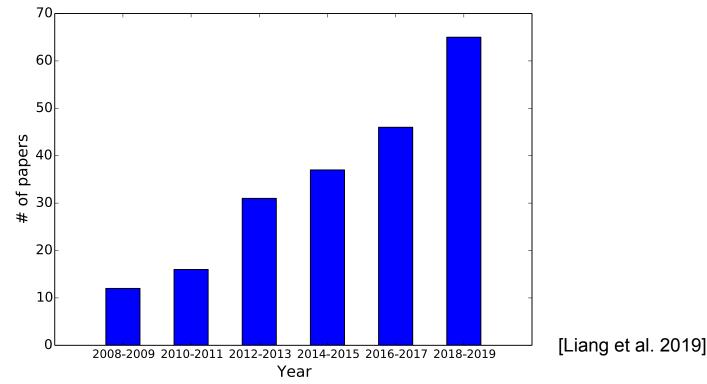
// setting one. skyflatnum = R. FlatNumForName I.SKYFLATNAME 1.	Void G_SochretExitLevel (void)		t skil_t skil, int episode,	ISPR PUNG 2.4. MULLIS PUNCH5.0.0, //	S PUNCHS CLORING IN CONTRACT OF	P ENEMY THINKING
// DOCM determines the sky tenture to be used	340 0 // IF NO WOLF3D LEVELS, NO SECRET EXIT 0.00 0 if (fgamemode == commercial)					"/ with targetplayer - 1, decided = 0
// depending on the current episode, and the game version. If [fournamede == commercial]	3.4.5. && two ObeokNumForName("map31"1<00) 5.1.0.7. astrotexts = false;				S PISTOLUP switch (generaction)	W bold in unit over are applying diminute of all players. W but some can be made preswore
I (gamenode pack trk) - parver to MULLIS DENZ I (gamenode pack trk) - parver to MULLIS DREM	10,0), ebsel S_BONRE 2,0.01, // Saecinetexit = trues	length = M_ReadFile (savename, Saavebuffer); save p = savebuffer + SAVESIRINGSIZE;		ISPR_PISC.0.4.(NULL).S_PISTOL2.0.01, // S_PISTOL ISPR_PISC.1.6.(A_FirePintel).S_PISTOL3.0.01// S_PI	STOL 2 case ga loadlevel:	
	gameaction = ga_completed;		paused = false; S. ResumeSound 0:	ISPR PISC 2.4. MULLIS, PST0L4.0.01, // S. PIST0L ISPR PISC 1.5.(A. ReFine), S. PIST0L.0.01, //	13 G.DoLoadLevel (); S.PISTOL4 break;	
skytexture = R_TextureNumFarName ("SKO'3"); if (gamemap < 12)				ISFR_PISE32769,7;(A_Light1),S_LICHTDONE.0,01, (SFR_SHTC.0,1.1A_WeaperReady),S_SOUN,0.01, //	// S_PISTOLFLASHcase galnewgime:	W Called By P. N. in: Alex.
skytexture = R_TextureNumForName ("SKY1"); else		sprind (schock, "varsion %", VERSION); if (stromp (save, p. voheck))			S STUNDOWN break;	
if (gammap < 21)	and the second s	fficien	if (skill > sk_nightmane) skill = sk_night	ISPR_SHTG.0ULLI.S_SOUNDP.0.0), // S_SOUND	1 G_DvdGame ();	
PERSONAL PROPERTY OFFICE	Contractory A			<pre>ISPH_SHIC.0. FindShotgun).5_SOUN3.0.00, // ISPH_SHIC.1_5_INULLES_SOUN4.0.01, // S_SOUN4</pre>	s sound the same as a	
kvelstarttic - n / for CSU table 0.001	VISUL A MARKAT ARE		s quite me with SPED and c ner			P_Recursiveliging
if fwipegamen (== ELI, provident L1,6,04	0.01 S MCDP rishLevel (i); // take by cards an	Here was as seed of	// ghe not work)	ISPY 10,2 UL SQU 0.0 V.9 UN		
webedan rere				17 ATEO IL SEU IC VIS SOUN		
gamestate = LEVEL: Lorent statut, 197770, binnerst, B. S	Relative and the second s	G_InicNew (gameskill, gamespisode, gamensap),	if (gamemode retail)		I, // ScoulingLangert G. Dowomphatowar	
for ti=0 ; i=MAXPLAYERS ; i++) ISPRESOUL 02770.6.INULLI.S.S	SCULS.000. switch(gimenia)			ISPRESHT2.0.1.(A_WeaponReady).S_bd).//	S DSGUN Case ga victory: S DSGUN Fisher StartFinale ()	
if (playeringameli) &6 playeralal.playerstate == PST_DEAD) playerstill playerstate = PST_REBORN;				ISPH_SHT2.0.1.(A_Lower1.S_DSGLNDOWN,0.00, // ISPR_SHT2.0.1.(A_Reset_S_DSGLNUP.0.0, //	S DSCUNUP break;	
mennet (playershi frags, 0, sizeof(playershi frags));	NV3.0.0. gamelaction 2 ga_victory; NV4.0.0. neture: PIVV3			(SPR_SHT2.0,3,(NuLLI,S_DSGUN2.0,0), // S_DSBUR (SPR_SHT2.0,7,(A_FineShotgun2),S_DSGUN3.0,0),	V1 case ga_worlddone: // S_DSGUN2 G_DoWorldDone 0;	
ISPR_PNV32771.6.INULLI.5.P	NULLOU Net GIOTUA		if (episode > 1) ecisode	(SFF)_SHT2,1,7,(NULL1,5_DSGUN4,0,0)	N3 break; S 10144 case ga_sovershot:	
displayplayer epila	Biners	ogran		(SPR_SHT2.3.7.(A_OpenShote1.5_DN6.0,0), SHT2.4.7.1.1.5_D	// S_DSOUNS M_SomenShot 0;	
gameetion - n g						
Z_CheckHeap	W2019 21 2000		episode = 3;	ISPR 12 IA_Ok hot 0.S_D N10	i /s. uno 🖪 🍟 👘	
// clear and b ing st. Micro 22 all of the st.	No commercia			DS DS DS S DS		
joyamove = joyamove = 0:	R R.S. O.G. W victory start			AHI2,0, 5,0,000,000,000,000,000,000,000,000,		
sendpause = sendsave = poused = fabe, memeet (mousebuttons, 0, sizeofimiosiduttons));	PMAP2.0 0 gameection and victory; PMAP3.0 0 option S PMAP	Z. Free Isaavelure	if (map < 1) map = 1;	ISPR_SHT2.32777,4.(A_Light2).S_LIGHTDONE.0.0), (SPR_CHGG.0.1.(A_WeaporfReact/).S_CHAIN.0.0), // 1	// S_DSCU/(additude	
memset (mousebuttons, 0, soverflipplastations); memset (joybuttons, 0, soverflipplastions));				ISPR_CHG6.0.1.(A_Lower).S_CHAINDOWN.0.0), /// ISPR_CHG6.0.1.(A_Roball.S_CHAINLP.0.0), ///	S CHAINDOWN S CHAINLP for 6=0 ; idMAXPLAYERS ; i++1	
	MANUE (Igamemap - 99/95 MANUEL SS (generice - commercial))		SS (gamemode != commercial)) map = 9:	(SPR_CHG6.0.4./A_FireCGan1.S_CH4/IN2.0.0), // (SPR_CHG6.1.4./A_FireCGan1.S_CH4/IN3.0.0), //	S CHAIN1 E S CHAIN2 E totwertrgemetill	
player_t* p: ISPA_CUP0_1_NULLIS_NULLI	0. // S// isoic isocret level 0.01. // Stor (i=0 ; i=:MAXPLAYERS ; i++1		M_ClearRandom 0;			
int IntegrilMAXPLAYERBIG FOCK OF INCLUSION			if (skill uk_nightmane II respannparm) respannmonstars - true;	ISPR_MISG,0,1.(A_WeaperReady).S_MISSILE.0.00, ISPR_MISG.0,1.(A_Lower).S_MISSILEDOWN.0.01, // 1	S_MISSLEDOWN	
			else respawnmonsters = false;		S_MISSILE1 G_ReadDemoTocmd (cmd);	
	0.00 Winite.didsecret = playersiconscleplayerI.didsecret;		if (lastparm II (skill sk_nightmare && gameskill ! sk_nig		S_MISSILE3 G_WhiteDemoTicand famili;	
memopy (frags.playerslplayer1.frags.sizgef(fragsi); killcount = playerslplayer1.killcount;	wminfo.oprid = gameepisode -1; wminfo.tast = gamemap -1;		for 6=5_SARG_RUN1 ; i<=5_SARG_PMIN2 ; i++)	(SPR_MISE.02760.0.(A_Light1).S_MISSILEFLASH2.0 (SPR_MISE.02769.4.0MULLI S_MISSILEFLASH2.0.0)	// S_MISSEEELASH# check for turbo cheets	
<pre>itemcount = players[player].temcount;_proc = nucleos = Nucleo</pre>			statestil.tics >>= 1;	(SPR_MISE.32770.4,1A_Light21,S_MISSILEFLASH4.0 (SPR_MISE.32771.4,1A_Light21,S_LIGHTDONE.0.0).	.01. // S_MISSILEFLASHI Cond->forwardmove > TUREOTHRESHOLD	
	// wminfo.next is D biased, unlike gamemap if (gamemode commercial)		mobjinfoIMT_HEADSHOT1.speed = 20*FRACUNIT;	(SPR_SWW0,2,4,1A_WeepenBeedy),S_SAW0,0,01.// (SPR_SWW0,3,4,1A_WeepenBeedy),S_SAW,0,01, //		
			mobjinfolMT_TROOPSHOTLspeed = 20*FFACUNIT; 1	(SPR_SAWG.2.1.(A_Lower1,S_SAWDOWN.0.0), //	S_SAWDOWN extern chan *player_names[4];	
memopy (playersiplayer) frags, frags, suppliplayersiplayer) trags) playersiplayer1bilcount = kilcount;			else if tskill !- sk_nightmare && gameskil sk_nightmare {	SPH_SAWG,2,1,(A_Hasse),S_SAWUP,0,01, // S_SAWU (SPH_SAWG,0,4,(A_Saw),S_SAW2,0,01, // S_SAW1	playersi coneolopiayert message = turbomessa	per,
	NULLLO.01 case 15: wminlo.next = 30; break; .0.01 // S_S case 31; wminlo.next = 31; break;		for (i=S_SARG_RUN1 ; i<=S_SARG_PAIN2 ; i++) stateslil.tics <<= 1;	(SPR_SAWG,1,4,(A_Saw),S_SAW3.0,01. // S_SAW2 (SPR_SAWG,1,0,(A_ReFine),S_SAW,0,01. // S_SAW3		
players/player/secret.count = secret/sound_st_0_rd_built_1_3_bt_rt [SH1_GG1]_4_15 [NULL] S_F114			mobjinfoIMT_BRUISERSH0TLspeed = 15*FRACUNIT; mobjinfoIMT_HEADSH0TLspeed = 10*FRACUNIT;	(SPR_PLSG,0,1.0A_Lower),S_PLASMADOWN,0,01,//		
p-susedown = p-sattackdown = trye;// don't do anytaying real p-splayerstate = PST_LIVE.	Technik (H. D. Sawitch (Samining) MITCHS		mobjinfolMT_TROOPSHOTLspeed = 10*FRACUNIT;	ISPR_PLSG.0.1.IA_Raise).S_PLASMAUP.0.0), // ISPR_PLSG.0.3.IA_FirePlasma).S_PLASMA2.0.0), //	S PLASMAUP if Igametic > BACKUPTICS S PLASMA1 && consistancy/lilbufl != cmd >consistancy/	
p-shealth = MAXHEALTH; p-sreadywaapon = p-spendingweapon = wp. petal; structure = p-spendingweapon = spendingweapon = spendingweapon = p-spendingweapon = spendingweapon = spendingwe	.0.01, // S. D. case 3151 .0.01, // S. D. case 3251 whitho.next = 15: break:			(SPR_PLSG, 1, 20, (A_Ref. rel), S_PLASIAA, 0, 01, // (SPR_PLSF, 32768, 4, (A_Light 11, S_LIGHTDONE, 0, 0).		P_NoiseAlert iP_mobi_t* target.
p-sweeponownedlwp_fistl = true_processing_interesting p-sweeponownedlwp_pistoll = true_processing_interestins_interesting_interesting_interesting_inte	default: whinfo.next = to; breac		// force players to be initialized upon first level load for G=0 ; i <maxplayers ;="" i++1<="" p=""></maxplayers>	(SPR. PCSF.22769.4,1A. Light1).S. LIGHTDONE,0.01, (SPR. BFGG,0.1,1A. WeaponReadul.S. BFG.0,01, //)	// S. PLASM/FLASH2 omd->consistancy, consistancyfill	
			playershil.playerstate = PST_REBORN;	(SPR BEGG.0.1.1A Lower) S EEGDDV/N.0.0) //	S BEGDOWN if (playershitma)	
lar find ; i <numammo (2769.6.011.l1.8.)<="" ;="" i++)="" pcl3="" still="" td=""><td></td><td></td><td></td><td>(SPR. BFCC,0,1,1A_Parent,S_BFCUP,0,0), // S_BFCUP (SPR_BFCC,0,20,4A_BFCsiound),S_BFC2,0,0), //</td><td>S BFG1 State of the one of the on</td><td>P. BoursiveSound lemmiter soubsector spectar, (0);</td></numammo>				(SPR. BFCC,0,1,1A_Parent,S_BFCUP,0,0), // S_BFCUP (SPR_BFCC,0,20,4A_BFCsiound),S_BFC2,0,0), //	S BFG1 State of the one of the on	P. BoursiveSound lemmiter soubsector spectar, (0);
	.0.01. // Sit (secretarist) ICCR2.0.01. wminfo.next = 8: // go to secret level		pauned = false; demoplayback = false;	(SPR_BF6C,1,10.(A_GunFlash1.S_BF63,0.0), //: (SPR_BF6C,1,10.(A_FintBFG),S_BF64,0.0), //:		
		'sane_pi++ = evelopere:	automapactive = false, viewactive = true:	(SPR_BFGG,1,20,(A_ReFire),S_BFG,0,01, // S_BFG4 (SPR_BFGF,32768,11,(A_Light1),S_BFGFLASH2,0,01		
	0.01 // S 5// réturning from secret level 0.01 // S. Niewitch (gameepiscele)		gamespisode = episode; damespisode = map;	(SPR BEGE 32769,6,1A Loniz) S LIGHTDONE 0.03, (SPR BLUD 2 8.0NULL) S BLD002.0.03, // S BLD00		
		P_ArchiveTuckont 0; P_ArchiveTuckont 0;	gameskill = skill;	(SPR_BLUD.1.6.INULLI.S_BLOOD3.0.0), // S_BLOOD (SPR_BLUD.0.8.INULLI.S_NULL.0.0), // S_BLOOD	for G=0 ; i-(MAXFLAYERS ; i++)	
					S_PUFF1 if (playeringame1il)	
				(SPR_PUFF,1,4,INULLI,S_PUFF3,0.0), // S_PUFF2 (SPR_PUFF2,4,INULLI,S_PUFF4,0.0), // S_PUFF3	if (playerslif.cmd.buttons & BT_SPECIAL)	
	(10) // S. SHETH WHITE next = 5; // ///////////////////////////////	tenats - name a - envelution	if (gamemode == commercial)	(SPR_PUFE3,4,INULL),S_NULL,0.0), // S_PUFE4	andrah fada-and it and had an 0.01.0000000	income and a second sec

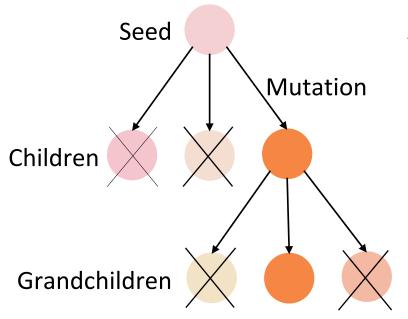
Dongdong She, Kexin Pei, Dave Epstein, Junfeng Yang, Baishakhi Ray, and Suman Jana Columbia University

Fuzzing: a popular way to uncover bugs

Number of fuzzing papers in top CS conferences



Evolutionary Fuzzing



Advantage: easy to implement Disadvantage: inefficient

- Random mutations are not effective
- Often get stuck in long sequence of wasteful mutations

Hard to find scalable and adaptive heuristics for guided mutation

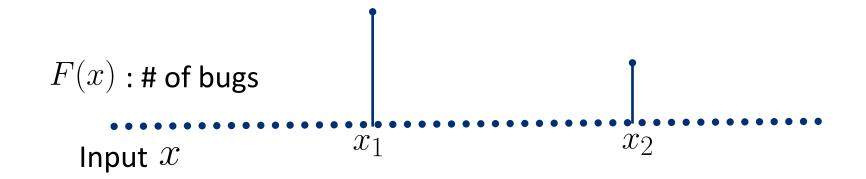
A new approach to fuzzing

 $\begin{array}{ccc} x & \Longrightarrow & \text{a program input } x \in X \\ F(x) & \Longrightarrow & \text{# of bugs found by input } x \\ C(X) & \Longrightarrow & \text{generate } K \text{ inputs from input space } X \end{array}$

$$\underset{x \in C(X)}{\operatorname{Maximize}} F(x)$$

Find C(X) that can maximize total no. of bugs

F(x) is discrete and hard to optimize

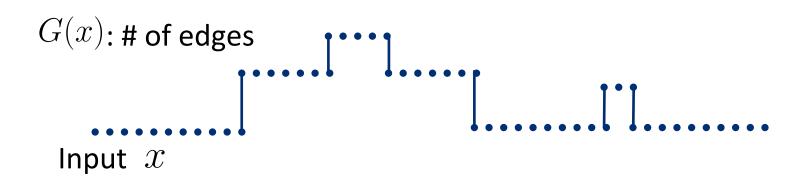


Hard to find inputs like x_1 and x_2 among flat plateaus

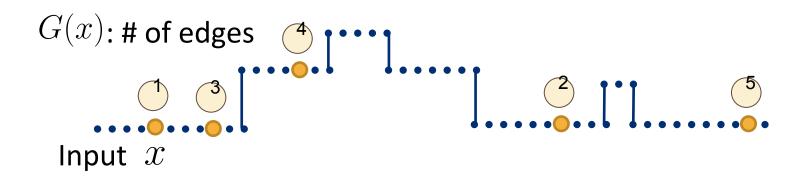
$$\begin{array}{ccc} x & \Longrightarrow & \text{a program input } x \in X \\ G(x) & \Longrightarrow & \text{edge coverage of input } x \\ C(X) & \Longrightarrow & \text{generate } \textit{K} \text{ inputs from input space } X \end{array}$$

$$\underset{x \in C(X)}{\operatorname{Maximize}} G(x)$$

Find C(X) that can maximize total number of edges



Evolutionary optimization

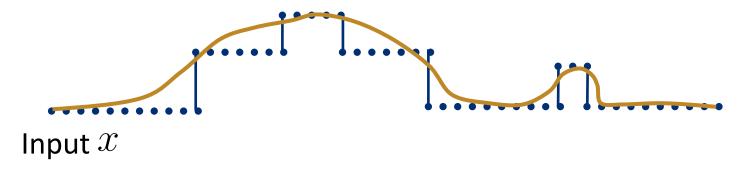


Random mutation is not efficient

Gradient-guided Optimization

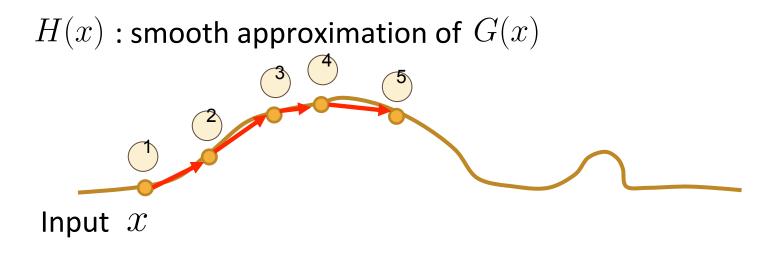
Smooth Approximation + Gradient-guided Mutation

H(x): #modet/gesproximation of G(x)



Gradient-guided Optimization

Smooth Approximation + Gradient-guided Mutation



Smooth Approximation

Problem:

How to smoothly approximate G(x)?

Universal Approximation Theorem:

A NN can approximate any continuous function

Neuzz Solution:

Use a NN to learn a smooth H(x)

Gradient-guided Mutation

Why gradient guidance?

Gradient indicates critical parts of input

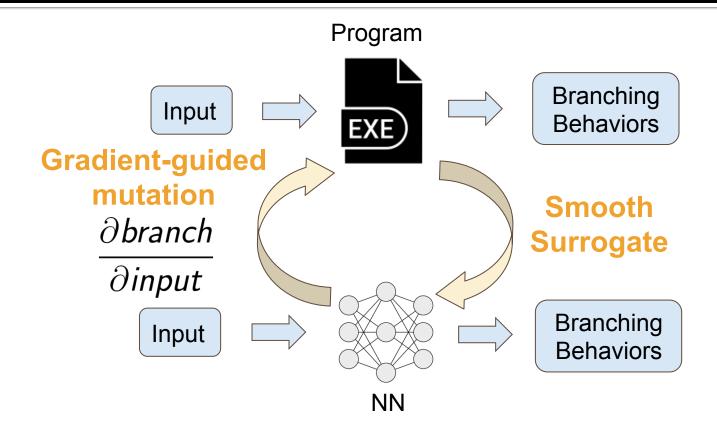
What are critical parts of the input?

Critical parts of input affect program branches

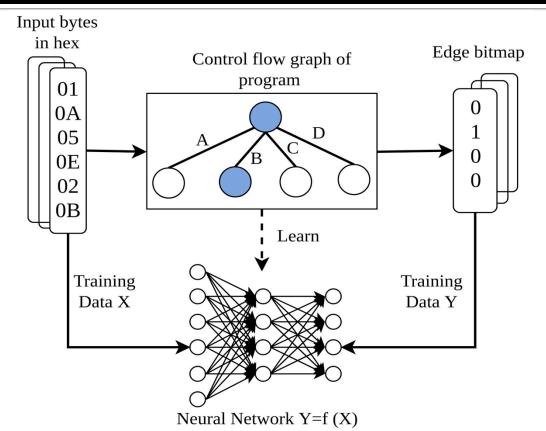
How gradient-guided mutation works?

Focus mutations on the critical parts of the input

Main Idea behind Neuzz



A Peek Into NN Model



Generalization to Unseen branches

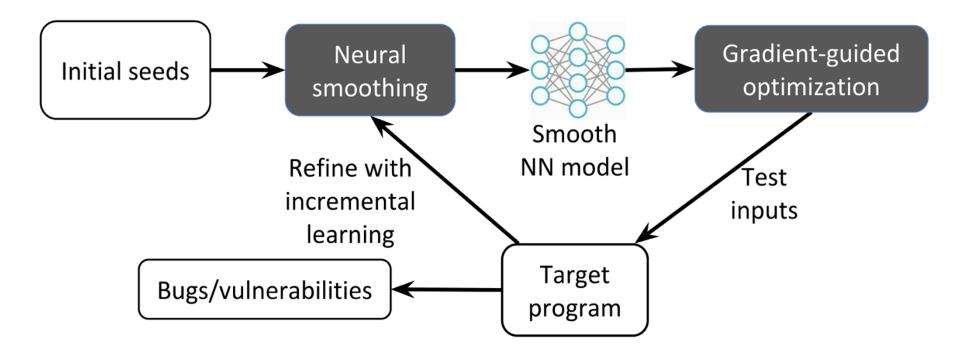
Observations:

- Real world program inputs have critical parts
- Most of branches are affected by the critical parts

Neuzz Solution:

- Identify critical parts based on observed branches
- Perform more mutations on the critical part of inputs to explore unseen branches

Design of NEUZZ

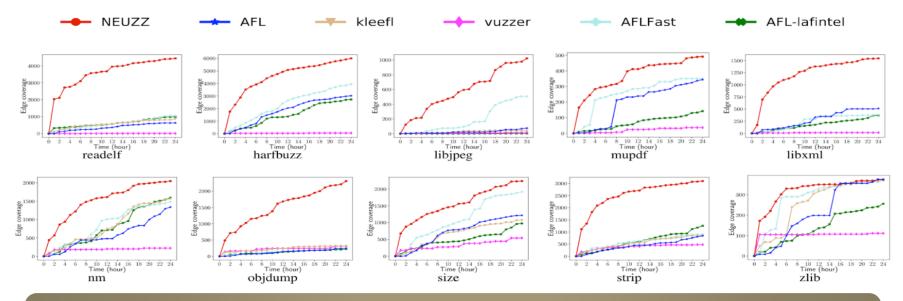


Evaluation

- > 10 real world programs
- Lava-M and DARPA CGC datasets
- Comparison with RNN-based fuzzers
- Performance of different model choices

Evaluations: Edge Coverage NEUZZ vs. state-of-the-art fuzzers

10 real world applications for 24 hours



NEUZZ achieves on average 3x more edge coverage than other fuzzers

Evaluations: Bug Finding NEUZZ vs. state-of-the-art fuzzers

Programs	AFL	AFLFast	VUzzer	KleeFL	AFL-laf-intel	NEUZZ
Detected Bugs per Project						
readelf	4	5	5	3	4	16
nm	8	7	0	0	6	9
objdump	6	6	0	3	7	8
size	4	4	0	3	2	6
strip	7	5	2	5	7	20
libjpeg	0	0	0	0	0	1
Detected Bugs per Type						
out-of-memory	1	1	×	1	1	1
memory leak	~	~	1	~	1	1
assertion crash	×	1	X	X	1	1
interger overflow	×	×	X	×	×	1
heap overflow	~	×	×	×	×	1
Total	29	27	7	14	26	60

NEUZZ finds the most number of bugs and all 5 bug types including two new CVEs

Evaluations: Lava-M and CGC

Lava-M dataset

DARPA CGC dataset

	base64	md5sum	uniq	who
#Bugs	44	57	28	2,136
FUZZER	7	2	7	0
SES	9	0	0	18
VUzzer	17	1	27	50
Steelix	43	28	24	194
Angora	48	57	29	1,541
AFL-laf-intel	42	49	24	17
T-fuzz	43	49	26	63
NEUZZ	48	60	29	1,582

Fuzzers	AFL	Driller	NEUZZ
Bugs	21	25	31

NEUZZ outperforms state-of-the-art fuzzers on LAVA-M and CGC

Evaluations: NEUZZ vs. RNN-based Fuzzer

Programs	Edge	Edge Coverage			Training Time (sec)			
	NEUZZ	RNN	NN AFL NEUZZ		RNN	AFL		
readelf -a	1,800	215	213	108	2,224	NA		
libjpeg	89	21	28	56	1,028	NA		
libxml	256	38	19	95	2,642	NA		
mupdf	260	70	32	62	848	NA		

NEUZZ achieves 6x more edge coverage and 20x less training time

Evaluations: Effect of Different NNs

Edge coverage for 1M mutations

Programs	Linear Model	NN Model	NN + Incre	emental
readelf -a	1,723	1,800		2,020
libjpeg	63	89		159
libxml	117	256		297
mupdf	93	260		329

NEUZZ achieves best performance with NN+Incremetal learning

Key Takeaways of NEUZZ

- Use NN gradients to identify the critical locations of program inputs
- Focus mutations on the critical locations
- Minimize runtime overhead by using simple feed-forward neural networks
- Retrain the network incrementally to find new critical locations

Github Repo

NEUZZ is available at https://github.com/Dongdongshe/neuzz

// setting one. skyfistrium – R. FlatNumForName I. SKYFL/JTN/ME I.	Vaid G_SecretExitLevel (void)		tskil_t_skil, int episode,	(SPR_PUNG,2.4,0NULL),S_PUNCH5,0.0),	// S_PUNCH4	// ENEMY THINKING
// DODM determines the sky tentane to be used	Off IF NO WOLFBD LEVELS, NO SECRET EXIT Off (fganieringe and commercial) So as (W'Checkharf or Name("mas31"1-0))			ISPR PISG.0.1.6A WeaponReady).S PISTOL.0.01/	// S_PLNCHS // do things to change the game state // S_PINCHS while (gameaction I= ga_nothing)	with target player -1 , threshold = 0
// depending on the current episode, and the pame variation. # [fournamode == commercial]	33. 88 (W/CheckNumForNamet*map31*)-(0) 05. # secretaint = false;			ISPR_PISC.0.1.(A_Lower).S_PISTOLDOWN.0.01, ISPR_PISC.0.1.(A_Raise1.S_PISTOLUP.0.0).	// S PISTOLUP switch Igameaction	27 Most controlers are spagned unsware of all players. 27 but some can be made presware.
II (pamemode pack, trit) II (pamemode pack, pld 1)	D. else S. BORGE DI. // Salerindexit = true,	langth = M. RandFile (sovename, Souvebuffer); save p = sovebuffer + SAVESTRINGSIZE;		ISPR_PISC,0,4,0NULLI,S_PISTOL2.0,01, // S_PIST ISPR_PISC,1,6,10, FintPintel1,S_PISTOL3.0,01/7 S_	PISTOL 2 case ga loadlevel:	
skytaxture - R. TextureNumFarName ("SKY3").	ghriveaction - ga_completed;		paused = false; S_ResumeSound D;	ISPR PISC 2.4. NULLIS PISTOL 4.0.01, // S. PIST ISPR PISC 1.5. (A. ReFire), S. PISTOL 0.01,	// S.PISTOLA break;	
if (gamemap < 12) skytesture = R_TestureNamForName ("SKY1");	Vol.01 // S_FREY2 Vold G_DuCompleted (vold)			ISPR_PISE.32768,7,(A_Light1),S_LIGHTDONE.0.0 (SPR_SHTG.0,1,0A_WeepenReady),S_SGUN,0.01,	// S. SOLIN G_DoNewGame U;	70 Collecting C. Numerkark. W Recommendy transmissional sectors.
		d Istrange Barvar, p. yaberkill	if (skill > sk_nightmane)	ISPR SHTC.0.1.1A LowerJ.S. SCUNDOWN.0.01, ISPR SHTG.0.1.1A Reset.S. SCUNUP.0.01		
ture Tex Nav SKY2')		fficien	skil - sk. night	[SPR_SHTG.0ULLI.S_SOUN2.0.0), // S_SOU (SPR_SHTC.0FineShotgun), S_SOUN3.0.0),	UN1 GLU oduano 0; // SISCUN2 brit	
Avenuation and a second s			s gute me with SPED and a ner			and the second
it followers and the state of t	C Play visible well (i); // take ay cards and		// posedly hacks the late edite vork.			
wipeger tate	Alter and a second s					
gamestate = LEVEL (Stransauces2770.0)	Printing Printing	// topeesite	if (gamemode retail)		DI, // S SCUNFCASH G.Deamphiles	
	Child & gamemode 1- commercial) LS D.C.L. switch(gimemie)			(SPR_SHT2.0.1.(A_WeapenReady).S_D0	AL AND STREAM AND A SHARE AND	
if (playeringameli) && playeral/Lplayerstate == PST_DEAD) playerstill playerstate = PST_PEBORN;				ISPH_SHT2.0.1.0A_Lower3.S_DSGUNDOWN.0.00; (SPR_SHT2.0.1.0A_Raise1.S_DSGUNUP.0.0),	// S DSOUNDP brook;	
mermet (players) il frags, 0, sizant players) il frags), LLL, S. PRIV	3.0.0). gurinidaction-2 ga_victory; 4.0.01. naturit; PINV2			[SP41 SH12,0,3,(NULLIS_DS0.0N2,0,0), // S_DS0 [SP8_SH12,0,7,(A_FresStotgur2),S_DS3UN3,0,0)	GUN1 case ga workdone: I, //S_DSGUN2 G_D6WekDone 0; break:	
P. SetupLavel pisod semenage, 0, gameskill;	U.D. // S. KINK 9.	ogran	episode > 1) episode	ISPH_SHT2,1,7,MULLIS_DSSUM4.0.01 - S_DSt 9 (SPH_SHT2,2,7,1A_Characteristics) S_DST_5,0,01, 5,0,01	L// S H4 case ga_screenshot:	
displayplayer startime - 1 0	ng Shiper dideoret - a	P. Understand Supervised		SHT24 PT 15 D SHT21 PT	UN Garneting garneting	
gameaction - 0 12 Con 112			6 isode > 3)			
// clear and to ing st	R C Ir may BS		apeade = 15	ISFR 12 (A.P. 1.S. UN,0	s.c mi	
memset (game down ooffo oi);	(CO) More commerces					
mousex = mousey = 0; sendpause = sendsave = poused = table;	// victory gameaction = ga_victory;	// done		ISPR SHT2 32777,4,14, Light21.S. LIGHTDONE,0.1	0), // S_DSGU#GovEgovEgovEgovEgovEgovEgovEgovEgovEgovEg	
memset (mousebuttons, Ü, sizeofinoosututtensii); memset (joybuttons, Ü, sizeofijoybuttensii);				ISPH_CH06.0.1, (A_vvaaporHeindy),S_CH0IN,0.01, ISPH_CH06.0.1, (A_Lower),S_CHAINDOWN,0.01,		
			if (Imap > 9) && (gamemoda != commercial) 1	(SPR_CHOD.0.1.4A_Raise),S_CHAINUP.0.03, (SPR_CHGG.0.4.4A_FireCGun1.S_CHAIN2.0.03, (SPR_CHGG.1.4.4A_FireCGun1.S_CHAIN3.0.03,		
	88 (gameriode 1= commercial))			ISER CHRG 1 D.M. ReFinel S. CHMN 0 D3	// S_CHAINELASH1 and = &playerslit.cmd	
player_t* p; ISPR CLIP() -T, NUCLI S NUCL 0 0	// doit-secret.lovel for-G=0;i		M_ClearRandom 0;	(SPR_CHOF.32769,5.0A_Light2).S_LIGHTDONE.0.4 (SPR_CHOF.32769,5.0A_Light2).S_LIGHTDONE.0.4 (SPR_MISG.0.1.0A_WeaporReady).S_MISSIE.0.00	0), // S_CHAINFLASH2	
int tragsIMAXPLAYERSIC POCK 0 TIMELEDS NULL 0 int kilcourt			if (skill sk_nightmane II responsemni) responsemmentations - true;	ISH1_MISB,0.1.0A_WeaponHeaby/S_MISSILE.0.00 ISPR_MISB,0.1.(A_Lower),S_MISSILEDOWN.0.00, ISPR_MISB,0.1.(A_Rene),S_MISSILEUP.0.0),	// S MISCI EDCIMAN	
int Lemicount; ISPFI CELLO, I MULLIS, MILLOT int Secretoomf; SPFI CELLO, I MULLIS, MILLOT			else respennmonsters = false;	ISPR_MISG.1.8.(A. Gard-Jack), S. MISSILE2.0.00, ISPR_MISG.1.8.(A. Gard-Jack), S. MISSILE2.0.00, ISPR_MISG.1.12.(A. FreeMissile1, S. MISSILE3,0,00)	// S_MISSILE1 G_HeadDempTicond Lond;	
	wniste.didsecret = players/cansoleplayerl.didsecret;		if flastparm II (skill sk_nightmare && gameskill !- sk_nig	(SFH_MISG, 1, 12, (A, FHYMARABELS, MISSILE 3, U, 0) (MISG, 1, 0, (A, FuFirw), S, MISSILE 0, 0), (SFH_MISF, 32760, 3, (A, Ligher1), S, MISSILFFLASH2	// S_MISSILE3 G_WhiteDemoTicand famili;	
kilcount = playerstplayer1.kilcount; = prove the second se	wminfo.epid – gameepisode -1; wminfo.lisit – gamernap -1;		for 6=S_SARG_RUN1 ; i<=S_SARG_PAIN2 ; i++)	ISPA MISE 32769 & INULLUS MISSILFELASH2 01	A.O., // S.MISSLEFLASH# check for turbo cheats A.O., // S.MISSLEFLASH# cand->lonwardmove > TURBOTHRESHOLD A.O., // S.MISSLEFLASH# cand->lonwardmove > TURBOTHRESHOLD	
			statestill.tics >>= 1; mobjinfolMT_BRUISERSHOTLspeed = 20*FRACUNIT; usiot);	ISPR_MISE32771.4,IA_Light21,S_LIGHTDONE,0.0 (SPR_SWV0,2,4,IA_WeepenReudy),S_SAVVD.0.01	 // S_MISSILEFLASH4 58. Igametics311 56. (Igametic>>5163) == 11 	
p = Splayers[player]; memset tp, D, sizeef[*pl]; SPA LAUN D-1 (MULLIS MULLIS)			mobjinfoIMT_HEADSHOT1.speed = 20"FFACUNIT; mobjinfoIMT_TROOPSHOT1.speed = 20"FFACUNIT;	(SPR_SAWG.2.1.(A_WeapenReady).S_SAW.0.0), (SPR_SAWG.2.1.(A_Lower).S_SAW.DOWN.0.0),	// S_SAV9 static char turbomessagetbUI:	
	af Gedretenit) Siwitch(gemensip)		else if fskill !- sk_nightmane && gameskill sk_nightmane)	(SPH_SAW6,2,1,0, Lower,S_SAW0DOW(0,0), (SPR_SAW6,2,1,0, Paise),S_SAW0P,0,0, (SPR_SAW6,0,4,0, Saw6,S,SAW2,0,0), // S_SAW	// S_SAVAP sprintf (turbernessage, "%s is turber' player_na	mestil);
playersiplayer1kilcount = kilcount;;;; colline;;;;; a 1.00.LLS_0.01 playersiplayerLiterricount = iterricount;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	 asiai 15: wininto.next = 30; break; asiai 31: wininto.next = 31; break; 		for 6=S_SARG_RUN1 ; i<=S_SARG_PAIN2 ; i++) states(i).tics <<= 1:	(SPR_SWW0,0,4,(A_Saw0,5_SAW0,2,0,0), // 5_SAW (SPR_SWW0,1,4,(A_Saw0,5_SAW0,0,0), // 5_SAW (SPR_SWW0,1,0,(A_ReFire),5_SAW(0,0), // 5_SAW		// //P_NoiseAlers
players[player] secret.count = secret.count			<pre>statesiii.tos <<= 1; mobjinfoIMT_BRUISERSHOTLspeed = 15*FRACUNIT; mobjinfoIMT_HEADSHOTLspeed = 10*FRACUNIT;</pre>	(SPR_PLSG,0,1,1A_WeaporReady1,S_PLASMA,0,0 (SPR_PLSG,0,1,1A_Leave1,S_PLASMADOWN,0,0)	 // S_PLASMA If thetgame 85 Instdems 85 Kgametic%blodupl 1 	
p-susedown = p-sattackdown = true; // don't do anything remed p-splayerstate = PST_LIVE.	staly switchiganitriap		mobinfolMT_TROOPSHOTLspeed = 10*FRACUNIT;	(SPR_PLSC,0,11A_Panio).S_PLASMM/P.0.01 (SPR_PLSC,0,31A_FreParina).S_PLASMA2.0.01	// S_PLASMAUP If Igametic > BACKUPTICS	
p-shealth = MAXHEALTH: Sign P-W 13.4 MAXLES MILLED p-sreadywaapen = p-pendingweapen = wp. pental, a 15.5 miller	 V S Di casie 315 V S Di casie 32; winimo.mest = 15; break; 			(SPR_PLSG.1.20.4A_Ref.rol.S_PLASMA.0.0), (SPR_PLSF.32768.4,1A_Light11.8_UCHTOONE.0.0		
p-sweeponownediap_fist1 = trues_processor_investors with the p-sweeponownediap_pistoll = trues_processor_investors with the processor_investors and processor_investors and processor_investor_inves	S Hi default: whith to not = gameroap;		// force players to be initialized upon first level load for G=0 ; i <maxplayers ;="" i++1<="" p=""></maxplayers>	ISPH_PLSF.32769.4,1A_Light11,S_LIGHTDONE,0.0 ISPH_BFGG,0,1.1A_WeapenReady1,S_BFG.0,01	01, // S. PLASMAFLASH2 and->consistancy, consistancyfillb	ullpol_t* emmiter 1
			playerslid.playerstate = PST_REBORN;	ISPH BEGG,0.1 IA Lowers,S. BEGDDV/NLO,D. ISPH BEGG,0.1 IA Passel,S. BEGUP.0.0, // S. BEG	// S_BECOOWN	
for field; ickLIMAMMO; i++) is no polo covers with the per- promovemental = maxeminated, polo to the test of test of the test of t			usergame = true; // will be set false if a demo paused = false;	(SPH_BF06,0.20,0) BF0:ound.S_BF02,0.00, (SPH_BF06,1,10,0) CurFlash1.S_BF03,0.00,	//S DTC1 else //S DTC2 consistancy[illbuf] = mdindex.	
	2010 wrinfo.neit = 9/ // go to secret level		demoplayback = false; automapactive = false;	(SPR BEGG.1.10.(A_FireBEG),S_BEG4.0.01 (SPR BEGG.1.20.(A_FireFire),S_BEG.0.0), // S_BEG	//SERIE	
	the figuremup we SI // S 1/// Péturning from secret level		automapactive = hase; viewactive = true; gameepische = episode;	(SPR_BFGF.32769.6.1.1.0. Light1).S. BFGFLASH2.0 (SPR_BFGF.32769.6.4. Light1).S. BFGFLASH2.0 (SPR_BFGF.32769.6.4. Light2).S. LIGHTDONE.0.0		
	7 returning from secret level		gamenepesote – opeone: gamenep – map; gamesiol – sioli:	(SPR_BUJD,2.8.JN(LL),S_BLOOD2.0.0), // S_BLO (SPR_BUJD,2.8.JN(LL),S_BLOOD2.0.0), // S_BLO	0001 // check for special buttons	
			gameskol = skat; viewacžive = true-	(SPR_BLUD.0.8.INULL).S_BLOUDL0.00, // S_BLO (SPR_BLUE.0.8.INULL).S_NULL.0.00, // S_BLO (SPR_PUFE32768.4./NuLL1.S_PUFE2.0.0)		
				ISPR_PUFF.1.4.INULLI.S_PUFF3.0.01, // S_PUF ISPR_PUFF.2.4.INULLI.S_PUFF3.0.01, // S_PUF		
Land L SIGN COLVER THREE NEEDS	<pre>// S Videse 2: 1 // S SHELL www.ello.next = 5;</pre>	Control of the state of the state of the	// set the sky map for the opsiode if C gamemode == commercial	(SPR_PUFE3.4.INULLI.S_NULL.0.0), // S_PUF		fixed_t dist;

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