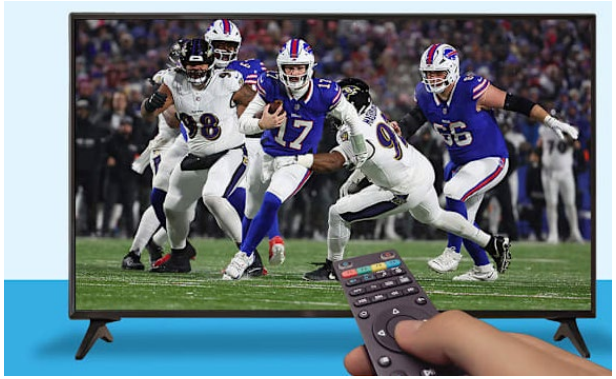
CASE : TV Commercial Detection

- Many researchers have approached the question of how to remove TV commercials from a recorded TV broadcast most of them based on machine learning algorithms.
- Many DVR apps (including Xfinity's Xfinity Stream app) have included features that will allow the user to fast forward through detected commercial content.
- Suppose two computer algorithms (Algorithm A and B) were trained using the same data set containing thousands of hours of recorded TV broadcast divided into "programming" and "commercial".
- The two algorithms were tested for efficiency using 1000 15-second video sequences representing verified "programming" and 1000 15-second "commercials" (played in random order) to see which ones they correctly identified.
- Which of the two algorithms performed better? Use hypothesis tests or confidence intervals to justify your answer.



CASE : TV Commercial Detection

	Programming correctly identified	Programming misclassified	Commercial correctly identified	Commercial misclassified
Algorithm A	990	10	870	130
Algorithm B	980	20	950	50

p_{pA}= Probability of Algorithm A correctly classifying a known programming video

p_{pB}= Probability of Algorithm B correctly classifying a known programming video

p_{cA}= Probability of Algorithm A correctly classifying a known commercial video

p_{cA}= Probability of Algorithm B correctly classifying a known commercial video

CASE : Carbon Monoxide Emission from Cigarettes

- The Federal Trade Commission (FTC) conducts periodic tests on the tar and nicotine content and carbon monoxide emission of each brand of cigarettes sold in the U.S.
- Marlboro claims to have less carbon monoxide emitted than from Kool cigarettes.
- Does the data provide evidence to support this claim?

CASE : Carbon Monoxide Data

Marlboro		Kool
15	15	15
12	12	13
16	16	11
11	12	16
6	11	10
10	12	9
12		17
15		13
7		16

CO Contents
(in milligrams)
for cigarettes

CASE : Carbon Monoxide Data

Marlboro		Kool
15	15	15
12	12	13
16	16	11
11	12	16
6	11	10
10	12	9
12		17
15		13
7		16

$\bar{x}_1 = 12.13 \quad s_1 = 3.00 \;\; n_1 = 16$

$\bar{x}_2 = 13.33 \quad s_2 = 2.87 \;\; n_2 = 9$

CASE : WSP DUI Reports

DISCOVERY REPORT

B1 B2

15-May-98

SERIAL NUMBER 949207

Date	Obs Time	Operator	Citation	T	Agency	DOB	Sex	Race	Co	Cr	Acc	DrinkLoc	Batch	IS	BA1	ET1	S.Tm	BrAC1	B1.Time	Sim	BA 2	ET2	BrAC2	B2.Time	Err
4/6/98	21:13	BACON/THOMAS/	6031095	1	SPD0070	4/10/60	F	W	17	01	N	9A00000	97039	84	1	58	Y	123	21:33	102	1	42	113	21:35	
4/7/98	2:42	BACON/THOMAS/	6031096	1	SPD0070	4/30/75	M	W	17	01	N	3E35059	97039	84	1	62	Y	136	03:03	102	1	64	136	03:05	
4/7/98	2:42	BESAW/ROBERT/	6031192	1	SPD0070	12/25/72	M	A	17	01	N	9A99999	97039	84	4	0	Y	R	03:12					:	
4/8/98	0:37	BACON/THOMAS/	6031097	1	SPD0070	12/1/53	F	W	17	01	N	3F072547	97039	84	10	67	Y	118	01:05	102	1	70	119	01:08	
4/8/98	2:32	BACON/THOMAS/	6031098	1	SPD0070	10/18/73	M	W	17	01	N	3C35346	97039	84	5	67	Y	086	02:57	102	1	71	088	03:00	
4/9/98	22:30	HAY/MICHAEL/D	5874320	1	SPD0070	4/15/69	M	W	17	01	N	9A99999	97039	84	1	71	Y	153	22:49	101	1	44	139	22:51	
4/10/98	3:00	HAY/MICHAEL/D	5874321	1	SPD0070	7/2/74	M	W	17	01	Y	9A99999	97039	84	6	43	Y	V	03:20					:	
4/10/98	3:09	BACON/THOMAS/	6031100	1	SPD0070	12/27/77	M	W	17	03	N	9A00000	97039	84	1	66	Y	109	03:31	102	12	74		V 03:36	
4/10/98	23:34	BACON/THOMAS/	6031126	1	SPD0070	5/2/73	M	W	17	01	Y	3F354169	97039	84	10	63	Y	196	23:55	102	6	29	181	23:58	
4/11/98	0:48	ROBBIN/ROBERT/	6031333	1	SPD0070	9/18/47	M	W	17	01	N	9A99999	97039	84	1	58	Y	111	01:08	102	1	64	105	01:10	
4/11/98	1:14	HAY/MICHAEL/D	5874322	1	SPD0070	12/30/78	M	W	17	01	N	9A99999	97039	84	1	35	Y	122	01:44	102	9	0		R 01:48	
4/11/98	1:22	BOWLING/CHRIS/	6031066	1	SPD0070	5/27/60	F	W	17	01	N	9A99999	97039	84			Y	R	01:54					:	
4/11/98	3:51	BACON/THOMAS/	6031127	1	SPD0070	6/27/78	F	W	17	03	N	9A00001	97039	84	1	60	Y	068	04:10	103	1	61	068	04:13	
4/11/98	22:50	HAY/MICHAEL/D	5874323	1	SPD0070	2/14/60	M	W	17	01	Y	9A99999	97039	84	1	35	Y	218	23:11	102	1	33	210	23:13	
4/12/98	1:50	HAY/MICHAEL/D	5874324	1	SPD0070	7/17/74	M	W	17	01	N	9A99999	97039	84	1	40	Y	162	02:19	102	1	49	168	02:21	
4/13/98	17:34	KORNER/MICHAE	6031699	1	SPD0070	4/13/48	M	W	17	01	Y	3A35560	97039	84	1	55	Y	242	17:55	101	1	52	230	17:57	
4/14/98	1:39	BOWLING/CHRIS/	6031067	1	SPD0070	8/18/72	F	W	17	01	N	9A99999	97039	84	2	63	Y	162	02:04	101	1	54	161	02:07	
4/14/98	2:43	BESAW/ROBERT/	6031193	1	SPD0070	9/2/73	M	W	17	01	Y	9A99999	97039	84	1	57	Y	216	03:03	101	1	67	227	03:06	
4/15/98	0:38	BOWLING/CHRIS/	6031068	1	SPD0070	9/2/59	M	W	17	01	N	9A99999	97039	84	3	58	Y	161	01:02	101	2	58	168	01:05	
4/15/98	3:15	HAY/MICHAEL/D	5874325	1	SPD0070	9/11/57	M	W	17	01	N	9A99999	97039	84	5	43	Y	172	03:41	100	2	52	198	03:43	
4/16/98	0:42	HAY/MICHAEL/D	6045553	1	SPD0070	7/15/34	M	W	17	01	N	9A99999	97039	84	1	41	Y	155	01:04	101	1	43	153	01:07	
4/17/98	0:44	ROBBIN/ROBERT/	60311337	1	SPD0070	11/26/78	M	W	17	01	N	9A99999	97039	84	1	60	Y	076	01:04	101	1	61	070	01:07	
4/17/98	0:52	BACON/THOMAS/	6031131	1	SPD0070	10/26/72	M	W	17	01	N	9A99999	97039	84	2	53	Y	133	01:12	102	1	65	128	01:15	
4/17/98	3:00	TEETER/M/S	5873707	1	SPD0070	5/22/74	M	W	17	01	N	3D07930	97039	84	1	86	Y	150	03:19	101	1	75	148	03:22	
4/17/98	20:42	BESAW/ROBERT/	6031194	1	SPD0070	6/2/71	M	W	17	01	N	3C07377	97039	84	4	54	Y	133	21:03	102	3	51	134	21:06	
4/17/98	23:13	HOTTLE/HEATHE	60311952	1	SPD0070	4/19/47	M	W	17	01	Y	3C35064	97039	84	1	50	Y	235	23:34	101	1	62	225	23:37	
4/17/98	23:17	BACON/THOMAS/	6031132	1	SPD0070	4/13/66	M	W	17	01	N	9A00001	97039	84	1	58	Y	170	23:43	101	6	63		V 23:46	
4/18/98	4:40	DIAZ/ADRIAN/ZA	60311333	1	SPD0070	11/17/79	F	W	17	01	N	9A00000	97039	84	2	31	Y	184	05:04	102	5	62	186	05:07	
4/19/98	23:49	ROBBIN/ROBERT/	6031339	1	SPD0070	7/30/65	M	W	17	01	N	9A99999	97039	84	1	32	Y	161	00:22	101	1	43	157	00:24	
4/19/98	2:00	HAY/MICHAEL/D	6031340	1	SPD0070	6/15/73	M	W	17	01	Y	9A99999	97039	84			Y	R	02:27					:	

BAC1	BAC2
123	113
136	136
118	119
86	88
153	139
196	181
111	105
68	68
218	210
162	168
242	230
162	161
216	227
161	168
172	198
155	153
76	70
133	128
150	148
133	134
235	225
184	186
161	157
Average Std.dev	

BAC1	BAC2	diff
123	113	10
136	136	0
118	119	-1
86	88	-2
153	139	14
196	181	15
111	105	6
68	68	0
218	210	8
162	168	-6
242	230	12
162	161	1
216	227	-11
161	168	-7
172	198	-26
155	153	2
76	70	6
133	128	5
150	148	2
133	134	-1
235	225	10
184	186	-2
161	157	4
Average		1.69565
Std.dev		8.98704