License Plate Recognition/ Neural Labs/ Sep. 2017

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## I. License Plate Recognition Solution

Furthering its dedication to be a top Video Surveillance solution provider, NUUO is pleased to announce its new strategic partnership with Neural Labs, a globally recognized ANPR software provider.

NUUO and Neural Labs are now working together to provide the most cutting edge ANPR solutions for under both NUUO Crystal<sup>™</sup> and NUUO Mainconsole (NVR IP+, Hybrid NDVR, and DVR card) platforms. The suite ensures that our clients always have access to the most advanced LPR solution in the market.

#### A. System Architecture

Neural Labs VAPR server automatically captures the license plate in real time and sends the metadata to NUUO metadata server, with this information, the user can create a pre-defined Blacklists and Whitelists list and take appropriate actions such as opening a gate or generating an alert.



### B. Compatible Versions

Neural Labs Version	Product	Server Version	<b>Client Version</b>	Plugin Version
VPAR Server v.2.9.8.2 with	Crystal™	v.3.8.0	v.3.8.0	v.2.2.0.4
Engine v.7.5.1.0	Mainconsole	v.7.2.0	N/A	v.2.2.0.4

### **II.** Neural Labs VPAR Installation

### A. Trial Version

For trial, please contact <u>USA@NEURALLABS.NET</u> for further technical support.

### B. Neural Labs VPAR Server Set-up

Please refer to the page 15 of <u>VPAR\_SERVER\_User\_Manual\_EN.pdf</u> for details.

### **III. NUUO Server Configuration**

- A. Crystal<sup>™</sup>
  - a. To use this feature, please upgrade your Crytal<sup>™</sup> Server to v.3.8.0. The plugin for Neural

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Labs LPR System has been included as default which can be found in the "Plugin Overview" tab.

<	• of to	Live View	Playback	Config System Overview	👗 admin ? — 🗗 🗙
<b>I</b>	◎ ಔ NVR Management Server	Prop	erties Hardware S	Setting Plugin Overview Source Overview Event Action	
			Mana	Mania	
X				Version 2.2.0.1	
			POS TCP Client	2.2.0.1	
?⊂	s video device (03)		SCB-C31	2202	
	ା ଝ video device (04)		NuFace	2.0.0.5	
	metadata Server		LPR NeuralLabs	2.2.0.4	
	INVR Metadata Server		LPR VIT	2.2.0.3	
	🗉 🖊 metadata source		POS TCP Serve	r 2.2.0.1	
	🎝 metadata channel		LPR Hikvision	2.2.0.0	
	Piet midulu 9 № US Server ∞ & IVS Server				
	+- 회 말 두 /	÷ + −			
Date:	2017/09/11   Time: 15:59:09   Server Address:10.0	4.46:5250	CPU Loading:5%	I Memory Usage: Total 8075MB Free 2698MB   Netwo	rk: Displayed Streaming Bit Rate 0.00

**b.** Open the Neural Labs VPAR Server and input the IP address of Crystal<sup>™</sup> server and assign a port in Configuration > XML Sending Connection.

11 fps - VPAR SERVER - Recognition Technology by Neural Labs Computer ID = 1	
👁 Main 🗹 Options 🔳 Camera Management 🖾 IO M	Aanagement 🔅 Configuration 🙀 General information 💬 Logs 👁 Review
General	Tuese ^
Image path: c:\tmp\imgs	
All images path: c\tmp\imgs	
Log path: CAtmp	
Doorlet path: c:\tmp\dorlet	
DB autoconnect	
Network	
Local IO Port 8040	
XML Sending Connection	
Standard conection     XML IP 10.0.10.204 XML port 7000	E
© Listen and send XML at port: 8051	
Heart Beat IP 10.0.10.37 HB port 9090	
Close conection after send	
Purge	
Purge DB registers after days: 30	
Purge file images after days: 30  Purge file logs after days: 30	
	Apply and save
✓ Purge every day at: 17:25 ▲	
Purge now	Apply and Save

c. Add a metadata source of Neural Labs LPR and input the assigned port.

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🐨 🗸 🥎	Live Vie	w Playback Conf	ig System Overview	🌡 admin १ - 🗗 🗙
Be NVR Management Server     B Recording Server     B Recording Server     B RvR Recording Ser     Construction     Cons	er Prover Meta	perties Channel Overvie data Source:	w Event Action Labs Labs Nurce	
s metadata channe	el Co	nnection test: 🔗		
Matrix	TCP	Server Port : 7000	3	
∞ & IVS Server		Blacklist :		
		Whitelist :		
+ - 21 = =	د د			
Date: 2017/09/11   Time: 16:14:46	Server Address:10.0.4.46:5250	CPU Loading:0%   Me	emory Usage: Total 8075MB Free 2	2704MB   Network: Displayed Streaming Bit Rate 0.0(

d. Users can add corresponding metadata channels and define "Camera ID" for receiving the detection results from multiple channels. (The ID of a camera is defined by Neural Labs VPAR system and can be found in Camera Management > Select Camera > ID)

10 fps - VPAR SERVER - Recognition Tech	nology by Neural Labs Computer ID = 1
Main Options C	Camera Management 🛱 IO Management 🔅 Configuration 🙀 General information 📴 Logs 👁 Review
Cameras	INFO General parameters Connection parameters Input parameters Calibration VPAR parameters Dorlet Pr
<mark>⊂≈</mark> cam1	
└──ं⊂ Camera 6	
	Name : Cam1
	Type : RTSP
	Size : 640 X 480
	UKL: IECaINOST.SUBU/VIGEO.Prol
	Evidence camera : NO
	Input mode : Read always
+ C 🟛	

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🤝 🗸	et 19	Live View	Playback	Config	System O	verview		🚨 admin 🤌 🚽 🏹
	≅ № R Management Server	Prope	rties Fil	ter Metad	data Display	Event Action		
	□ ≞ Recording Server □ □ ≞ NVR Recording Server	Metada	ta Channel:	Enable				
L <b>%</b>			Name:	metadata cha	nnel			
?=	⊜ ≪ video device (02) ⊡ ≪ video device (03)	1	Description:					
	a ≼ video device (04) a Recording Failover Server		l					
	Kecolung Failover Server	C	Camera ID : [			1		
	■ ♣ NVR Metadata Server ■ ₺ metadata source	Stroamir	a schodulo: '	Time zone of I	Motadata So		lotadata Sonior): LITC ±8 : 00 (Daviliant of	aving ±1:00)
	🕫 metadata channel	Sueaniii		Priority Sche	edule Name	Property	Description	aving +1.00)
	j∺ ⊈ Matrix ⊫ ⊛ IVS Server			1 Alwa	iys	Connect	test description for always	
	🗉 🃾 IVS Server			+-/++				<b>B</b>
		Re	tention day:	7 📲 day	(s)			
		Cop	oy schedule:	G <sub>1</sub>				
-		ŝ						

e. For Blacklist and Whitelist applications, input the relevant license plate numbers into the blacklist and whitelist column in the "Properties" tab. All the metadata channels under the metadata source will share the same blacklist and whitelist for flexible system design. Then, setup a specific action for blacklist or whitelist by User Defined Event in metadata channel > Event Action and modify the text of the event condition to "InBlacklist" or "InWhitelist" (Please use the correct case for each letter. The comparison is case-sensitive). Once set-up is complete, <u>Mainconsole-Crystal</u> Server will automatically compare the receiving license plate numbers with those in the list and do instant responses.

et to ► 📀	Live View Playback Config System Overview	💄 admin 🧵 – 🗗 🗙
A NVR Management Server     A Recording Server     A Recording Server     A NVR Recording Server     A video device     A video device (02)     A video device (03)     A video device (04)     P Recording Fallover Server     A Metadata Server     A Metadata Server	Properties Channel Overview Event Action Metadata Source:   Enable Plugin type: LPR NeuralLabs Source type: LPR NeuralLabs Name: metadata source Description:	
್ metadata channel - Ք Matrix	Connection test: Ø	
i≊ n≱ IVS Server i≊ IVS Server	Blacklist : Whitelist :	
+ - 1 🗄 🛱	2.13	
Date: 2017/09/11   Time: 16:14:46   Server Address:10.0	0.4.46:5250   CPU Loading:0%   Memory Usage: Total 8075MB Free 2704MB   Network: Displayed Stre	eaming Bit Rate 0.00

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#### B. Mainconsole

**a.** To use this feature, please upgrade your Mainconsole Server to v.7.2.0 and install the plugin for Neural Labs LPR System in Metadata Application > Plugin > Upload.

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ta Source Display Plug-in  Update  Brand Model Type Version  CTCP Client AC 2.1.1.0  PR TCP Client LPR 2.0.1.0  Nu-connection 2.0.0.5  Nec LPR 1.0.8  DP IVS 1.0.8  DP IVS 1.0.8  Soyal AC 1.0.8  Soyal Client AC 1.0.8  Client AC	Interview         Plug-in           Update         Type         Version           Arrand         Model         Type         Version           CTCP Client         AC         2.1.1.0           PR TCP Client         LPR         2.0.1.0           Urace         Nu-connection         2.0.0.5           Yeo Client         AC         1.0.8           Yoo Client         AC         1.0.8           Opdate         AC         1.0.8           Opdate         AC         1.0.8           Oyal         AC         1.0.8           Orall         AC         1.0.8           AULT_FALCO         AC         1.0.8           TT         LPR         1.0.8           verFocus         AC         1.0.8	ata Source Display Plug-in	urce Display Plug-in  take  t  t  Model Type Version  P Client AC 2.1.1.0  CP Client LPR 2.0.1.0  cP Client LPR 2.0.1.0  cP Client AC 1.0.8  Client AC 1.0.8	Vetadata Appli	cation					?	
Update         Version            CTCP Client         AC         2.1.1.0           PR TCP Client         LPR         2.0.0.5           isec         LPR         1.0.8           yco Client         AC         1.0.8           poll         NV5         1.0.8           oyal         AC         1.0.8           loyal         AC         1.0.8           oyal         AC         1.0.8           loyal Client         AC         1.0.8           AULT_FALCO         AC         1.0.8           rustFouror         POS         1.0.8           upper trained way         POS         1.0.8           TT         LPR         1.0.8           upTenerv         QC         1.0.8	Update           Strand         Model         Type         Version           C TCP Client         AC         2.1.1.0           PR TCP Client         LPR         2.0.1.0           Uface         Nu-connection         2.0.0.5           (sec         LPR         1.0.8           Op         IVS         1.0.8           Opal         AC         1.0.8           Oyal         AC         1.0.8           Oyal         AC         1.0.8           Oyal         AC         1.0.8           Itcros Gateway         POS         1.0.8           TT         LPR         1.0.8           verFocus         AC         1.0.8	Update           strand         Model         Type         Version           C. TCP Client         AC         2.1.1.0           PR TCP Client         LPR         2.0.1.0           UFace         Nu-connection         2.0.0.5           isec         LPR         1.0.8           yco Client         AC         1.0.8           DP         TVS         1.0.8           oyal Client         AC         1.0.8           dycal Client         AC         1.0.8           oyal Client         AC         1.0.8           update         POS         1.0.8           TT         LPR         1.0.8           VerFocus         AC         1.0.8	Model         Type         Version         ^           CP Client         AC         2.1.1.0         ^           CP Client         LPR         2.0.1.0         ^           CP Client         LPR         2.0.1.0         ^           ce         Nu-connection         2.0.0.5         _           LPR         1.0.8         _           Client         AC         1.0.8           AC         1.0.8         _           Client         AC         1.0.8           FALCO         AC         1.0.8           cous         AC         1.0.8	ta Source   Disj	play Plug-in						
Brand         Model         Type         Version           CC TCP Client         AC         2.1.1.0           PR TCP Client         LPR         2.0.1.0           luFace         Nu-connection         2.0.0.5           //sec         LPR         1.0.8           //yco Client         AC         1.0.8           //pP         JVS         1.0.8           /goal         AC         1.0.8           /goal         AC         1.0.8           /AULT_FALCO         AC         1.0.8           /dtrops Cateway         POS         1.0.8           /mtTout         LPR         1.0.8	Arand         Model         Type         Version         A           CT CP Cleint         AC         2.1.1.0         PR         <	Barand         Model         Type         Version         ^           AC TCP Client         AC         2.1.1.0         ^           PR TCP Client         LPR         2.0.1.0         ^           UFAce         Nu-connection         2.0.0.5         ^           Visec         PR         1.0.8         ^           Op         NS         1.0.8         ^           Soyal         AC         1.0.8         ^           Soyal Client         AC         1.0.8         ^           MoltT_FALCO         AC         1.0.8         ^           VierSocateway         POS         1.0.8         ^           VierFocus         AC         1.0.8         ^	Image: Model         Type         Version         ∧           CP Client         AC         2.1.1.0         ∧           CP Client         LPR         2.0.1.0         ∧           re         Nu-connection         2.0.0.5         ↓           LPR         1.0.8         ↓         ↓           Client         AC         1.0.8         ↓           TyS         1.0.8         ↓         ↓           Client         AC         1.0.8         ↓           T_FALCO         AC         1.0.8         ↓           ocus         AC         1.0.8         ▼	👆 Update							
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Micros Gateway POS 1.0.8 //T LPR 1.0.8	Iicros Gateway POS 1.0.8 IT LPR 1.0.8 verFocus AC 1.0.8 ✓	Micros Gateway         POS         1.0.8           VIT         LPR         1.0.8           ÉverFocus         AC         1.0.8	s Gateway POS 1.0.8 LPR 1.0.8 ocus AC 1.0.8	VAULT_FALCO		AC	1.0.8				
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NorFocus AC 10.9 M	verFocus AC 1.0.8	EverFocus AC 1.0.8	ocus AC 1.0.8	VIT		LPR	1.0.8				
AC 1.0.6			>	EverFocus		AC	1.0.8	~			
Xelfocus AC 1.0.0			,	verFocus		AC	1.0.8	×			
											-
								1	OK 🗶 (	Cancel	

**b.** Open the Neural Labs VPAR Server to input the IP address of Mainconsole server and assign a port in Configuration > XML Sending Connection.

11 fps - VPAR SERVER - Recog	nition Technology by Neural Labs	s Computer ID = 1				
Main 🛃 Option	ns 📕 Camera Manag	ement 🔁 IO Mana	gement 🍄 Configuration	General information	💴 Logs 💿 Review	
General					<b>Neural</b>	
Image path:	c:\tmp\imgs					
All images path:	c:\tmp\imgs					
Log path:	c:\tmp					
	an transfer					
Doorlet path:	c:\tmp\dorlet					
DB autoconnect						
Network						
Local IO Port	8040					
Standard conection XML IP 10.0.10     Listen and send XML a	XML port	7000				
Close conection after sen	nd	3050				
Purge						
Purge DB registers after data Purge file images after data	days: 30					
Purge file logs after days	s: 30					
Purge every day at:	17:25	ſ	Apply and save			
Purge now			Apply	and Save		

- c. Add a metadata source of Neural Labs LPR and input the assigned port.
- d. Users can add corresponding metadata channels and define "Camera ID" for receiving the detecting results from multiple channels. (The ID of a camera is defined by Neural Labs VPAR system and can be found in Camera Management > Select Camera > ID)

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10 fps - VPAR SERVER - Recognition Tec	innology by Neural Labs Computer ID = 1
Main Options	Camera Management 🖾 IO Management 🕸 Configuration 🙀 General information 彈 Logs 👁 Review
- Cameras	INFO General parameters Connection parameters Input parameters Calibration VPAR parameters Dorlet Parameters
E LOCATION	Camera information
Camera 6	ID: 1
	Name : cam1
	Type: RTSP
	Size : 640 X 480
	URL : localhost:8080/video.pro1
	Evidence camera : NO
	Input mode : Read always
+ C 🟛	

e. For Blacklist and Whitelist applications, input the relevant license plate numbers into the blacklist and whitelist column in the "Properties" tab. All the metadata channels under the metadata source will share the same blacklist and whitelist for flexible system design. Then, setup a specific action for blacklist or whitelist by User Defined Event in metadata channel > Event Action and modify the text of the event condition to "InBlacklist" or "InWhitelist" (Please use the correct case for each letter. The comparison is case-sensitive). Once set-up is complete, Mainconsole Server will automatically compare the receiving license plate numbers with those in the list and do instant responses.

### C. Metadata Display

The plugin will receive the .xml file sending from the NeuralLabs VPAR Server, and transform the data into a human readable format displayed in the interface of NuClient and Mainconsole as pictured below. The definition of special data receiving from the Neural Labs VPRA server and users can omit those unwanted data by setting the regular expression in metadata channel > Filter.

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Solution	Live View Playback Config System Ov	erview 💈 admin ? _ & X
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■ Gefault User D	Титадитор=228 ImageW/dth=1149	
⊟ Physical Device ⊡ Camera ⊡ 🔛 🛃 edgar_y	imaga/kaijit⊨63 Patii=a:\tmp\imgs\574A3E0A=C3A6-483A-9830-A0809A8FCD59\20170804\088816901E7755-000001-115-671.64	B.jpg
Metadata Channel     BANVR Me	BiracitonVactor=1 imgSiza=0	
□ IVS Channel	Computarib≕1 Feadback=0X	
⊡ I/O Device ⊡ I/⊂ Device	IndidenceID=45731 ResComerc=0	
□ Virtual Content E-Map	nFram <b>==1</b> av/FileNama=af(tmp)(mgs)(8/4/A6E0A+CBA6+CDAA+SB60+A6B00ABFCD69)(2017/0901)(1888159013735+000001-111	+0221.6393.jpg
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PTZ Panel X		
107 metadata channel		
VO PTZ Panel		
Event List ×		
	Monitor#1, View: New View, 1 contents added	(∞∎∞ m m ∰. ⊞ ⊞ ⊟ ⊟ ⊡ ∰ Ω ↔ Ω (0)
Event List Properties Date: 2017/09/04   Time: 18:3	3:23   Server Address:10.0.10.202:5250   CPU Loading:30%   Memory Usage: Total 12157MB Free 3004ME	i   Network: Displayed Streaming Bit Rate 7971.38 kbps
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		- 0 *

- (a) ProcTime: LPR image processing time
- (b) CharHeight: Height of the characters of the plate, measured in pixels
- (c) ImageLeft: Left coordinate of the plate in the image
- (d) ImageTop: Top coordinate of the plate in the image
- (e) ImageWidth: Width of the plate in the image
- (f) ImageHeight: Height of the plate in the image

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- (g) DirectionVector: Flow direction of the plate
  - 0: Unknown direction or it has not moved
  - -1: Moves away from the camera position
  - 1: Moves toward the camera position
- (h) Feedback: Reason of NO reading, in case of using a trigger
- (i) IncidenceID: A unique ID for the detection event.
- (j) List: ID list or -1 if the plate is not in list

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