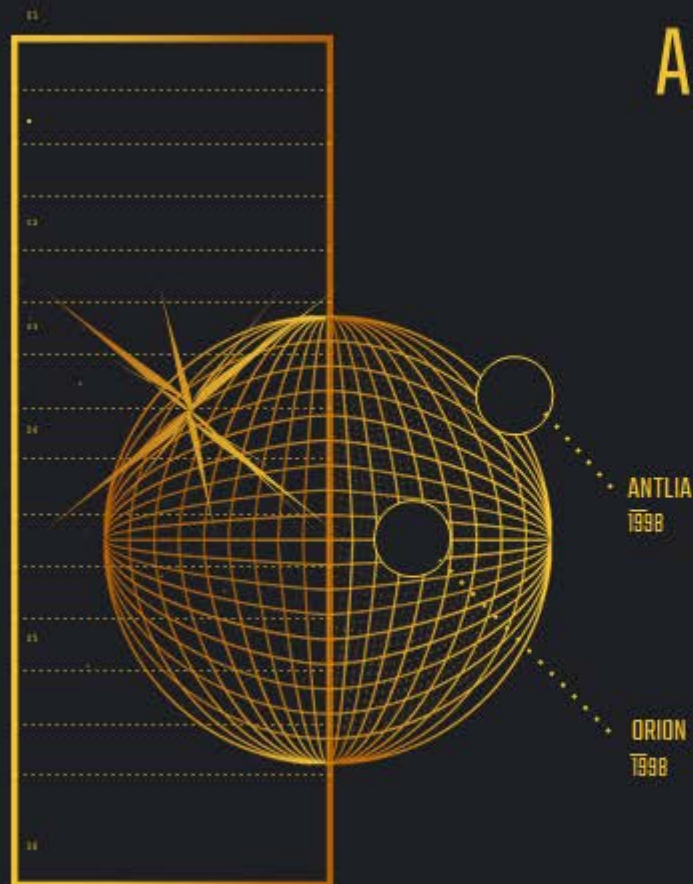


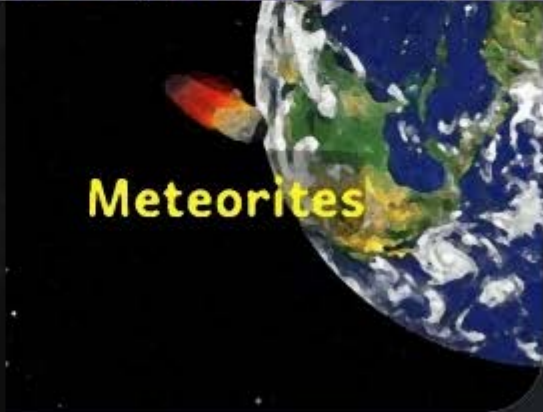
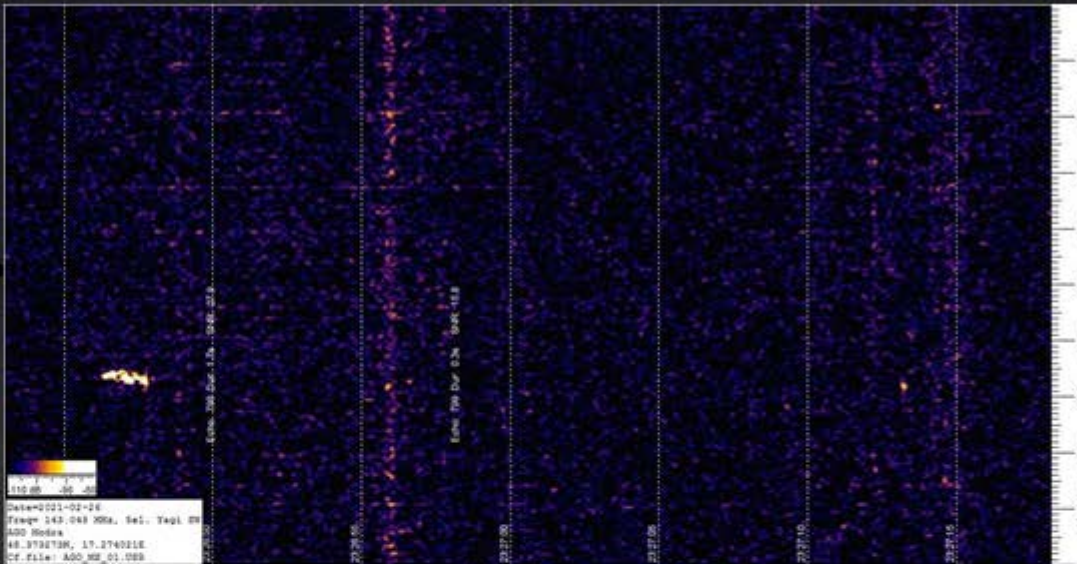
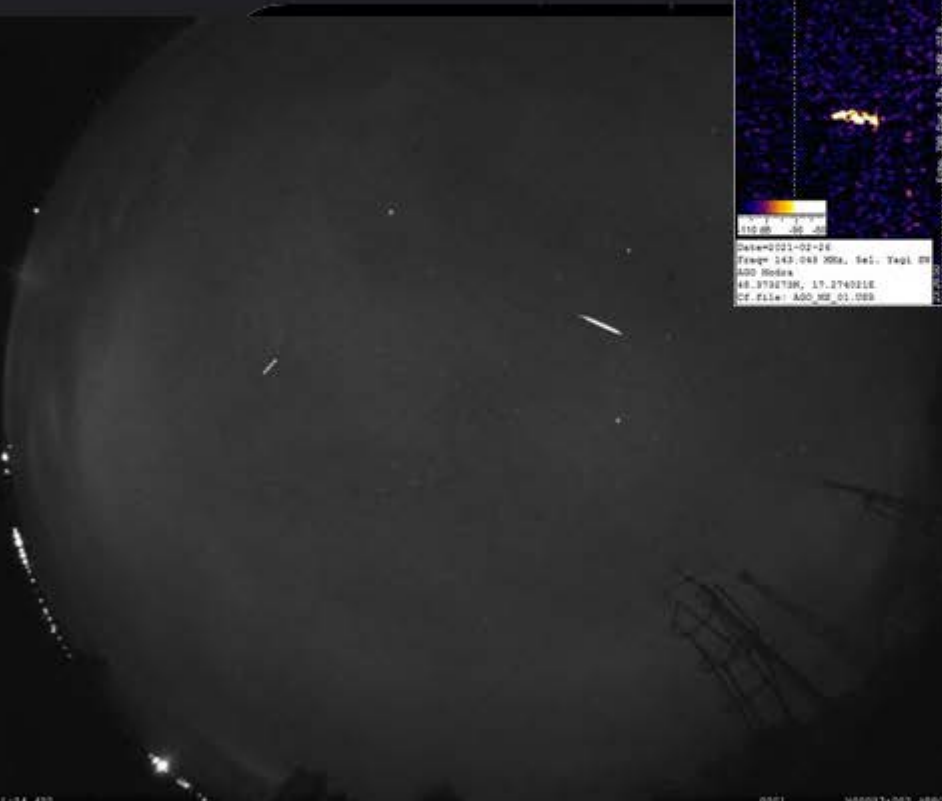
Applying YOLO for the detection of specific data within the field of astronomy



Lenka Kališková, Peter Butka
Viera Krešňáková, Šimon Mackovjak
Juraj Tóth, Pavol Zigo



Introduction to Meteors



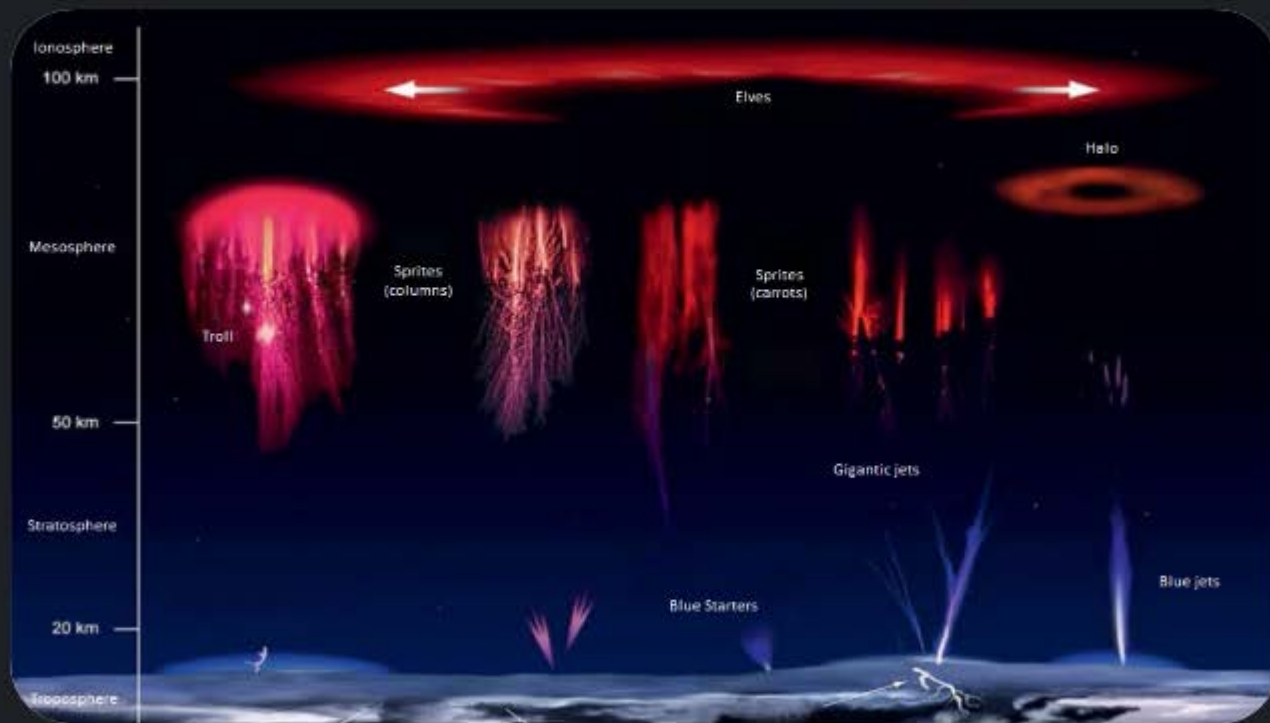
Meteorites

01

05



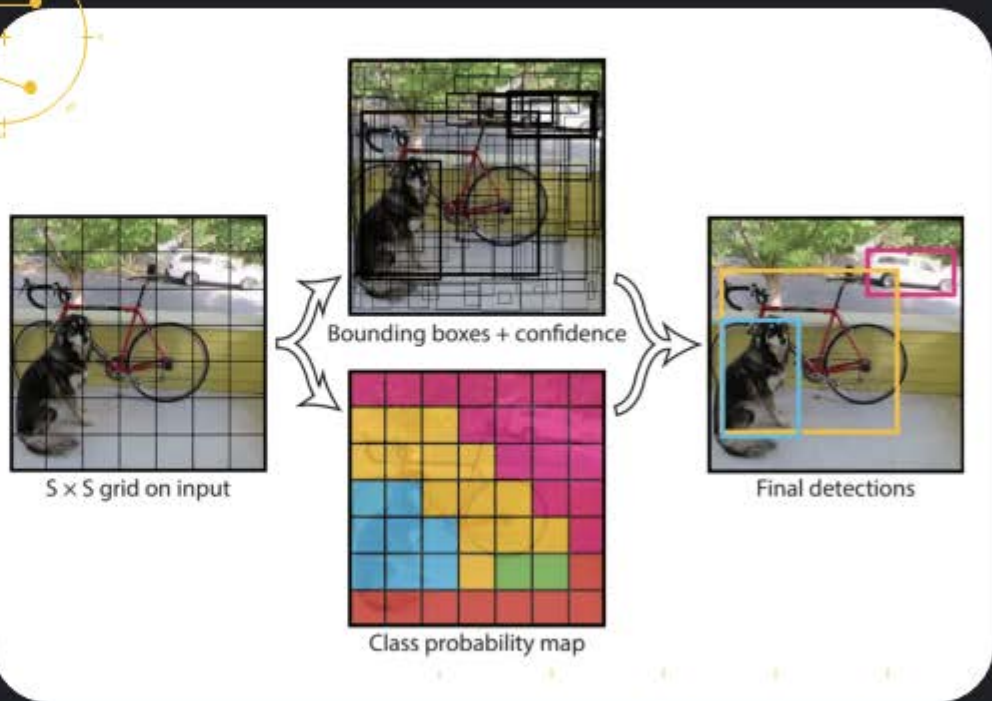
Introduction to Transient Luminous Events



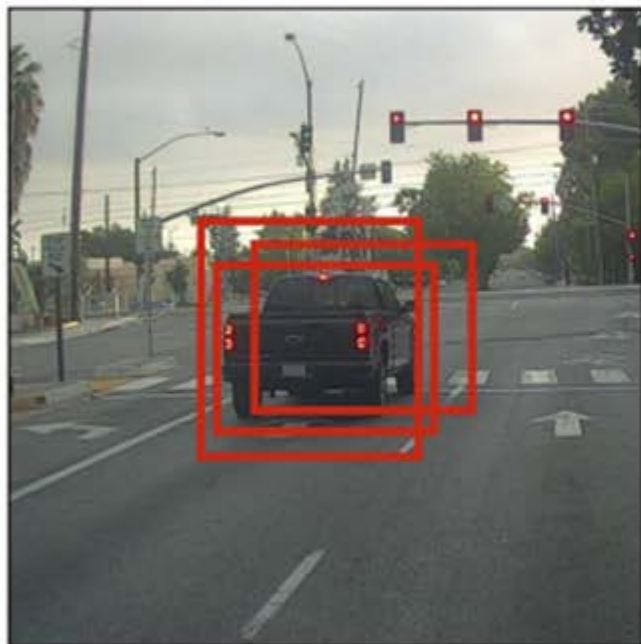
Time: 0.6 FPS



Y **O**U
O **N**CE
L **O**OK
O **N**LY
version 5



Before non-max suppression



Non-Max
Suppression



After non-max suppression



Meteor detection – AMOS



Evaluation of the AMOS meteor dataset

	Images	Meteors	Precision	Recall
Meteors	241	248	0.972	0.996

7 false
positive

1 missing

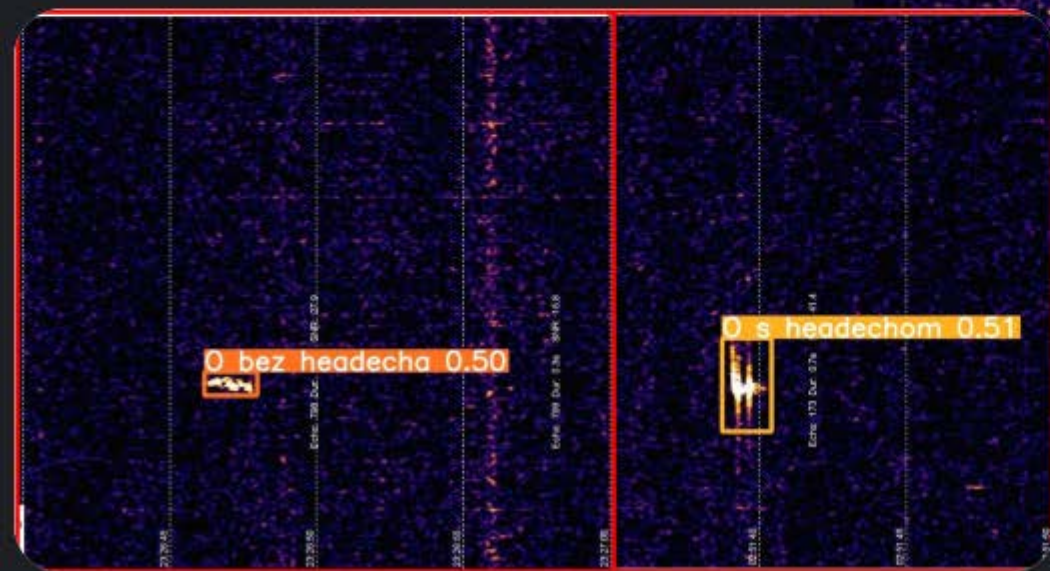
003-1040559

1250 003-77156.6

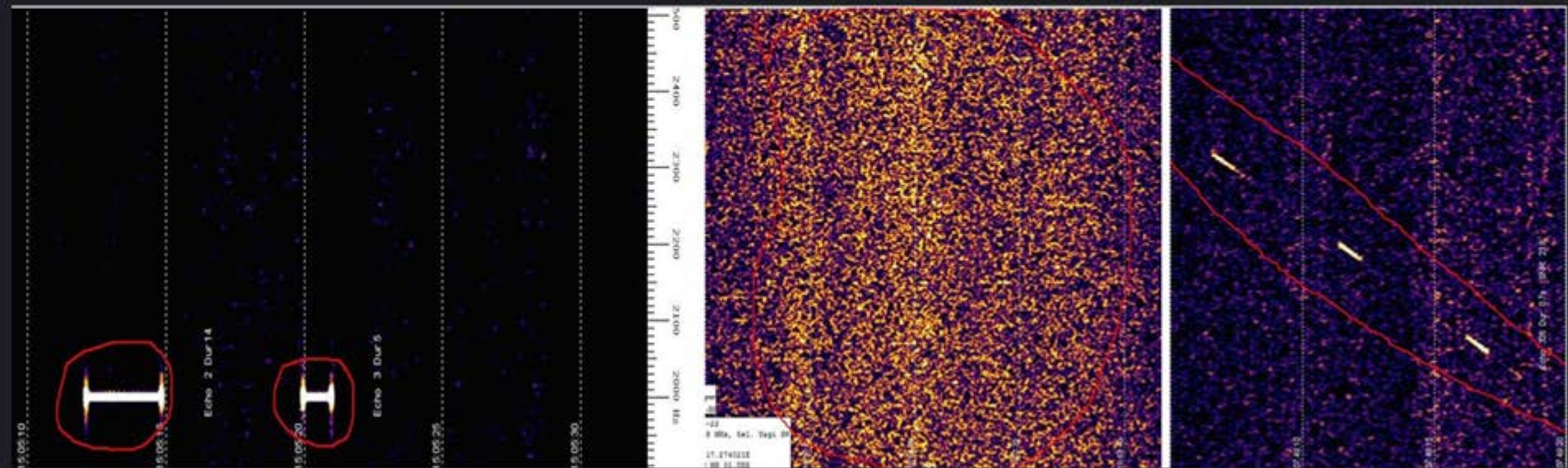
1760 0009-14563.7

73273

Detection meteors in radio spectrograms



Issues



Evaluation of the radio meteor dataset

		Actual values	
		Positive	Negative
Predicted values	Positive	496	12
	Negative	16	10



	event name	label	x	y	width	height	confidence	length_in_sec	real_begins_in_sec	real_begins_in_time	picture_ends_in	date
253	event20210227_011500_94	krátka bez headechom	0.366585	0.640254	0.0205255	0.161648	0.616688	0.5341	12.8784	1:23:10.878	01:23:33	27.02.2021
256	event20210227_012333_99	krátka s headechom	0.366585	0.640254	0.0205255	0.161648	0.616688	0.7418	12.8784	1:23:10.878	01:23:33	27.02.2021
257	event20210227_012448_101	krátka bez headecha	0.368637	0.676704	0.0147783	0.0253566	0.637945	0.5341	13.0564	1:24:26.056	01:24:48	27.02.2021
258	event20210227_012534_102	krátka bez headecha	0.356732	0.675119	0.0139573	0.0253566	0.524158	0.5045	12.6409	1:25:11.640	01:25:34	27.02.2021
259	event20210227_012605_103	krátka bez headecha	0.357143	0.66561	0.0131363	0.0285261	0.571403	0.4748	12.6706	1:25:42.670	01:26:05	27.02.2021
260	event20210227_012833_105	krátka bez headecha	0.369869	0.638669	0.0205255	0.0412044	0.318841	0.7418	12.997	1:28:10.997	01:28:33	27.02.2021
261	event20210227_013008_107	krátka s headechom	0.357553	0.698891	0.0139573	0.0602219	0.554584	0.5045	12.6706	1:29:45.670	01:30:08	27.02.2021
262	event20210227_013206_108	krátka bez headecha	0.358374	0.672742	0.0155993	0.0269414	0.623523	0.5638	12.6706	1:31:43.670	01:32:06	27.02.2021
263	event20210227_013206_108	krátka bez headecha	0.799261	0.683043	0.0303777	0.0412044	0.370387	1.0979	28.3383	1:31:59.338	01:32:06	27.02.2021
264	event20210227_013222_109	krátka bez headecha	0.359606	0.683835	0.0262726	0.0396197	0.439859	0.9496	12.5223	1:31:59.522	01:32:22	27.02.2021
265	event20210227_014356_116	krátka s headechom	0.364532	0.698098	0.0147783	0.0903328	0.488469	0.5341	12.908	1:43:33.908	01:43:56	27.02.2021
266	event20210227_014518_118	krátka s headechom	0.361248	0.671949	0.0344828	0.101426	0.273861	1.2463	12.4332	1:44:55.433	01:45:18	27.02.2021
267	event20210227_014518_118	dĺhá s headechom	0.362069	0.667195	0.0361248	0.0824089	0.313051	1.3056	12.4332	1:44:55.433	01:45:18	27.02.2021
268	event20210227_014518_118	krátka bez headecha	0.511905	0.66561	0.0139573	0.0285261	0.385227	0.5045	18.2493	1:45:01.249	01:45:18	27.02.2021
269	event20210227_014518_118	krátka bez headecha	0.932266	0.695721	0.0139573	0.0348653	0.500336	0.5045	33.4421	1:45:16.442	01:45:18	27.02.2021
270	event20210227_014524_119	dĺhá s headechom	0.211412	0.666403	0.0353038	0.0776545	0.322189	1.276	7.003	1:44:56.003	01:45:24	27.02.2021
271	event20210227_014524_119	krátka bez headecha	0.361658	0.66561	0.0139573	0.0285261	0.555589	0.5045	12.819	1:45:01.819	01:45:24	27.02.2021
272	event20210227_014524_119	krátka bez headecha	0.78202	0.696513	0.0139573	0.0332805	0.518733	0.5045	28.0119	1:45:17.011	01:45:24	27.02.2021
273	event20210227_014728_124	krátka bez headecha	0.358374	0.690174	0.0139573	0.0427892	0.428893	0.5045	12.7003	1:47:05.700	01:47:28	27.02.2021
274	event20210227_014935_128	krátka s headechom	0.363301	0.666403	0.0238095	0.0554675	0.43528	0.8605	12.7003	1:49:12.700	01:49:35	27.02.2021
275	event20210227_015338_130	krátka s headechom	0.367406	0.68542	0.0188834	0.0649762	0.600977	0.6825	12.9377	1:53:15.937	01:53:38	27.02.2021

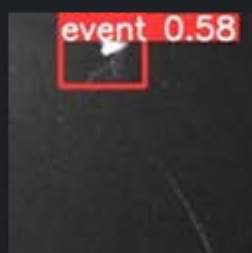
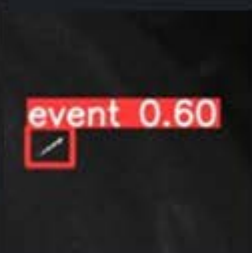
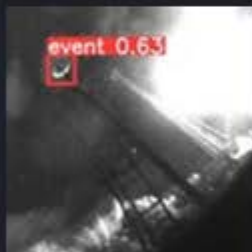


Automatic TLE detection





Issues



TLE dataset

	TP events per year	Num. of all Images	False Positive
2014	9	-	
2015	18	-	
2016	61	41 987	1 007
2017	77	48 189	713
2018	25	52 371	832
2019	48	53 964	1 986
2020	96	39 375	1 120
2021	43	31 251	1 013
SUM	377	267,147	6 671

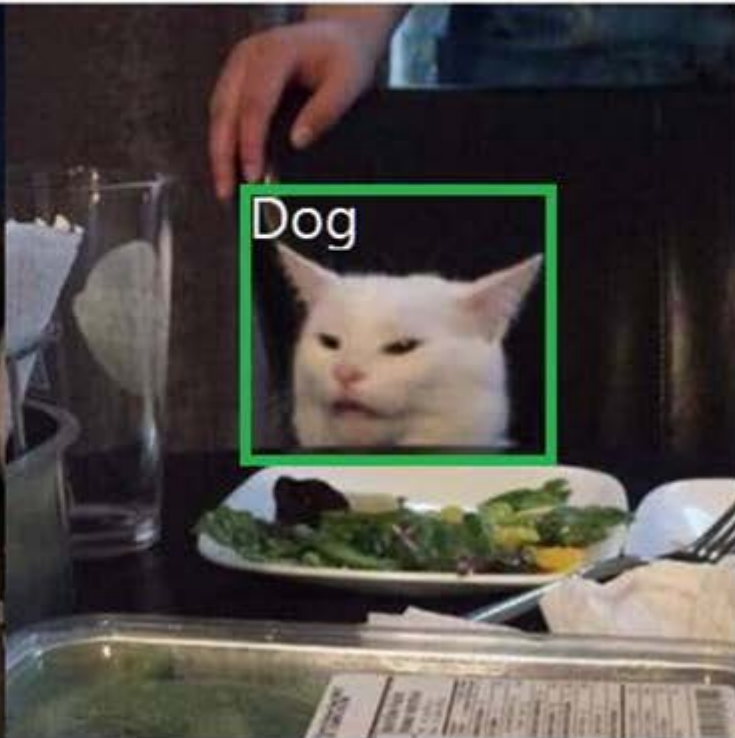
THANKS

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People with no idea about AI, telling me my AI will destroy the world

Me wondering why my neural network is classifying a cat as a dog..





People: AI so smart, it will distroy us!

AI:



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