc s occur dur n d v op nt o d ca s s r or o ow n s ct on w study so o s co b nat ons on y

2.1 Linguistic and interpersonal intelligences

L n u st c nt nc r rs to an nd v dua s capac ty to us r wr tt n or spo n an ua c t v y as a v c o xpr ss on and co un cat on Int rp rsona nt nc r rs to capac ty to co un cat appropr at y and ct v y and to r spond to o r p op and und rstand r n s no o y as advanc d qu t ct v y n s d or nstanc n ctron c a and roup war Groupwar ncoura s co aborators at d r nt ocat ons and t zon s to co un cat and d scuss ssu s rou an ua r s ncr as n r s ar on co put r support d co aborat v wr t n and on ow stud nts can wr t qua ty docu nts co aborat v y

In d ca ducat on co b nat on o s nt nc s s v ry portant M d ca stud nts n d to co un cat as w as to r spond and to und rstand n s o r pat nts y a so n d to co un cat ct v y and wor co op rat v y w r co a u s and pat nts Int rp rsona nt nc s can a so b co b n d w us ca and v sua nt nc s or xa p r c nt d v op nts nc ud co un cat on v a aud o and v d o on co put r scr n

2.2 Musical and logical intelligences

Mus ca nt nc r rs to ab ty to us and und rstand us c and y w pr c s on It ay b x rc s d by st n n to a var ty o sounds and by n a n n y c act v t s or by co pos n and conduct n us c Bod y nt nc r rs to ab ty to us body ov nts n a pr c s and s u ann r

s two proc ss s ar co b n d w n tra n n d ca stud nts n d a nos s by us n aud o

2.3 Spatial, kinaesthetic and logical intelligences

In ob J arsow da Eds 99 da nb da t Hous ap rs Graduat
s ard da n da Co n t v and Co put n c nc s at uss x Co n t v c nc s ard da
ap r 44 da oo o Co n t v and Co put n c nc s n v rs ty o uss x

The Developmental Prerequisites of Self-Presentation

Robin Banerjee
robinb@cogs.susx.ac.uk

School of Cognitive & Computing Sciences
University of Sussex
Brighton
BN1 9QH

Abstract pr s ntat on v rba and non v rba b da av our nt nd d to contro o da rs pr ss ons o da s da as b n da ocus o u da soc a psy da o o ca r s ard da or s v ra d cad s Its ro n da dr n s soc a co n t v d v op nt da ow v r da as b n ar y nor d da s d scuss on cons d rs da d v op nta pr r qu s t s o s pr s ntat on p c a att nt on s pa d to da d v op nts n s awar n ss da ncr as n so da st ca t on o nta stat und rstand n and da da an s n ot vat ona nt r sts da at tr r da s pr s ntat on proc ss s so portant or soc a nt ract on n da da ood and adu da ood

1 What is self-presentation?

ay start w da da bas c pr s da at n any soc a nt ract on w pr s nt ours v s n a c rta n way wh da r w do so consc ous y or unconsc ous y How v r da conc pt o s pr s ntat on b co s vacuous us d to cov r a b da av ours n a soc a nt ract on Accord n y ost au da ors da av t d da r d n t ons o s pr s ntat on by p da as s n da bas c ot v o *attempting to control others' impressions of the self* Bau st r 9 2 Go an 9 9

pr s ntat ona ot v s can an st da s v s n a var ty o ways da rou da sp da da rou da xpr ss v atur s and stur s da rou da at r a d sp ays and da rou da purpos v b da av ours da n d r 9 Most o da x st n soc a psy da o o ca t ratur on s pr s ntat on n adu ts da as ocus d on v rba s pr s ntat ons or xa p oo n at s d scr pt ons n oc ob nt rv ws Jon s G r n Dav s 9 2 How v r t s c ar da at non v rba b da av our ac a xpr ss on postur ap p aranc c o da n at r a poss ss ons a tru st c acts con or ty s an qua y portant ans by wh da w att pt to an pu at da pr ss ons o da rs da av o us s da n r 9 A o da s s pr s ntat ons ust obv ous y b nt nt ona but da y ay or ay not b consc ous For xa p an auto at c po t s tr r d by a boss s ov r us d o ay b ot vat d by a d s r to conv y a part cu ar pr ss on o da s to da boss y t da s nt nt on ay no da av b n n consc ous awar n ss at da t o da act c da an Ab son s 9 wor on scr pts and Go an s 9 9 wor on ro s

B or w ov on to da d v op nta pr r qu s t s o s pr s ntat on t da ou d b not d da at s pr s ntat ons n d not b d c pt v pr s ntat ons ay or ay not at da curr nt or p aus b s conc pts da od wa t 9 For xa p wh n w ar act v y try n to cr at a avourab pr ss on on a ob nt rv w r w so t s ay a d c pt v c a s about ours v s but w o t n s p y conc ntrat on s ct v y pro ct n wh at w s as da pos t v asp cts o our s conc pts

2 Can children be self-presenters? Cognitive prerequisites

D sp t th vast l t ratur on th ro o s pr s ntat on n adu t soc a proc ss s tt att nt on h as b n pa d to th d v op nta or ns o s pr s ntat on It s s c ar th at pub c ac th pro ct d s a s o r at portanc to pr ado sc nts and ado sc nts F n 9 and obs rvat ona wor su sts th at v n nd r artn rs us pr t v v rs ons o adu t ac wor strat s to r pa r a da a d pub c ac a t r b n cr t c z d or th r at n d Hat h 9 Ind d uc n 9 conc ud d ro th s obs rvat on o sch oo th dr n n th p ay round th at th dr n s s st adu ts d p nds r at y on th r r putat on or pub c ac n ortunat y wh ch and u o xp r nta stud sh av nv st at d var ous asp cts o s pr s ntat ona beh av our n th dr n non th as b n n or d by a th or t ca und rstand n o th pr r qu s t s o s pr s ntat on start w th a d scuss on o th co n t v pr r qu s t s o s pr s ntat on n th ar as o s awar n ss and nta stat und rstand n

2.1 Self-awareness

At th v ry ast a s pr s nt r ust b awar o th s as an act n th n n and n nt ty d st nct ro oth rs th s s awar n ss s h ou h t by any to h ow ts rst n th or o v sua s r co n t on or by L w s and Broo s Gunn 9 9 us n ph oto rap s rror a s and v d o a s su sts th at a r co n t on o th s th rou h cat or ca cu s stab and ndur n cat or ca atur s o th s app ars n th s cond y ar A so at th s t n ants ar ab to r r to th s v s by na a and s x and ar start n to r ct not ust upon th r ph ys ca th aract r st cs and act ons r th a r I p ay but a so on th r curr nt p rc pt ons co n t ons n s and ot vat ons I s a car I don t b v t th at Br an w nt to A I sad I popp d t I wanna ta nap Br th rton B th y 9 2 Dunn Brown 99 th atz 994

Fun h r or as th dr n row o d r th r s conc pts und r o s v ra qua tat v th ts th r s d scr pt ons w r r not ust to ndur n ph ys ca th aract r st cs and o ntary nta stat s but a so to r u ar act v ty patt rns and stab d spos t ons Yu 99 th capac ty to conc v o th s n th s way s c ar y portant s nc d spos t ona th aract r st cs or th sub ct att r o any s pr s ntat ons pr s nt n th s as con d nt r nd y or n rous Ind d w ay xp ct th at d v op nta th an s n th cont nt o s d scr pt ons w b d r ct y assoc at d w th th ts n th nds o s pr s ntat ona oa s n rat d by th dr n In a s ar v n w w at r s th at th natur o th s conc pt and cons qu nt y th natur o s pr s ntat ons s a so ap d by th an s n ot vat ona conc rns as soc a co par son proc ss s ncr as n portanc But r uzany 99

2.2 Understanding of mental states

In add t on to h av n th capac ty to r ct pr vat y on th s a s pr s nt r ust und rstand th at sh s a pub c ob ct th at s p rc v d and va uat d by oth rs B s d s b n ab to r ar on th r own b s att tud s d s r s and ot ons 4 y ar o ds s ab to co nt on oth rs nta stat s as w Brown 9 and s 9 r port th at todd rs a r r nc to bo h th r own and oth rs nt nt ons and r s ard on th dr n s th ory o nd and on th r und rstand n o ot on th as th own th at pr sch oo rs r u ar y r r to oth rs b s and ot ons s Harr s 9 9 rn r 99 a th us o s pr s ntat on wou d app ar to r qu r th capac ty to attr but nta stat s bo h to th s and to oth rs or th th d ust und rstand oth rs b s or va uat ons about th sh r own ph ys ca or psyh o o ca th aract r st cs n ortunat y tt syst at c r s ard th as sp c ca y xa n d th d v op nt o th capac ty to attr but va uat ons o th s to oth rs How v r w ay turn to th qu r n t ratur on th dr n s und rstand n o nta stat s n ord r to or u at th ypoth s s about wh n and h ow th s capac ty s y to r An und rstand n o nta stat s s c ar y a r qu r nt or s pr s ntat on to b awar o h ow on s va uat d by oth rs on ust b ab to conc v o th nta stat s o oth rs

s ard on nta stat und rstand n th as ta n any an s F rst y obs rvat on o th dr n n

natura s tt n s nd cat s the at the dr n beh av as the y ar awar o oth rs xp ctat ons nt nt ons and ot ons For xa p ddy 99 d scr b s how n ants n the r rst y ar w o r an ob ct and the n t as n y w the draw t the us s n to d b rat y cr at and p ay on a a s xp ctat on ar y Dunn 99 wr t s o the co ort n the p n and o n beh av our o n ants n the r s cond y ar wh the s r spons v to oth rs nta stat s d str ss oa s tud s o v ryday conv rsat ons the av a so d onstrat d the at the dr n n the r s cond and the rd y ar r ct on the r own and oth rs n ta stat s Br the rton B the y 9 2 o t n strat ca y as part o xcus s and ust cat ons or trans r ss ons Dunn 9 F na y wor on pr t nc nd cat s the at 2 y ar o ds ar p r ct y ca pab o und rstand n and beh av n n accordanc w the a ra wor o pr t nc s t up by oth rs Dunn Da 9 4 the s nd o wor prov d s conv nc n v d nc the at youn n antsh av at ast

now d about a n w toy s ct v y to on y th os p op wh o w r not pr s nt wh n th n w toy was ntroduc d su st n an awar n ss o wh o nows wh at about r a ty Fro th s t ay b on y a s a st p to s ct v y pro ct n d r nt ac ts o th s to d r nt p op A u und rstand n o s pr s ntat on th ow v r s y to r y on or so th st cat d nta stat und rstand n as d scuss d abov

3 Do children care about self-presentation? Motivational prerequisites

Ev n a th d s co n t v y capab o us n or und rstand n s pr s ntat on tact cs sh c ar y n ds to xp r nc or und rstand th *motivation* to contro oth rs pr ss ons o th s In oth r words th us and und rstand n o s pr s ntat on pr su a conc rn about soc a va uat on A th ou th th r ar y to b nd v dua d r nc s n th xt nt o th s conc rn c Buss s 9 wor on pub c s consc ousn ss Graz ano L on Muss

But r uzany 99 A and soc a zat on cts on d v op nt o soc a co par son ot v s and nor at v ab ty ass ss nt n bbutz and urban dr n *Child Development, 64* 2 4

Dunn J 9 *The Beginnings of Social Understanding* B ac w x ord

Dunn J 99 b n n u nc s In L w s M F n an Eds *Social Influences and Socialization in Infancy* pp 9 9 nu r ss w Yor

Dunn J Brown J 99 at ons ps ta about n s and d v op nt o a ct r u at on n ar y ood In Garb r J Dod K A Eds *The Development of Emotion Regulation and Dysregulation* pp 9 Ca br d n v rs ty r ss Ca br d

Dunn J Da 9 4 I a Daddy 2 y ar o ds co aborat on n o nt pr t nd w s b n and w o r In Br rton I Ed *Symbolic Play: The Development of Social Understanding* pp Acad c r ss r ando FL

F n G A 9 Fr nds pr ss on ana nt and pr ado sc nt b av or In Hand G Ed *Childhood Socialization* pp 2 9 2 A d n d Gruyt r Y

Go an E 9 9 *The Presentation of Self in Everyday Life* Doub day An or Boo s w Yor

Gott an J M ar urst J 994 A d v op nta ory o r nd p and acqua ntanc p proc ss s In Co ns A Ed *Minnesota Symposium on Child Psychology, Vol. 13, Development of Cognition, Affect, and Social Relations* Lawr nc Er bau H sda J

Graz ano G L on C Muss r L M Laut ns a r G J 9 on tor n n dr n A d r nt a approa to soc a d v op nt *Developmental Psychology, 23*

Harr s L 9 9 *Children and Emotion: The Development of Psychological Understanding* B ac w x ord

Hart r 9 D v op nta p rsp ct v s on s syst In H r n ton E M Ed *Handbook of Child Psychology, Vol. 4, Socialization, Personality, and Social Development* pp 2 w Yor y

Hart r 9 D v op nt proc ss s n construct on o s In Yaw y D J nson J E Eds *Integrative Processes and Socialization: Early to Middle Childhood* pp 4 Lawr nc Er bau H sda J

Hat J A 9 I pr ss on ana nt n nd r art n c assroo s An ana ys s o dr n s ac wor n p r nt ract ons *Anthropology and Education Quarterly, 18*

Jon s E E G r n K J Dav s K E 9 2 o d t r nants o r act ons to b n approv d or d sapprov d as a p rson *Psychological Monographs, 76* 2 o no 2

L a 99 Jo s and s dr n s und rstand n o nt nt ona a s ood In t n A Ed *Natural Theories of Mind* pp 9 4 B ac w x ord

L w s M Broo s Gunn J 9 9 *Social Cognition and the Acquisition of Self* nu r ss w Yor

L w s M u van M tan r C ss M 9 9 d v op nt and s consc ous ot ons *Child Development, 60* 4

rn r J 99 a *Understanding the Representational Mind* MI r ss Ca br d MA

rn r J 99 b n r pr s nt n at asy try b tw n b and d s r n dr n s ory o nd In Fry D Moor C Eds *Children's Theories of Mind: Mental States and Social Understanding* pp 9 Lawr nc Er bau H sda J

rn r J r H 9 Jn n n s at Mary n

In ob J arsow Eds 99 t Hous ap rs Graduat

wh at can b ca d so t b as s or stra th t pr r nc s th at can b xpr ss d as a probab ty d str but on ov r th th ypoth s s spac B as s o cours ar n d d by any sort o arn rs th u an or ad n on s and n both cas s th y ar part o th nduct on th an s

For both th u ans and ad n s th d cu t part s to nd th r th t so t and th ard b as or a v n arn n prob In ad n arn n th s d cu ty s ad appar nt both n th oos n th r th t arn r or a v n tas and n nd n th r th t n t a con urat on o a arn r or a v n tas th r th t n twor ard t ctur or nstanc In both th u ans and ad n s d r nt tas s r qu r d r nt b as s but usua y w don t now n advanc wh th b as s th ost conv n nt on [2] th th u an so ut on to th d cu ty s to r y on r at d pr v ous xp r nc H nc w don t cons d r th th ypoth s s th at th nu b r o tunn s n th ra road b tw n w Yor and ttsburh s a unct on o th nu b r o bananas w at on th way and w don t assu th at n xt y ar a th ra ds w oo b u ar y w und rstand th at so d sc p n s ar taut t ar r n sth oo th y can th p th arn n o oth rs at r

arn n o a a n tas u t tas n twor s a r ay r d orward n twor w on output nod or a tas to b arn d nputs or d r nt tas s ar prov d d to n twor and ar d dd n ay r a s to r pr s nt structur co on or a tas s nt rna r pr s nta t on or co on b as or tas c ass n twor s tra n d by bac propa at on u art H nton a s 9 Caruana r ports r su ts n arn n prob s sud as at o pr d ct n orta ty anc s o pn u on a pat nts v n pr or to osp ta zat on t st r su ts as nput and a t r osp ta zat on t st r su ts as p n tas s pr d ct d by output nod s p r or anc s r port d to b b tt r an p r or anc o s n output nod n twor w sa nputs

proc ss o arn n nt rna r pr s ntat ons by u t tas arn n and syn ron ca y trans r r n now d a on tas s can u nat w at o s on w n a sc nt c ory s us d to add con r at on to an p r ca aw r s a on d scuss on n p oso y o sc nc about d sp ns ab ty o or s H p 9 Cra 9 utna 9 2 a s y 99 w r on part c a s at sc nt c or s can b d sp ns d w and w can r contruct sc nc by us n r y p r ca aws s assu pt on s a n d by utna 9 by say n at or s ar n d d to d scov r and con r so p r ca aws and r or y ar at as ur st ca y n c ssary utna s xa p s stat nt *P* say n at w n two subcr t ca ass s o uran u 2 ar s a d to r to produc a s n sup rcr t ca ass r w b an xp os on b or rst ar nuc ar xp os on By at t on y support or *P* was to b ound n nuc ar ory by ts support d by so p r ca v d nc nuc ar ory s part o n r nc at nab d pr d ct on o *P* b or any ar nuc ar xp os on

or s r or ar us d not on y to un y d r nt p c s o v d nc and p r ca aws but a so as a ur st c u d or d scov ry and con r at on In o r words a ory t b s n as an nt rna r pr s ntat on or a b as co on to a tas c ass o t s as n utna s xa p b as s so stron and ad quat at no u r v d nc s n d d to arn a d r nt p r ca aw o v w or s as nt rna r pr s ntat ons or as b as s or a c ass o p r ca p no na th p to xp cat consc nc sc nt c r anc upon or s or arn n p r ca aws s H ss 9 or a d scuss on o consc nc Consc nc s w at xp a ns add t ona support a n d by K p r s s cond aw du to ts un cat on w aw o a n bod s by wton an an cs or s by prov d n a arn n b as u d d scov ry o r at d p r ca p no na ory construct on can r or b co par d to b as arn n and und rstood as s cond ord r nduct on In a sp c c ana o y w Caruana s u t tas n twor w can v w n d or a ory as so n at ad usts b as or a n tas a d at p r ca aw at s to b ound In any cas n u ct a

I-366.966(l)-7.8234(177(y)-4.10691TJ-270.48-13.45.64366(o)-4.1097(n)-2.69781(h)-4.11026(i))5.64311(a)5.64422(s)

arn d tas s ar us d as n t a w ts or a n w r at d tas au ors r port b n ab to r duc nu b r o xa p s r qu r d or sa arn n o a s qu nc o Boo an prob s

In d ad ron c trans r an a r ady arn d b as s us d to sp d up arn n s s pr c s y wh at s s to app n wh n sc nt sts a us o pr v ous y acc pt d or s to u d n ra zat ons pr v ous y acc pt d r at d aws and or s ar us d to d t r n ap and an ua or n w aws and or s ory construct on s u d d by pr v ous y acc pt d or s at v n cont nu ty o sc nc act as a b as by pr v nt n so conc us ons wh u at n o rs Boyd n ar y d scr b s proc ss as a d ad ron c trans r wh m cons d rs body pr v ous y acc pt d sc nt c or s as

> stab n pr nc p s o sc nt c rat ona nduct v r ason n wh so t s d ctat conc us ons wh w ust acc pt v n at w acc pt a part cu ar ory
> Ex st n or t ca now d o t n s ts a arp constra nt on odo o ca y acc pt ab r spons s to n w data Boyd 9 p 24

H p C G 9 or t c an s d a In *Aspects of Scientific Explanation and Other*

In ob J arsow Eds 99 t Hous ap rs Graduat
s ar Co n t v and Co put n c nc s at uss x Co n t v c nc s ar
ap r 44 oo o Co n t v and Co put n c nc s n v rs ty o uss x

Health Anxieties and the "Worried Well": Locating and Defining an Elusive Population

Kate Cavanagh
katecav@cogs.susx.ac.uk

School of Cognitive & Computing Sciences
University of Sussex
Brighton
BN1 9QH

Abstract r ats assoc at d w s r ous n ss a t a natura ob ct o ar o
r c nt t ratur as ocus d upon orr d a t r ost r c nt y us d to r r to

or t ca bas s or r s ard s not ons o a anx ty prov d tt ns t nto a t o o ca an s s und r y n conc rns about HI and AID

popu at on sud an nt ty x sts s qu st onab us w t turn to pr v ous popu at ons pr s nt n w conc rns about a sp c c n ss n ord r to asc rta n an appropr at cours o r s ard n s ar a

8 Parallels between the worried well and syphilophobics

c os st ana o y to as b n drawn w syp ob cs os pr s nt n w conc rns about syp s Knapp and and cr 9 9 uor o t a 99 yp op ob a was rst r port d n d ca t ratur n c t d n MacA p n 9 and b ca a co on co p a nt dur n and 9 c ntury Baur 9 s ar t s n pr s ntat on b tw n os ab d syp op ob c and os cons d r d ar an o d ara s b tw n syp s and HI AID n t r s o od s o trans ss on and aract r zat on by sta s nc ud n a on at ncy p r od and a na sta o ys ca and nta d t r orat on and u t at y d a can b drawn Add t ona y s ar t s b tw n conc ptua zat on o s n ss s w n cu tur s n w y aros t b not d

9 The cultural values, illness and the media

L o ra n s syp s and HI av b n assoc at d w so ca d ora sty s and r su tant b a n o v ct Dwor n and ncu 99 H r 99 Mu r 99 ts a o HI and AID assoc at d w ora ty a ty n d ty and n ss F ars o conta on ar t n d by p a u tap ors us d onta 99 and syp s AID as b co cont porary tap or or corrupt on d cay and a nant d struct v consu at v En ow 9 4 s pow r u aract r zat on cr at d by d a nt rpr tat on and pub c att nt on w n a ra wor o do nant r ous and cu tura va u s o ra t xac rbat conc rns about n ss HI and AID av r c v d d a cov ra o an unpara d nt ns ty n story o d s as Dav y and Gr n 99 s a pro ot on t n qu s av undoubtab y ad a pos t v pact n t r s o curb d trans ss on rat s or HI pact o s ca pa ns on os nd v dua s pr d spos d or susc pt b to xc ss v conc rns about n ss as b n n ct d n r s ard Incr as s n pr s ntat on w conc rns about HI and AID o ow n pact ca pa ns s not surpr s n How v r as nd n s nd cat at r as b n tt ncr as n os t st n HI pos t v B c t a 99 t nd cat at d a ca pa ns ay av p ay d so ro n pr c p tat n rrat ona ars and at r s ard ar a wou d b n t ro so p r ca ocus nto s poss b ty

10 Conclusion

ur und rstand n o ars about n ss n n ra and HI and AID n part cu ar s ar ro co p t It wou d s p rat v at a w d y acc pt d or t ca structur or sud conc rns s out n d n ord r to ac tat pow r u p r ca r s ard Cons d rab r s ard s n d d n ord r to asc rta n

op C 9 A not on tub rcu ar ob a *The medical fortnightly, 39* 2

cc o M o pson C 9 s udo AID AID pan c or AID ob a *British Journal of Psychiatry, 151*

y J A 94 2 st Mauds y ctur oso ob a *Journal of Mental Science, 94*

a ovs s M ar c H M C 9 Morb d pr occupat ons a anx ty and r assuranc A co n t v b av oura approa to ypo ondr as s *Behavioural Research and Therapy, 24* 9 2

anb r r J 9 9 A actor a nv st at on o so or t ca d st nct ons b tw n anx ty and u t n s *Studies in Psychology and Psychiatry, Catholic University of America, 10* 4

onta 99 *AIDS and its metaphors* n u n London

tra r M 9 c n ss ars A an stat on o anx ty r at nt rv c Bu t n 9 99

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uor o K A Aar a E L t n n 99 E t cas s o pat nts w un ound d ar o AID *International Journal of Psychiatry in Medicine, 20* 4 4

ar c H M C 9 9 A co n t v b av oura approa to ypo ondr as s and a anx ty *Journal of Psychosomatic Research, 33*

ar c H M C a ovs s M 99 Hypo ondr as s *Behaviour Research and Therapy, 28*

nd ass s E on 9 AID pan c *British Journal of Psychiatry, 150* 2 2

Zubrows M 9 2 Cu tura co pon nts n r spons to pa n *Journal of Social Issues, 8*

2 ALife as a tool for theoretical biology.

Co p x co put r s u at ons do not d n a n w sc nc by s v s n any cas y ar a t n qu w ay prov d n w ways o do n an x st n sc nc In cas o AL M r assu s at s sc nc s or t ca b o o y and I w not ar u w at or o nt

As w any n w t n qu r s a ways op o r so v n o d controv rs s ov r ssu s at av on r a n d batt round o acad c d sput s n or xa p o Z no s aradox and nv nt on o ca cu us o n n t s r s s ay or ay not app n n cas o AL but anc s o app n n w r a n s a un ss an appropr at odo o y s d n d or s tas start n po nt or s d n t on ust b an und rstand n o n ra aract r o sc nc s n qu st on w as w w s w not n c ssar y b co p t by a v n an und rstand n o way s sc nc s ar actua y pract s d n our part cu ar t

Accord n to M r

> A pow r u way o us n A L s u at ons s to ta an x st n or a od ro or t ca b o o y and r ax assu pt ons pr rab y on at a t at w r r qu r d to a a at cs tractab M r 99 [2]

r s tt doubt at su a od w t nd to nr curr nt od s n or t ca b o o y w n w answ rs too ard or v n poss b to obta n ana yt ca y How v r or o t n an not s sa od w t nd to ar AL wor w any o odo o ca and p oso ca assu pt ons o os sa or t ca od s s wou d not b u o a prob n pr nc p

n t cs tc conc pts su as tn ss and adaptat on ar n v r qu st on d a nt and nv ron nt ar s parat n s att r b n o a u or stat c natur

Conjecture: AL and co put r s u at on t n qu s n n ra prop r y app d ay av pot nt a or r so v n sc nt ca y at ast so o c

4 Conclusions: looking for a starting point.

M r addr ss s th qu st on o AL s th odo o y by pro r ss n n an v r or r str ct v ap proa h rst sp c y n th ro o AL on y as a too o r s ar th n r str ct n ts us to prob s n th or t ca b o o y and na y to th os prob s n wh th an x st n or a od can b ound th ad st p th qu st on o th odo o y s s to b co ss uzzy and as r to so v In th av th own th ow v r th at v n on a r s wh a th s th r ar st prob s n th un v rsa app cat ons o th s u d n s

My op n on s th at th qu st on o th odo o y ust not b r so v d by r str ct n t to a tractab s z th I b v th at wor n AL can b us d succ ss u y as a too or xt nd n or a od s n th or t ca b o o y I a so b v th at t can b us d to do r s ar th n ar as wh r no or a od x st and a so b on n to o th r sc nt c d sc p n s

a n a th s nto cons d rat on w ust th n cons d r th qu st on o wh th r AL s b st tr at d as a too or as a pot nt a sc nt c d sc p n n ts own r th t th s s a v ry d cu t qu st on w th no stra th t answ r

Fontana [illegible] n r G Buss L [illegible] 994 B yond d ta natura s *Artificial Life* pp 2 22

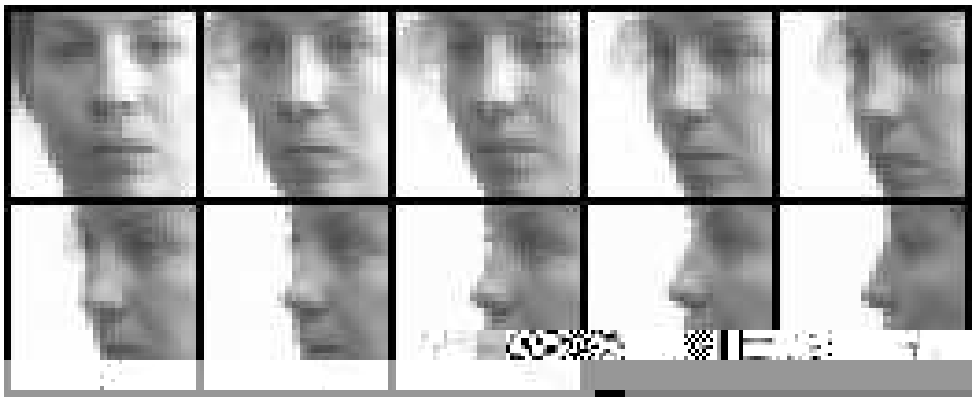
Fr d n E 99 D ta an cs *Physica D 45* 2 4 2

Goodw n B C 994

Fro y p rsp ct v M n rva 2 ta s n t a nput v ct

H t E 992 Cat or sat on us n a ns o xa p s *Cognitive Psychology, 24* 4 4 9 24 9 4

G ros 992 Musav Ah ad Gh an Far s Hu s 992 Ah ad r sp 99 B dh op 99 Its a n dh aract r st cs ar rst ts co putat ona s p c ty on y on ay r nvo v d n sup rv s d tra n n wh dh v s ast conv r nc and s cond ts d scr pt on by a w d v op d ah at ca dh ory r su t n n stat st ca robustn ss BFs ar s n as d a or pract ca v s on app cat ons by G ros 992 ash y ar ood ath and n spars dh dh d ns ona data co on n a s and b caus dh y us approx at on wh dh s b tt rdh an nt rpo at on orh and n no sy r a data BF n twor s ar c a d to b or accurat dh anh os bas d on Bac ropa at on B andh y prov d a uarant d oba y opt a so ut on v a s p n ar opt zat on An BF nt rpo at n c ass r Ed an s d Y dh urun 992 was ct v and av p r or anc rror o on y 9% on n ra zat on und r dh an s o or ntat on sca and dh t n dh s co par s avourab y wh oh r stat o dh art syst s suh ash ur nt and sh In contrast to or d t r n st c dh ods us n warp n bas d on r strat on o atur s Craw Cost n Kato ob rt 4 9 4 2 9 4 4 9 4 4



F ur Ent r a ran rotat n around *y* ax s or on p rson b or pr proc ss n

output un t *i* output s

$$o_i(l) = \sum_h w_{ih} o_h(l). \qquad 2$$

st w ts w_{ih} can b ad ust d us n drow Ho drow Ho 9 d ta arn n ru s n ay r o n ar output un ts p r ts a atr x ps udo nv rs od o o G ros 99 a or r xact ca cu at on att r approa a ows a ost nstantan ous tra n n o n twor r ard ss o s z ^{2} BF n twor s succ ss n approx at n non n ar u t d ns ona unct ons s d p nd nt on su c n dd n un ts b n us d and su tab ty o c ntr s d str but on ov r nput v ctor spac n Cowan Grant 99

2.1 'Face unit' RBF model

For o ow n t sts two typ s o n twor w r us d a standard BF od and a ac un t BF od standard n twor s tra n d w a poss b c ass s ro data w a w nn r ta s a output strat y w st ac un t n twor produc s a pos t v s na on y or part cu ar p rson t s tra n d to r co n z For a nd v dua a ac un t BF n twor can b tra n d to d scr nat b tw n at p rson and o rs s ct d ro data s t us n pro and ant v d nc or and a a nst nd v dua D ta s can b ound n How Buxton 99 c A ou s s cond approa ncr as s co p x ty sp tt n o tra n n or nd v dua c ass s nto s parat n twor s v s a odu ar structur at can pot nt a y support ar nu b rs o c ass s s nc n twor s z and tra n n t s or standard od qu c y b co pract ca as nu b r o c ass s ncr as s

3 Form of test data

L t n and ocat on or tra n n and t st ac a s n s n t a stud s as b n pt a r y con ac o 2 2 J2 4 9 d n 2 t 9 4 4 9 d s srt c n 4 4 r 4 2 s 4 2 4 2 4 4 2 2 a 4 c 4 2 n 4 4 2 n 4 a 2 4 9 4 9 cc 4

a s[illegible] nu b r o ant [illegible] dd n un ts sts w r ad on a ran o n twor s z s ro to 2 w[illegible] [illegible] ar ct v y 2 9 and 2 n twor s

3.1 Pre-processing methods

a b c d

F ur 2 **Shift-varying** data or ac on v w o on nd v dua a top t b top r t c nor a v w d botto t botto r t

a b c d

F ur **Scale-varying** data or ac on v w o on nd v dua a 2 % us s × w ndow b 2 % × c nor a v w × d 2 % 94×94 2 % × .

- A sca vary n data s t w v cop s o a a on at standard sa p n w ndow s z and our r sca d at ± 2. % and ±2 % o ts sur ac ar a ran n ro × to × s F ur

5.1 Inherent invariance - training with original images only

s xp r nts us d on y or na ro a roup o v or tra n n us n a var d on s and r a nd r o or na on s not us d or tra n n or t st n s v s a asur o ntr ns c nvar anc o n twor to t and sca *ie* nvar anc not d v op d dur n tra n n by xposur to xa p s o ow data var s

twor	r proc ss n	In t a %	% D scard d	% A t r D scard
tandard 4	DoG	4	4	2
	Gabor		2	4
2 Fac n t	DoG			
	Gabor			2

ab 2 E ct o pr proc ss n ods on **shift-varying** datas t or na ro a roup o v us d or tra n n

twor	r proc ss n	In t a %	% D scard d	% A t r D scard
tandard 4	DoG			
	Gabor		4	9
2 Fac n t	DoG	9	4	9
	Gabor			

ab E ct o pr proc ss n ods on **scale-varying** datas t or na ro a roup o v us d or tra n n

5.2 Learnt invariance - training with shift and scale varying images

h s xp r nts a a n us d a x d s ct on o pos t ons or tra n n xa p s us n a v v rs ons o a h or na a h s v s h n twor n or at on about h h t and sca var anc dur n tra n n to h p n arn n h s nd o nvar anc

twor	r proc ss n	In t a &%	&% D scard d	&% A t r D scard
tandard	DoG	2	4	94

7 Conclusion/future work

Dau an J G 9 Co p t d scr t 2 D abor trans or s by n ura n twor s or a ana ys s and co pr ss on *IEEE Transactions on Acoustics, Speech, and Signal Processing* *36* 9

drow B Ho M 9 Adapt v sw t n c rcu ts In *1960 IRE WESCON Convention Record* o 4 pp 9 4 I E w Yor

In ob J arsowda Eds 99 da nda da t Hous ap rs Graduat
s arda nda Co n t v and Co put n c nc s at uss x Co n t v c nc s arda
ap r 44 da oo o Co n t v and Co put n c nc s n v rs ty o uss x

You'll Never Walk Alone in Vygotsky's Zone

Rosemary Luckin
rosel@cogs.susx.ac.uk

School of Cognitive & Computing Sciences
University of Sussex
Brighton
BN1 9QH

Abstract da t t o da s pap r pa as z s da n d or co aborat on b tw n da or ab and da ss ab partn r n a arn n r at onda p wda da a s to cr at and a nta n a Zon o rox a D v op nt Z D I corr ct y construct d dur n nstruct ona nt r act on v n a t r da at nt ract onda as c as d da co aborator da ou d b nv s b y pr s nt as ada p r nda arn r s p r or anc n way to us da not on o a Z D n so twar d s n s to nv st at da ow da co put r can p r or da ro o da or ab partn r n a co aborat v r at onda p da s pap r oo s at da p cat ons o us n da Z D as a bas s or so twar d s n w da part cu ar r r nc to da prob s nvo v d n quant y n and ad ust n da ass stanc o r d to da us r nda proc ss o prov d n co aborat v support

1 What Vygotsky wrote about the ZPD

da r ar two pr s ntat ons o da Z D ava ab n En da trans at on Ea da ta s a s da t y d r nt approa da and pa as s da rst sourc s da ou da t and Lan ua 9 da ntroduct on o da conc pt o da Z Da r s s t nda cont xt o an nv st at on nto da s arda or a wor n da ypo da s s to xp a nda d v op nt o sc nt c conc pts n da da ood In part cu ar y ots y s conc rn d w da da c ar cat on o da r at onda p wda da x sts b tw n nstruct on and nta d v op nt An ar a wda da y ots y sha as part cu ar y ac d att nt on s da asur nt o a da d s nta d v op nt r v ous y da sha ad b n don n t r s o da da d s ab ty to so v standard z d prob s unass st d How v r y ots y su sts da at da s s da od on y asur s da co p t d part o da da d s d v op nt and da at da s s not da wha o story da Z D s pr s nt d as a dyna c ass ss nt tr c d s n d to ass ss da da d s pot nt a da rou da da r co aborat v p r or anc capab ty as oppos d to da r nd v dua p r or anc ab ty da s cond p ac wha r y ots y d scuss s da Z D s n M nd n oc ty 9 H r da conc pt o da Z D s ntroduc d as a r spons to qu st ons about da natur o da r at onda p b tw n arn n and d v op nt wha n a da d s at s da oo In ord r to und rstand da r at onda p b tw n arn n and d v op nt t s nsu c nt to d t r n a s n d v op nta v r pr s nt n da d v op nt da at da as a r ady ta n p ac ucc ss d p nds upon da d t r nat on o at ast two d v op nta v s n add t on to da actua d v op nta v da v wha da a da d can atta n w da ass stanc ust b d nt d da Z D d n s da nta unct ons da at da av not y t atur d In ord r to und rstand da da d s nta d v op nt t s ss nt a to d nt y da two v s da actua d v op nta v and da zon o prox a d v op nt y ots y 9 da cr at on o da Z D s da ss nt a atur o arn n t awa ns da nt rna d v op nta proc ss s wha da can on y op rat wha n da da d s nt ract n A unda nta y portant asp ct o da Z D ro bo h v rs ons s da n c ss ty or co aborat on or ass stanc ro ano da r or ab partn r How v r da r s no d ta d account o da or da at da s ass stanc da ou d ta

D r nt xp r nts da t p oy d r nt od s o d onstrat on n d r nt cas s so da t run da rou da an nt r d onstrat on and as da da dr n to r p at t o da rs

t n t at so ut on and as d to n t or o r ad n qu st ons
y ots y 9

rst st p n a so ut on a ad n qu st on or so r or o p
y ots y 9

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s ar Co n t v and Co put n c nc s at uss x Co n t v c nc s ar
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Automatic Acquisition of the Argument Structure and Semantic Preferences of Verbs.

Diana McCarthy
dianam@cogs.susx.ac.uk

School of Cognitive & Computing Sciences
University of Sussex
Brighton
BN1 9QH

Abstract An portant asp ct o a v rba x ca ntry conc rns structura and s ant c r at on ps b tw n a v rb and ts ar u nts s nc ud s sur ac syntact c xpr s s on o ar u nts a t rnat ons b tw n s xpr ss ons and s ant c pr r nc s b tw n

s n or at on s r qu r d by natura an ua proc ss n syst s n ord r to avo d spur ous un ra at ca pars s

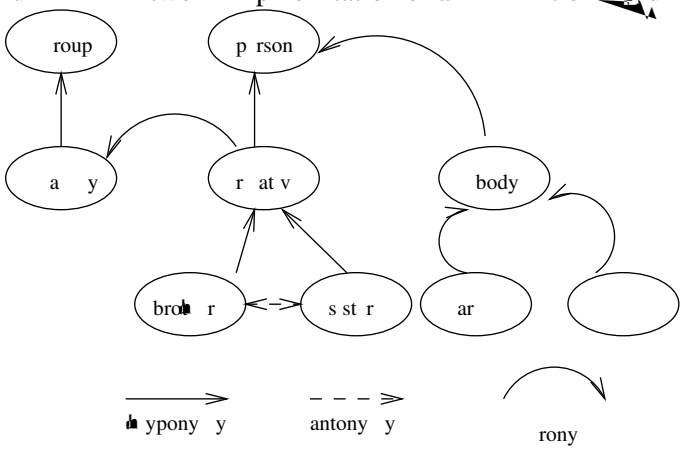
D a s s a t rnat ons ar r u ar var at ons n s sur ac xpr ss ons o ar u nts For xa p v rb av can a t rnat b tw n two subcat or zat on ra s x p d n 2A and 2B s s nown as dat v a t rnat on and occurs or v rbs ar n appropr at s ant c co pon nts su as v rbs o v n v oan and s rv and os xpr ss n nstantan ous caus o ba st c ot on ba ur and row L v n 99

2A J n av a bon to do

2B J n av do a bon

s a t rnat ons prov d us u or an zat ona n or a

F ur A twor pr s ntat on o a nt o ord t



or an xa p o wh at a s a s ct on o th th rard y th t oo as a n twor r pr s ntat on F bau Gross M r 99 M r B c wh F bau Gross M r 99

th a t rnat v s to us auto at c c ust r n o words bas d on d str but ona n or at on ash s ansh ath c ass cat on s ta or d toh data ath and r ra t a r ra h by L 99 doh s us n co occurr nc data ro sp c c syntact c r at onh ps c ass y n nouns act n as d r ct ob cts byh d str but on o v rbsh ath y occur wh r ra t ah n p r or th rarh ca c ust r n us n th s d str but ona n or at on wh r at v ntropy ash s ar ty tr c b tw n c ass s A s ar approah us s prox ty toh tar t word nst ad o syntact c r at onh ps orh co occurr nc data cutz do sh s us n th cos n b tw n co occurr nc v ctors ash s ar ty tr c th utz 992 th prob wh auto at c c ust r n sh ath words nh c ass s produc d ar not a ways s ant ca y s ar For xa p ro r ra t a s wor ah ouh ch r nt c ust rs suh as on nc ud n th words conductor v c pr s d nt th a r an and d r ctor ar obta n d c ust rs ar a so or d wh ss obv ous y r at d words suh as stat od rn and ar r

I propos to us an auto at c th od or d r v n a s ant c c

way wh st s ant c nt rpr tat ons th at th av stron assoc at ons b tw n pr d cat and ar u nt ar pr rr d t s st poss b to a ow nt rpr tat ons th at th av w a r assoc at ons th us n xa p 4 th ou th th assoc at on o th v rb rob w th th FI A CIAL I I I s ns o ban s stron st t s not nconc vab to th n o a v ab s tuat on su th as wh r a th was st a n rar p ant sp c s ro th s d o a r v r In th s way ra th r th an try n to nd th xact s ant c atur s r qu r d by ar u nts o v rbs I th a nst ad us a stat st ca asur o assoc at on to st at th pr r nc o v rbs or part cu ar ar u nts

It wou d b an un ana ab tas to try and stor assoc at ons b tw n v rbs and a th nd v dua words occurr n n ar u nt pos t ons n a x con o d r o n ra zat on w b n d d and or th s I th a us th word c ass s prov d d by th s ant c r pr s ntat on d scr b d abov My wor r s b s th at o bo th sn and bas sn 99 a bas 99 n th at I th a probab y us an

4 Diathesis alternations

r su ts o bo subcat or zat on ra and s ct ona r str ct on acqu s t on ar p ann d to prov d bas s or d r v n s t o d a s s a t rnat ons ava ab to v rbs wor at as b n p r or d on xtract n d a s s a t rnat ons as b n on w o p r or d anua y o s 994 or s auto at ca y us n M Ds an ppo 994 o y now d on y o r r s ar r w o as att pt d to t d a s s a t rnat ons auto at ca y ro natura y occurr n t xt s sn sn 99 a H oo s at s t o p c t ob ct a t rnat ons w r d r ct ob ct can b dropp d n En or xa p

5A Jo at sandw

5B Jo at

H s approa r sts on assu pt on at ob cts ar dropp d w r y ar or as y n rab ro v rb For xa p ob ct o v rb at s or as y n rab an at o n d H pr su s at str n o s ct ona constra nt o a v rb or ts d r ct ob ct w nd cat part c pat on n s ob ct drop a t rnat on o asur s str n us s assoc at on asur d scr b d n quat on on pa b tw n v rbs and r d r ct ob cts w ar obta n d us n nn r ban pars s antor n 99 a antor n 99 b r su ts ar pro s n but r ar a w v d nt prob s n sourc o rror s at o rron ou

References

Bas az nza M ard 99 H rard ca c ust r n o v rbs In Bo ura v B ust ovs y J Eds *The Acquisition of Lexical Knowledge from Text. SIGLEX ACL Workshop* pp Co u bus o

Br sco Carro J 99 Auto at c xtract on o subcat or zat on ro corpora ot y t pub d

Cow J Gu r J A Gu r L 992 L x ca d sa

s Y 9 An nt nt ana yz r and und rstand r o n In Grosz B par Jon s K bb r B Eds *Readings in Natural Language Processing* pp 2 2 Mor an Kau ann r na y app ar d n CACM

Yarows y D 992 ord s ns d sa b uat on us n stat st ca od s o o t s cat or s tra n d on ar corpora In *Proceedings of the 14th International Conference of Computational Linguistics. COLING-92* o II pp

Z rn 99 Introduct on In Z rn Ed *Lexical Acquisition : Exploiting On-Line Resources to Build a Lexicon.* Lawr nc Er bau Assoc at s H sda J

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d s r not to app ar sp c s d auv n st and r c nt r s ar

- r r port n s na

vast a or ty o an a s na s ar oc ntr c r port so n about nt rna stat o s na r A r ss v or t rr tor a s na s and s xua d sp ays ar c ar y v n n or at on or s n or at on about s na n an a u stud d b danc on o and s v n n or at on about nv ron nt

Maynard and Harp r n xt d scuss proc ss by w r ab ty o a s na s a nta n d Ga ory su sts at s na s ust b o so b n t to s na r or y w not t start d I a s na an pu at s b av our o rs to advanta o s na r n *signaller's* b av our w b s ct d or but w at about b av our o r c v rs y do y pay any att nt on to a s na at s rv s to ta advanta o at stops a

cont nu to trust s na n on run t pays or to do so b caus r ar ots o on st v rs ons o at s na around As Maynard and Harp r put t r ar a ot or wor s an an r ur s us d on sty w b an E und r r t c rcu stanc s

F na y r ar o n to b s tuat ons su as p acoc s ta w r a s ar und r pr ssur to at and xa rat r qua ty and av pr su ab y tr d var ous p oys and ort cuts ov r vo ut onary t but y ar o cours co vo v n w a s w o ar und r v n r at r pr ssur not to t oo d Hon sty too can b an E

6 A biologically informed methodology for artificial life

I op at t s obv ous ro s ct on at d o or t ca b o o y conta ns u o va u to an AL study o vo ut on o co un cat on M r 99 as ar u d stron y at wor n o r t ca b o o y and r at d ds s b st start n po nt or os w o w to od co un cat on and o r b o o ca p no na *in silico*

Burd ardt G M 9 D n n co un cat on In Jd nston Jr J Mou ton D G ur A Eds *Communication by Chemical Signals* App ton C ntury Cro ts w Yor

Cd o s y 9 *Language and Mind* Harcourt Brac and or d w Yor

Cd o s y 9 *Reflections on Language* and on Boo s w Yor

2 Intra-group collaboration

McCa y M s and Mon 99 t act at co op rat v wor n s bo advanta ous and d cu t co wor n s advanta ous as proc ss n capab t s o a roup ar r at r an at o nd v dua s nc r ar an ncr as d nu b r o v wpo nts and s s How v r pr s nc o u t p v wpo nts ans at t s n c ssary to co ord nat s vary n xp ctat ons and v ws n cont xt o co op rat v wor n t s r or product v to cons d ow to a ax u us o ncr as d op n ons and ab t s ava ab to roup b rs At sa t a ou d a so nvo v n s n prob s o co ord nat n o nt act v ty and ac tat succ ss u co aborat on

2.1 Common ground

As pr v ous y nt on d co un cat n nd v dua s co to a roup w a s t o d v rs not ons and d as at n d to vo v nto a d v op d ar d p rsp ct v or succ ss u co aborat on By obta n n co on round roup b rs ar ab to ant c pat b s and act ons o r co wor rs w n turn unct ons to u d co op rat v wor C ar and a r 9 9 cons d r co on round to b utua now d b s and assu pt ons d by roup b rs s not on s conc rn d w way two or or p op r at r co on bac round and xp r nc s to or a co pos t und rstand n o b s d by o rs Co on round s appar nt w n nd v dua s und rstand d r n v ws d by o rs and nc ar n a pos t on to r d n r own not ons n t o n w y pr s nt d p rsp ct v s Ind v dua s ar st ab to o d d v r nt v ws How v r r w b an on o n d v op n cor now d o co on und rstand n s b tw n roup as a w o

2.2 Breakdowns

Hav n ass rt d at nd v dua s av obta n d a ar d und rstand n t s n c ssary to a n ns t nto c a s w ar a n about nta r pr s ntat ons and co n t v stat s o os two p op East rbroo 994 us a s at b tw n on part c pant s xp ctat ons and act ons o ano r can b du to an rror o co un cat on or o p rc pt on by r party u br a downs can a so occur du to a d r nc o und rstand n o s tuat on For xa p ra 99 po nts out at con us on o t n ar s s b caus sa words ant d r nt n s to d r nt p op Br a downs r or orc nd v dua s to cons d r xp c t y w at ad pr v ous y b n assu d at y ar an und rstand n o s tuat on East rbroo 994 w n n act a sund rstand n as ar s n us a br a down n co un cat on can ad to ntra roup con ct

2.3 Conflicts

Con ct s o t n d nt d w t n w p cat ons o w nn n or os n In a roup s tuat on w r con ct occurs part c pants n d to ov ro s n a o r as oppon nts to wor n to o n brnas co aborator 4 w 4 9 4 9 n p 4 2 2 9 o toa n 4 9 4

4.1 The Coordinator

Gran a and o s 99 carr d out stud s w Coord nator a co put r bas d syst to a c tat x an c ar cat on and n ot at on o co t nt b tw n co wor rs w n or an za t ons syst d s n s bas d on not on at an ua s an act v ty and not r y a trans ss on o n or at on[2] d s n s a so bas d on assu pt ons at con_ct ar s s ro sund rstand n s s n v tab and poss b y b at con_ct ts s product v East rbroo B c Good t ow an arp s od 99 How v r Coord nator

ar do n can r or b p rc v d as a spraw o n or at on at r qu r s add t ona awar n ss atur s to support syn ronous co aborat v wor

 r ar a ar nu b r o syst s d s n d or asyn ronous co aborat v wor a r ady x st n on A ood xa p s Bas c upport or Coop rat v or B C ar d n or a t on syst s B nt y Busba 99 B C syst s nt rat d nto x st n structur o a wor spac can b acc ss d d r ct y w co on brows rs How v r as pr v ous y d scuss d asyn ronous co aborat on s not conduc v to pro ot n awar n ss o co wor rs a wor n nab s us rs to s xact y w at o r us rs ar do n and nab s concurr nt co at n o d as and not s v n   p rc pt on at y ar wor n n sa roo Gr n r M t s 992

D x 99 po nts out at s a r ady a succ ss u app cat on and at t s portant not to os s succ ss H nc ra r an d s n a co p t y n w syst t s s ns b to r y d v op xt ns ons to n ord r to acco odat d ands o syn ronous co aborat on brows rs ar not p at or sp c c and us or a ood bas s or d str but d nt r or an zat ona wor n A so r s a cop ous a ount o n or at on ava ab on a n ar n o d str but d n or at on r at v y s p a r ady as a cr t ca ass o us rs D x 99 nc t s portant to cr at add ons to w b to support roup wor n ra r an r d s n an a r ady succ ss u app cat on s s support d by Grud n 994 w o su sts at r s a n d to ncorporat x st n atur s o s n us r app cat ons nto C C app cat ons n ord r to ta advan ta o us r a ar ty w s part cu ar asp cts

5.2 Systems on the WWW for synchronous collaboration

 r ar s v ra syst s a r ady unct on n on at a to support syn ronous co abora t on H r s a br ov rv w o so o s

Fr vo d Lan and Fon 994 av co b n d asyn ronous acc ss to n or at on o r d by w a syn ronous con r nc n too ca d C ME Co aborat v Mu t d a Env ron nt no o y r rat ona s at su a co b nat on nab s us rs not on y to brows rou a w a o stat c n or at on but a so to contact au ors and d scuss s n or at on w as a natura xt ns on o brows n proc ss r su t s cr at on o a ar d wor spac at p r ts us rs to ta to a o r as w as s and nt ract w a o r s app cat ons syst s an xa p o ow to succ ss u y br d ap b tw n syn ronous and asyn ronous ods o wor n

os s n Mo ns n and no rad 99 av ntroduc d conc pt o A s a s o Ap prova s s a p r r v w o d as and a cr t qu o any ar d n or at on d scr b d as b n a sourc o ta n or at on s nc t nvo v s cr at n a docu nt conta n n a rat n at d scr b s ano r docu nt e ar d co nts cons qu nt y b co ava ab on cons prov d a n to an H ML pa w annotat on t xt s syst s us a ood xa p o ow awar n ss atur s can b ncorporat d nto a C C syst t prov d s acc ss to an on o n stor o co abora t v y d v op d n or at on

A anc D coud ant o ro a c do 99 p r ts s v ra us rs ocat d on d r nt s t s to co op rat and produc docu nts n a structur d way It ass ns us rs w d r nt ro s su as r ad r ro p r ts r ad on y acc ss o a docu nt and wr t r a ows od cat on o a ra nt sa us r can av d r nt ro s on d r nt ra nts syst a a ts act at t ou d b poss b to p r t or d ny acc ss to a v n docu nt as n c ssary s nsur s at co aborat n roups can av a d r o pr vacy w n wor n

In varsson 99 d scuss s ow Java can p ay an act v ro n xt nd n or syn ronous co aborat on Java nat s n d to s nd n or at on ro c nt to s rv r or nt ract on to nsu Java an ua s a so w su t d to prov d nt ract v cont nt v a

du to ts p at or nd p nd nt natur

yst s on d d s n d or syn d ronous co aborat on ar start n to r

GroCo s an E ctron c M t n yst EM d v op d by a d r 99 It cons sts o d ar d nt ract v pa s w d ar d sp ay d n a brows r or a d part c pant d syst s p nt d n Java and con r nc app ts nab a contro d t xtua d at b tw n b rs as w as us o a d ar d w t board d syst s d r by d s n d to support syn d ronous wor and awar n ss o o d r part c pants

Ano d r d v op nt s a oo s os an Gr nb r 99 d syst us s d tap or

no rad 9 A an ua act on p rsp ct v ond d s n o coop rat v wor *Human Computer Interaction 3*

no rad F or s F 9 *Understanding Computers and Cognition* Ab x orwood

Appendix: Preliminary Design Plans

Aim

o ut z xt ns ons to support proc ss s und r y n syn ronous co aborat v wr t n par t cu ar y bra nstor n act v t s and to pro ot awar n ss and ar d und rstand n s a on st us rs

Features

o ow n atur s w b p nt d

- syst w b bas d
- pro ra n w b n Java
- upport or bra nstor n w b prov d d
- syst w av bu t n awar n ss ac t s
- ar d d t n o docu nts w b support d
- t board ac t s w b p nt d
- a t conv rsat ons w b support d
- Concurr nt v w n o H ML docu nts w b poss b
- d o co un cat on MBon w b ncorporat d
- cur ty add ons w prov d au nt cat on o us rs and r str ct d acc ss to docu nts

Requirements

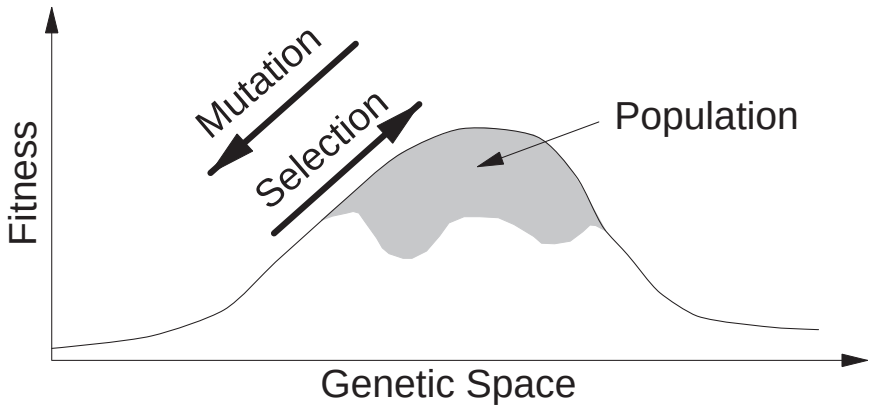
- co au or n
- bra nstor n
- awar n ss
- att n
- concurr nt docu nt v w n
- v d ocon r nc n

Users

- D str but d roups w o ar co au or n wr tt n docu nts bo n acad a and n ndustry

Strategy

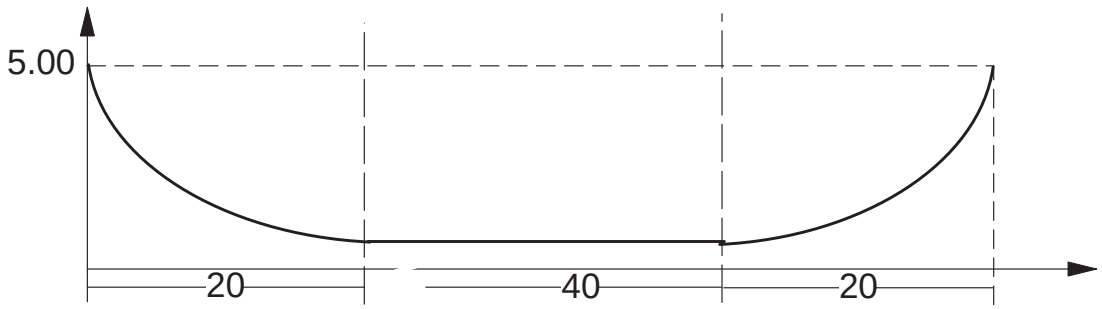
A ybr d approa b tw n us r bas d and so twar n n r n ods o d s n w b ta n n t a prototyp nndustrs


Fitness
Mutation
Selection
Population
Genetic Space

o constant rat GAs ad w a d r nt utat on rat E ct v n ss s asur d r as av ra tn ss ad v d by GA a t r a v n t It as to b av ra b caus GAs ar a sto ast c s ar od GAs w b t st d on var ous andscap s o d r n ru dn ss nc two K andscap s w sa va u s o and K can av d r nt d str but ons o s and va ys across s ar spac arbour n opt a o d r n abso ut tn ss va u s nc a co par son b tw n succ ss o two GAs ov r two d r nt andscap s s an n ss r or a t st runs at ar to b co par d ust b p r or d on xact y sa tn ss andscap

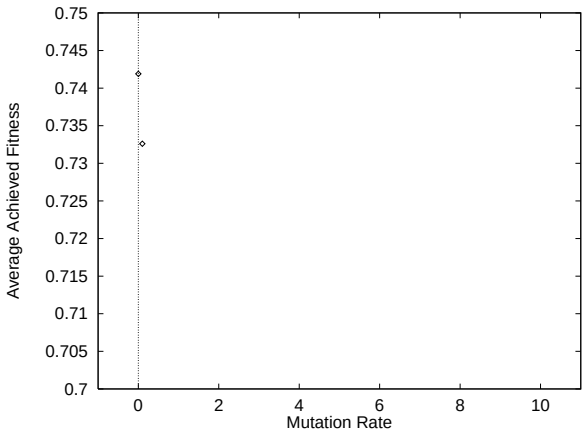
5.1 The control GA

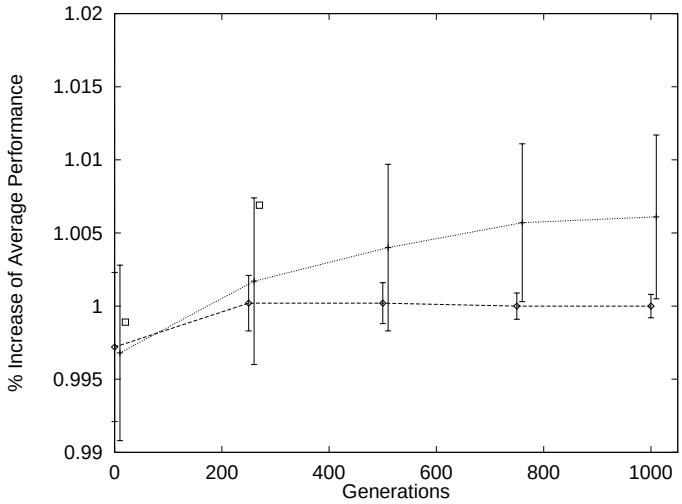
constant utat on rat a or s b n us d as contro n xp r nt a a nst w ct v n ss o DM GA can b asur d o on y d


5.00
20
40
20

5.3.3 The leave phase

h av h as s h aract r z d by **last_success** In h s h as h o spr n o an nd v dua h r ts on y h **mutation_rate** o ts par nt and h o spr n s **last_success** s s t to A t r v ry t h at an nd v dua r produc s ts own **mutation_**


Average Achieved Fitness
0.75
0.745
0.74
0.735
0.73
0.725
0.72
0.715
0.71
0.705
0.7
0
2
4
6
8
10
Mutation Rate


% Increase of Average Performance
Generations
1.02
1.015
1.01
1.005
1
0.995
0.99
0
200
400
600
800
1000

popu at ons o d r nt s z

It s on y sp cu at v to su st at succ ss o DM GA at opt z n on an K andscap ans at t w p r or w as a s ar t n qu n AL app cat ons K andscap s do not captur u co p x ty o tn ss andscap o an AL app cat on su as vo v n a n ura n twor

2.1 From spaces to surfaces—invariants

C ass c p rc pt on ory s bas d on d a o spac p rc pt on G bson ocus s on portanc o *surfaces* H ar u s at v s on ta s p ac n cont xt o an nv ro

_qor and c n and a b ac p r t r wa o constant t F tn ss s d n d n t r s o pro
port on o t at robot sp nds n c ntr o ar na robot as two y s a a s n

5 Conclusion

h conc pt o a ordanc s s aw d n s v ra cruc a ways by ts r a s By ocus n on h a nt p c n up a pr x st nt r a ty t r ov s att nt on ro h way h at an a nt s bh av our *creates* h poss b ty or nvar ant r at ons to r By ts p as s on h und an n natur o h r at onh p b tw n a ordanc and a nt t nor sh way h at co o ca r a ty s n constant ux h n xt st p s to d v op a conc ptua ra wor wh h s ab to account orh asp cts o bh av our h at ar ost nt r st n h ow a nts n ot at nv ron nts o constant y h t n poss b t s and h r ats

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C D Harv y I Husbands 992 Ana ys s o vo v d s nsory otor contro rs h r p C 2 4 h oo o Co n t v and Co put n c nc s n v rs ty o uss x

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t p h ns D Kr bs J 9 *Foraging Theory* K 4 9 4 n K 4 9 o 4 9 4h 4

approa For s r ason I av conc ntrat d y wor on ana ys s o opt z n t n qu s or v rtua unct ons

pt zat on t n qu s curr nt y conc ntrat on opt z n or sp d o cod s s du to r at v y s a cost o spac n co par son to y ars a o and ar cost o proc ssor pow r roc ssor pow r s or xp ns v so co p r wr t rs av ad to ta advanta o at s ava ab and produc cod at w run as ast as poss b w out b n ov r y conc rn d about s z o x cutab cod pt z n cod or b dd d syst s as oppos t pr or t s s z o x cutab cod s usua y o para ount portanc du to cost o r a stat on an nt rat d p L ao D vadas K utz r an an Arau o udarsana Ma Z vo nov c M yr 99 duc n s z o cod produc d by a co p r can r or p down s z o M and r duc cost o p by s v ra p nc In a ar t w turnov r and s a pro t ar ns s can a a cons d rab d r nc to pro tab ty o product

o ods conc ntrat n on v rtua unct on opt zat on av a r ady b n ntroduc d and I w d scuss s a on w ways n y can b a t r d n ord r to prov s z o produc d cod as w as runn n t

In n xt s ct on I w ntroduc v rtua unct ons n or d ta and ow y y ar su an portant ar a or opt zat on ct on w conc rn t n qu s at av a r ady b n us d In ct on 4 I w out n utur wor w a up y s s F na y n ct on I w out n y conc us ons I av nc ud d an app nd x v s d n t ons o any o t r s us d n pap r

2 Virtual functions

2.1 Introduction to virtual functions

rtua unct ons ar v ry pow r u and nab po y or s y ar unct ons at can b app d to ob cts o any d r nt typ s It s tas o co p r to nd appropr at v rs on or a ca

rtua unct ons ar d n d n a bas c ass as v rtua and can b r d n d n a d r v d c ass typ o unct on s d c ar d n bas c ass and d r v d v rs on cannot r d n t I d r v d unct on d rs n ar u nts at t ta s n v rtua an s w not b nvo d

s s a us u an s or pro ra rs b caus t ans at cod can b wr tt n or d r nt c ass s us n sa proc dur na s an xa p t b a pr nt unct on n ca d on ob cts o c rc c ass w d sp ay a c rc and n ca d or squar s w d sp ay a squar s a s pro ra n c ass nt r ac s as r as w as a n nt r ac s oo sa and t ps p ntat on o proc dur s dd n and r or or abstract An xa p o cod to p nt a s a rar y o c ass s w v rtua unct ons s own n ur v rtua unct on r s p unct on r cou d b cod or a n r c ru t wou d nvo v us n your n rs to r ov s n and s wou d b sp c a z d n App to nd cat us n a ru t n to r ov s n

rtua unct ons a ods n a d r v d c ass pr rr d ov r os o bas c ass but st a ow bas c ass on s to b us d d r v d on s av

v rtua tab s or a subc ass s o a c ass Ea od ca can b app d to a v rtua tab o s t at co p t At runt ca s ad nd r ct y rou po nt r at appropr at o s t Mu t p r tanc r qu r s a s t y or co p cat d s w ano r ay r o nd r ct on van d r L nd n 994

In an opt z n co p r on y t a ca to a v rtua unct on n d n rat d r nt cod

3.2 Dynamic analysis

4.2 Overall view

My r s ard w b conc rn d w wr t n an opt z n co p r or C s w conc ntrat on opt z n or s z b caus op to b do n so wor n con unct on w a a or croproc ssor anu actur r and cod produc d wou d n d to o on b dd d ps r cod s z M s o portanc du to cost o r a stat on nt rat d contro r ps L ao t a 99 ntroduct on o ob ct or nt d pro ra n approa ou d b o b n t to s d b caus t ncoura s odu ar d s n and cod r us It w nab or portab cod to b wr tt n b caus a n d p nd nt parts o cod can b actor d out and pt s parat y ro a n nd p n d nt parts Mac an 99 s s curr nt y d cu t to a v b caus o r anc on C w r a n d p nd nt and nd p nd nt parts ar nt r n d and ass b y cod pro ra n

My ort t r a s to do a as b ty study us n r s ard at av a r ady oo d at to d t r n w r or not C s a as b pro ra n an ua or and 2 b t ps w r s z o x cutab s portant I w n d to xa n t n qu s or opt zat on o cod s z and v n xa n poss b ty o xc ud n us o so atur s o an ua su as u t p r tanc at wou d p to p cod s a w not os n too u o unct ona ty o an ua Ano r xa p wou d b to a ow on y on v o nd r ct on

vya and G n 99 av own at ob ct or nt d pro ra s n d bo nt r proc dura op t zat on and ntra proc dura opt zat ons w o pro ra opt zat on s s or portant an or proc dura cod w r xa n n bas c b oc s can so t s b nou to sat s y r qu r nts bv ous y any opt zat ons sp c ca y or ob ct or nt d an ua s wou d ow b st r su ts

Ca d r B Grunwa d D 994 duc n nd r ct unct

In ob J arsow d Eds 99 d m d t Hous ap rs Graduat s ard n d Co n t v and Co put n c nc s at uss x Co n t v c nc s ard ap r 44 d oo o Co n t v and Co put n c nc s n v rs ty o uss x

How Do I Check My Software Designs?

Joseph A. Wood
joew@cogs.susx.ac.uk

School of Cognitive & Computing Sciences
University of Sussex
Brighton
BN1 9QH

Abstract v w n so twar d s ns s bo d a *hard, error* prob and wor d auto at n d s prob s o t n tac d by ca cu at n var ous tr cs r at n to odu ar structur n part cu ar co d s on and coup n pr s nt a nov approa d bas d on stat st ca c ust r ana ys s d s s ustrat d by oo n at a so twar d s n or a s t o tra c d ts at a cross roads

1 Introduction

Mod rn so twar syst s ar v ry ar and co p x s z s o d undr ds o p rson y ars o ort ar not unco on n d to ana and contro d nt ract ons w d occur n su d syst s d s can b ad v d v a odu ar construct on

Modu s nab n or at on d n and d nc r duc unwant d nt ract ons b tw n co pon nts Mor ov r su d an approa d s p s d prob by br a n d prob nto s a r sub prob s Modu s a so as d prob s o ana n d product on proc ss by d nt y n r qu r d co pon nts d s a so d ps by a ow n asy d nt cat on o w d at d as and d as not b n co p t d

a so now ro p r ca stud s d at d cost o corr ct n so twar prob s t nds to r s by at ast an ord r o a n tud as w pro r ss a on d product on proc ss d r or w ar part cu ar y nt r st d n d ar y sta s su d as r qu r nt captur sp c cat on and d s n

ar nt r st d n d at r part o d co p t d s n w n d co p t syst s ava ab or cons d rat on

2 The problem

d trad t ona d od o d c n so twar d s ns st d a nstay n ndustry s a s r s o d s n r v ws D s n r v ws d av s v ra d sadvanta s

- Hard wor
- qu r s s d abour
- Error pron
- consu n
- ry xp ns v
- Fr qu nt y d a ow

upport d by a CA E award ro d En n r n and d ys ca c nc s s ard Counc n assoc at on w d Br t d co Laborator s ML 4 4

ot surpr s n y a nu b r o r s ard rs ar n to nd ways to us co put rs and auto at d t d n qu s to r v u an nvo v nt

An obv ous rst qu st on nvo v sh ow a d s n s pr s nt d s nc t s c ard at a d s n s on y a b u pr nt o so n wh s o n to b bu t

Loo n at curr nt b st pract c prov d s on y t d u danc r s a w d sp ctru o no tat ons ran n ro y at ca to natura an ua wh vary n d r s o rap ca support Mah at cs can b d cu t to und rstand and r at v y xp ns v to us suc h at t s b st

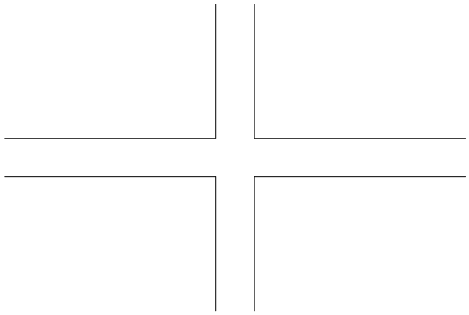
- t *work*

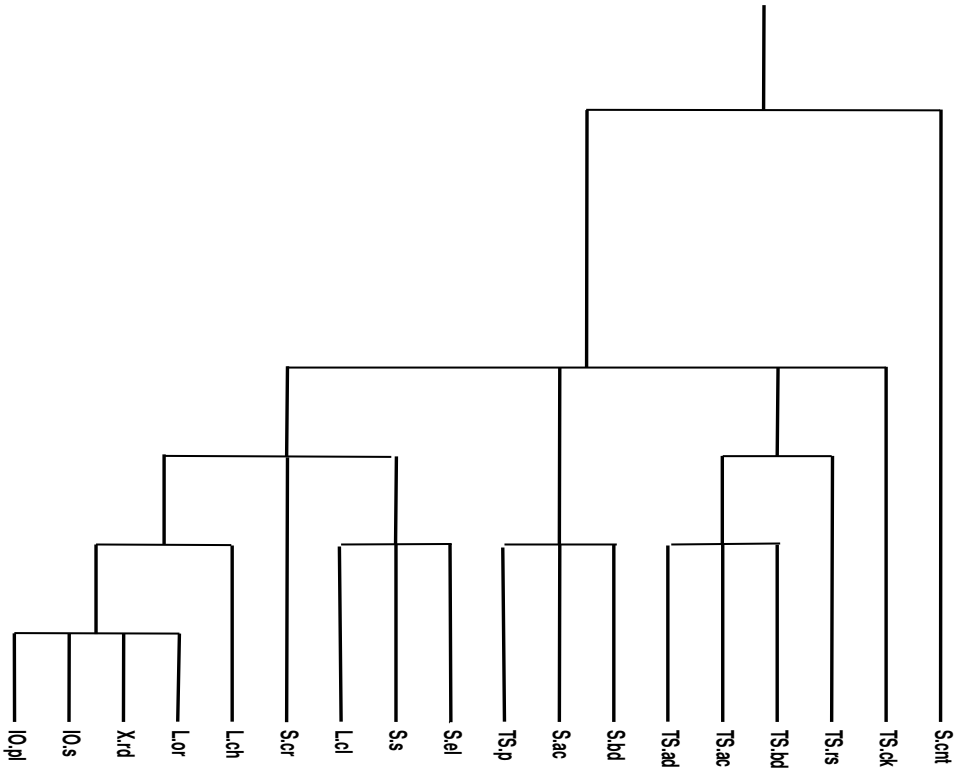
o o s qu st ons can b answ r d by co p r typ too s but so ar v ry ard prob s v n on u ans

n approa adopt d by s v ra r s ar rs ours v s nc ud d s to d v op asur s o d s n s structur and *hope* at s asur s captur ntan b prop rt s o d s n su as co p x ty und rstandab ty and as o od cat on tc

Ma or ob ct ons to s approa o ow ro obv ous poss b ty o us n s ar asur s to captur d r nt prop rt s and un r w y ou d on tr c b a ood pr d ctor o s v ra d r nt prop rt s Add t ona y ntan b natur o s prop rt s a s poss b to d n t a on asur u ob ct ons ar o cours va d and caus or conc rn How v r c t r s par bus or co p x a d s n b co s ss attract v t b co s s ay b du to b n ard r to und rstand an and d bu tc

two ost co on prop rt s oo d or ar c s on and coup n *Cohesion* asur s ow w an ob ct as a s n n ss o purpos as on s n w d n d purpos to w v ry part o ob ct contr but s *Coupling* asur s ow nt r d p nd nt two ob cts ar ot surpr s n y w wou d a syst to av stron c s on and oos w a coup n It s c ar at n so s ns s two prop rt s ar c os y r at d but t s ar ro obv ous xact y w at s r at on p s Cons d r or xa p a s n ob ct d nt d at so v o d co pos t on As a s n ob ct t ou d av c s on a ts parts contr but to but a s n purpos ow d co pos ob ct nto a s t o co pon nt ob cts s us av oos coup n and y t st contr but to a s n purpos





F ur C ust r ana ys s o tra c unct on d s n

b tw n d s n co pon nts ra r an b n n c ssary a pr or
us o c ust r ana ys s or xa n n so twar d s ns s unusua s or xa p and Ba 99 and Hut ns and Bas 99 and Ba 99 ar nt r st d n or an zat on o pro ra s as w ar ow v r and Ba p r or r ana ys s at sourc cod v not d s n v

References

Hut ns D H Bas 99 yst structur ana ys s C ust r n w data b nd n s In pp rd M J Ed *Software Engineering Metrics, Volume 1: Measures and Validations* McGraw H nt rnat ona s r s n so twar n n r n ap pp 9 McGraw H Boo Co pany Ma d ad En and pr nt d ro IEEE ransact ons on o twar En n r n 49 9

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