

Matching System Results for the 2020 Biometric Technology Rally

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2020 Biometric Technology Rally Overview

The 2020 Biometric Technology Rally tested the state of the biometric industry with regard to the ability to identify people using high-throughput systems in the presence of their personal face masks. Both biometric image capture systems ("acquisition systems") and biometric matching algorithms ("matching systems") were tested. Acquisition systems were designed to take under 8 seconds per transaction and operate without staff. Six face acquisition systems and 10 face matching systems were tested. One iris acquisition system and three iris matching systems were also tested. Matching systems were evaluated based on their ability to match images from each corresponding acquisition system. For further information about the 2020 Biometric Technology Rally acquisition system results and test design, please visit <https://mdtf.org>.

The 2020 Rally data collection and analysis occurred at the Maryland Test Facility (MdTF), a DHS affiliated biometrics testing laboratory, in Autumn of 2020. Select matching system performance results are available below.

Face and iris recognition performance was assessed on a sample of 582 diverse people under two independent conditions:

- Without Masks: Individuals removed their personal face masks immediately prior to using each system.
- With Masks: Individuals wore their personal face masks while using each system.

To comply with information sharing agreements between DHS and the biometric system providers, all company names are double aliased, with separate aliases for acquisition and matching systems associated with mask and no-mask performance. If you are interested in contacting one or more of the companies that participated in the Rally, please send an e-mail to peoplescreening@hq.dhs.gov and specify the aliased systems of interest.

Data Description

- Mask: The test condition under which images were acquired. Without Mask: Individuals removed their personal face masks immediately prior to using each system. With Mask: Individuals wore their personal face masks while using each system.
- Acquisition System: The aliased acquisition system name.
- Matching System: The aliased matching system name.
- Total People: Total number of people that attempted to use each acquisition system. Due to variation in individuals' behavior during the test, some individuals did not perform a valid transaction with some acquisition systems, creating a variation in the "Total People" count between acquisition systems.
- Acquired Images: The number of people for whom at least one image was successfully acquired by the acquisition system within 20 seconds.
- Extracted Images: The number of people for whom the last image acquired within 20 seconds was able to generate a template with the matching system.
- Correct Identifications: The number of people correctly identified by the matching system using the last image acquired within 20 seconds.
- Full System TIR (%): True identification rate, expressed as the percentage of people that used the system who were correctly identified (Correct Identifications / Total People).
- Matching Focused TIR (%): True identification rate, expressed as the percentage of acquired images that were correctly identified (Correct Identifications / Acquired Images).

Face Matching System Results

Mask	Acquisition System	Matching System	Total People	Acquired Images	Extracted Images	Correct Identifications	Full System TIR (%)	Matching Focused TIR (%)
With Mask	Coosa	Alan	581	481	478	462	79.5	96.0
With Mask	Coosa	Brush	581	481	481	21	3.6	4.4
With Mask	Coosa	Cedar	581	481	481	418	71.9	86.9
With Mask	Coosa	Mayo	581	481	463	395	68.0	82.1
With Mask	Coosa	Nolan	581	481	481	361	62.1	75.1
With Mask	Coosa	Osage	581	481	481	423	72.8	87.9
With Mask	Coosa	Pond	581	481	481	385	66.3	80.0
With Mask	Coosa	Sandy	581	481	481	375	64.5	78.0
With Mask	Coosa	Taff	581	481	479	437	75.2	90.9
With Mask	Coosa	Wolf	581	481	481	422	72.6	87.7
With Mask	Elk	Alan	580	550	412	401	69.1	72.9
With Mask	Elk	Brush	580	550	550	55	9.5	10.0
With Mask	Elk	Cedar	580	550	550	504	86.9	91.6
With Mask	Elk	Mayo	580	550	535	509	87.8	92.5
With Mask	Elk	Nolan	580	550	550	505	87.1	91.8
With Mask	Elk	Osage	580	550	501	487	84.0	88.5
With Mask	Elk	Pond	580	550	550	522	90.0	94.9
With Mask	Elk	Sandy	580	550	549	476	82.1	86.5
With Mask	Elk	Taff	580	550	549	505	87.1	91.8
With Mask	Elk	Wolf	580	550	538	502	86.6	91.3
With Mask	Fray	Alan	579	565	561	555	95.9	98.2
With Mask	Fray	Brush	579	565	565	48	8.3	8.5
With Mask	Fray	Cedar	579	565	565	516	89.1	91.3
With Mask	Fray	Mayo	579	565	554	529	91.4	93.6
With Mask	Fray	Nolan	579	565	565	529	91.4	93.6
With Mask	Fray	Osage	579	565	551	532	91.9	94.2
With Mask	Fray	Pond	579	565	565	532	91.9	94.2
With Mask	Fray	Sandy	579	565	565	480	82.9	85.0
With Mask	Fray	Taff	579	565	563	521	90.0	92.2
With Mask	Fray	Wolf	579	565	562	531	91.7	94.0
With Mask	Glen	Alan	580	524	523	517	89.1	98.7
With Mask	Glen	Brush	580	524	524	52	9.0	9.9
With Mask	Glen	Cedar	580	524	524	479	82.6	91.4
With Mask	Glen	Mayo	580	524	485	459	79.1	87.6
With Mask	Glen	Nolan	580	524	524	491	84.7	93.7
With Mask	Glen	Osage	580	524	517	504	86.9	96.2
With Mask	Glen	Pond	580	524	524	500	86.2	95.4
With Mask	Glen	Sandy	580	524	523	456	78.6	87.0
With Mask	Glen	Taff	580	524	524	483	83.3	92.2
With Mask	Glen	Wolf	580	524	524	498	85.9	95.0
With Mask	Jacks	Alan	580	496	492	481	82.9	97.0
With Mask	Jacks	Brush	580	496	496	43	7.4	8.7
With Mask	Jacks	Cedar	580	496	495	432	74.5	87.1
With Mask	Jacks	Mayo	580	496	458	419	72.2	84.5
With Mask	Jacks	Nolan	580	496	496	400	69.0	80.6
With Mask	Jacks	Osage	580	496	482	434	74.8	87.5
With Mask	Jacks	Pond	580	496	496	414	71.4	83.5
With Mask	Jacks	Sandy	580	496	496	417	71.9	84.1
With Mask	Jacks	Taff	580	496	491	446	76.9	89.9
With Mask	Jacks	Wolf	580	496	491	445	76.7	89.7
With Mask	Round	Alan	581	408	408	402	69.2	98.5
With Mask	Round	Brush	581	408	408	22	3.8	5.4
With Mask	Round	Cedar	581	408	408	389	67.0	95.3
With Mask	Round	Mayo	581	408	408	398	68.5	97.5
With Mask	Round	Nolan	581	408	408	396	68.2	97.1
With Mask	Round	Osage	581	408	407	397	68.3	97.3
With Mask	Round	Pond	581	408	408	392	67.5	96.1
With Mask	Round	Sandy	581	408	408	361	62.1	88.5
With Mask	Round	Taff	581	408	408	386	66.4	94.6
With Mask	Round	Wolf	581	408	408	398	68.5	97.5
Without Mask	Besek	Clark	581	518	518	503	86.6	97.1
Without Mask	Besek	Gila	581	518	518	511	88.0	98.6
Without Mask	Besek	James	581	518	518	515	88.6	99.4
Without Mask	Besek	Leaf	581	518	518	235	40.4	45.4
Without Mask	Besek	Maumee	581	518	518	517	89.0	99.8
Without Mask	Besek	Owens	581	518	518	515	88.6	99.4
Without Mask	Besek	Pearl	581	518	518	515	88.6	99.4
Without Mask	Besek	Reese	581	518	518	517	89.0	99.8
Without Mask	Besek	Sabine	581	518	518	463	79.7	89.4
Without Mask	Besek	Yadkin	581	518	517	512	88.1	98.8
Without Mask	Dans	Clark	574	570	570	551	96.0	96.7

(continued)

Mask	Acquisition System	Matching System	Total People	Acquired Images	Extracted Images	Correct Identifications	Full System TIR (%)	Matching Focused TIR (%)
Without Mask	Dans	Gila	574	570	570	560	97.6	98.2
Without Mask	Dans	James	574	570	570	564	98.3	98.9
Without Mask	Dans	Leaf	574	570	570	88	15.3	15.4
Without Mask	Dans	Maumee	574	570	570	567	98.8	99.5
Without Mask	Dans	Owens	574	570	570	562	97.9	98.6
Without Mask	Dans	Pearl	574	570	550	539	93.9	94.6
Without Mask	Dans	Reese	574	570	564	561	97.7	98.4
Without Mask	Dans	Sabine	574	570	570	517	90.1	90.7
Without Mask	Dans	Yadkin	574	570	569	562	97.9	98.6
Without Mask	Pine	Clark	582	498	498	484	83.2	97.2
Without Mask	Pine	Gila	582	498	498	485	83.3	97.4
Without Mask	Pine	James	582	498	498	497	85.4	99.8
Without Mask	Pine	Leaf	582	498	498	66	11.3	13.3
Without Mask	Pine	Maumee	582	498	498	497	85.4	99.8
Without Mask	Pine	Owens	582	498	498	493	84.7	99.0
Without Mask	Pine	Pearl	582	498	491	490	84.2	98.4
Without Mask	Pine	Reese	582	498	497	497	85.4	99.8
Without Mask	Pine	Sabine	582	498	498	450	77.3	90.4
Without Mask	Pine	Yadkin	582	498	498	492	84.5	98.8
Without Mask	Stone	Clark	577	544	544	534	92.5	98.2
Without Mask	Stone	Gila	577	544	544	536	92.9	98.5
Without Mask	Stone	James	577	544	544	540	93.6	99.3
Without Mask	Stone	Leaf	577	544	544	186	32.2	34.2
Without Mask	Stone	Maumee	577	544	544	542	93.9	99.6
Without Mask	Stone	Owens	577	544	544	538	93.2	98.9
Without Mask	Stone	Pearl	577	544	544	543	94.1	99.8
Without Mask	Stone	Reese	577	544	544	541	93.8	99.4
Without Mask	Stone	Sabine	577	544	544	494	85.6	90.8
Without Mask	Stone	Yadkin	577	544	540	536	92.9	98.5
Without Mask	Vly	Clark	578	572	570	557	96.4	97.4
Without Mask	Vly	Gila	578	572	572	562	97.2	98.3
Without Mask	Vly	James	578	572	572	568	98.3	99.3
Without Mask	Vly	Leaf	578	572	572	184	31.8	32.2
Without Mask	Vly	Maumee	578	572	569	569	98.4	99.5
Without Mask	Vly	Owens	578	572	572	567	98.1	99.1
Without Mask	Vly	Pearl	578	572	569	568	98.3	99.3
Without Mask	Vly	Reese	578	572	571	569	98.4	99.5
Without Mask	Vly	Sabine	578	572	572	506	87.5	88.5
Without Mask	Vly	Yadkin	578	572	572	560	96.9	97.9
Without Mask	West	Clark	576	576	576	560	97.2	97.2
Without Mask	West	Gila	576	576	576	562	97.6	97.6
Without Mask	West	James	576	576	576	573	99.5	99.5
Without Mask	West	Leaf	576	576	576	139	24.1	24.1
Without Mask	West	Maumee	576	576	576	574	99.7	99.7
Without Mask	West	Owens	576	576	576	564	97.9	97.9
Without Mask	West	Pearl	576	576	574	572	99.3	99.3
Without Mask	West	Reese	576	576	574	571	99.1	99.1
Without Mask	West	Sabine	576	576	576	529	91.8	91.8
Without Mask	West	Yadkin	576	576	573	569	98.8	98.8

Iris Matching System Results

Mask	Acquisition System	Matching System	Total People	Acquired Images	Extracted Images	Correct Identifications	Full System TIR (%)	Matching Focused TIR (%)
With Mask	Round	Eagle	581	394	394	391	67.3	99.2
With Mask	Round	Goat	581	394	394	389	67.0	98.7
With Mask	Round	Penguin	581	394	392	386	66.4	98.0
Without Mask	Pine	Bear	582	478	470	460	79.0	96.2
Without Mask	Pine	Rhino	582	478	478	468	80.4	97.9
Without Mask	Pine	Sheep	582	478	478	467	80.2	97.7