### DHS SCIENCE AND TECHNOLOGY

### 2021 Biometric Technology Rally Pre-Submission Webinar



Science and Technology



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### Outline

- Background
- Test Process
- Logistics
- Metrics
- Application Programming Interface (API)
- Acquisition System Application Details
- Matching System Application Details



# **Biometric & Identity Technology Center**

### Vision

- Drive biometric and identity innovation at DHS through RDT&E capability
- Facilitate and accelerate understanding of biometrics and identity technologies for new DHS use cases
- Follow "Build once, use widely" approach

### <u>Goals</u>

- Drive efficiencies by supporting cross cutting methods, best practices, and solutions across programs
- Deliver Subject Matter Expertise across the DHS enterprise
- Engage Industry and provide feedback
- Encourage Innovation with Industry and Academia





### **Biometric Technology Rallies**



- Rally Goals
  - Focus Industry on a specific use-case (e.g., high-throughput, face masks)
  - Identify and mitigate risks associated with new biometric technology
  - Create an independent assessment of current industry offerings
  - Collaborate and guide promising technologies, using Cooperative Research and Development Agreements
- Annual Rallies
  - High throughput unattended use case
  - Scenario testing with naïve test volunteers
  - Dozens of commercial devices
  - Finger, face, and iris modalities
  - More information: <u>http://mdtf.org</u>



### **Past Biometric Technology Rallies**

2019

**Biometric** 

**Rally** at

MdTF

Technology



 2018 Rally assessed acquisition systems  2019 Rally assessed acquisition systems and matching systems



- 2020 Rally assessed acquisition and matching systems in the presence of *face masks*
- Since 2018, the Rallies have demonstrated progress in the performance and maturity of biometric acquisition and matching systems
  - Rally results provide insights into how people interact with biometric systems to improve usability
  - Rally results have been used to inform participating vendors, leading to improved performance of both acquisition and matching systems

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# **2021 Biometric Technology Rally**

- Scenario will be a "high-throughput" use case
  - Face or multimodal systems
  - Acquisition systems and/or matching systems
- Results will demonstrate the efficiency, effectiveness, and user satisfaction with current commercial biometric systems:
  - Ability of acquisition systems to capture images that work across algorithms
  - Ability of matching systems to work across acquisition systems
  - Biometric system performance with and without face masks
  - NEW: Biometric system performance reported by specific demographic groups
- DHS Science and Technology (S&T) will continue to collaborate and guide promising technologies and share information via Cooperative Research and Development Agreements





# Why participate in the Rally?

#### For acquisition system providers

- Receive biometric images collected on your system from a diverse sample of people
- Measure performance of your system in a high throughput use-case
- Measure performance with specific demographic groups
- View videos of transactions to identify use errors and improve your system

### For matching system providers

- Measure performance across a variety of commercial acquisition systems
- Measure performance with specific demographic groups
- Receive demographic and biometric data to help tune system performance
- Opportunities to partner with acquisition systems

#### All Rally participants will...

- Inform government regarding your system's performance in an operationally relevant scenario test
- Receive industry recognition via aliased reporting of results
- Attend VIP Day, a networking opportunity with government and industry representatives
- Form an ongoing Cooperative Research and Development Agreement (CRADA) with DHS S&T



# What Is a CRADA?

- An agreement between a federal laboratory and a non-federal entity to conduct collaborative research and development (R&D) activities
- A legally binding and enforceable agreement that allows federal researchers and their CRADA partners (collaborators) to exchange data and ideas while protecting intellectual property and proprietary information
- Collaborative activities performed under a CRADA can span the entire R&D lifecycle, from basic research and concept ideation to test and evaluation, pilot technology deployments, and product enhancement



No funding will be provided by DHS S&T under Rally CRADAs

### When Is a CRADA Appropriate?

- CRADAs are an ideal mechanism for collaboration when DHS:
  - Has resources and/or expertise not otherwise available to industry or outside parties that can be used to further the development of mission-critical technology
  - Needs the help of a private sector partner to develop an idea or technology to further its R&D mission
  - Needs a private sector partner to advance development of a technology or product to make it useful for consumers or the commercial market



# 2021 Biometric Technology Rally System Requirements

- Who can participate?
  - Vendors of face, face/iris and face/fingerprint biometric acquisition systems
  - Vendors of face, iris, or fingerprint biometric matching systems
  - Vendors may provide a matching system, an acquisition system, or both
- Minimum requirements for acquisition systems:
  - Operate in an unmanned mode (i.e., no operator / instructor present)
  - Operate within a 6' W x 8' L physical footprint
  - Collect a single face biometric image per test volunteer
  - Process and submit biometric data within defined time constraints
  - Acquire images from people wearing face masks
  - Optional: Collect additional face, iris, or fingerprint images
- Minimum requirements for matching systems:
  - Provide a software package that conforms to the MdTF Matching API
  - Match images of people wearing face masks to images of people without face masks
  - Operate within some computational limits (RAM/CPU usage, speed, etc.)



# **Rally Timeline**

### **Before Testing**







DIVERSE PERSPECTIVES + SHARED GOALS = POWERFUL SOLUTIONS



# Test Process



**DIVERSE PERSPECTIVES + SHARED GOALS = POWERFUL SOLUTIONS** 

# **Acquisition System Rally Station**



- Equipment must be installed in a 6' wide x 8' long area (1.8 x 2.4 m)
- One six outlet power strip will be provided
  - Power consumption will be monitored
  - 5-amp maximum power draw enforced
- One network drop will be provided for Rally API communication
  - Acquisition system providers must use own switch to network any hardware
- No access to the internet will be provided during system installation, VIP day, or scenario testing
  - Bring a hotspot if you need internet connection while at the facility



### **Acquisition System Test Process**





### **Acquisition System Test Process**



### **Acquisition System Test Process**

- Acquisition systems will collect biometric images from demographically diverse volunteers:
  - Volunteers will have prior experience with biometric devices and processes
  - Volunteers will be told to comply with any acquisition system instructions
  - Volunteers will not be briefed on how to use specific acquisition systems
- Volunteers will be divided into multiple groups, each led by a test guide:
  - Test guides will move each group between Rally Stations in a unique counterbalanced order
  - Volunteers will use the system one at a time
  - Volunteers will use each system twice: Without-masks first, then with-masks
- Test timing will be automated:

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- Each group will be allotted a fixed amount of time at each Rally Station
- Systems maintaining a 10 second average transaction time will be able to process the full group
- Groups will promptly move to the next station when the time has expired even if the system failed to process everyone

### No acquisition system provider staff will be allowed on the floor during testing



## **Matching System Test Process**

- Matching systems will be deployed on an isolated network at the MdTF for evaluation
- Matching systems will be evaluated using probe images of volunteers acquired at the MdTF by acquisition systems during the Rally
- Each probe image will be matched against a set of "historic" gallery images from ~500 volunteers previously tested at the MdTF
- The volunteer in the image with the rank-1 score above threshold will be chosen as the match result:
  - Failure to process: matching systems should optimize template generation based on the Rally scenario
  - Probes in the gallery: at least one gallery image for the correct volunteer should have a rank-1 score above threshold
  - Probes not in the gallery: the matching system should uniformly report scores below threshold
- Fusion will be performed on match results for iris and fingerprint images
- Vendors will provide a set of thresholds to be used in the evaluation to achieve specific FMR settings
  - It is important to provide accurate estimates of FMR at each threshold, as these will be used to compute true identification rates





# Logistics



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### **Selection Process**

### **Acquisition Systems**

- Adhere to the MdTF API
- Acquire high quality biometric images
- Operate within the required time / space constraint
- Operate in an unmanned environment
- Readily integrate into the test environment at the MdTF
- Be relevant to the high-throughput DHS use-case

### **Matching Systems**

- Adhere to the MdTF API
- Be appropriately containerized
- Operate within set computational constraints
- Achieve a high true identification rate
- Achieve a low failure to process rate

- All systems should be effective across demographic groups
- All systems should be effective in the presence and absence of face masks

A maximum of 10 acquisition systems will be selected.

If a single organization submits multiple applications, the preferred system for inclusion should be indicated, but no commitment is made to abide by this preference.



### **Selection Process**

- Acquisition systems and matching systems will apply with a white paper and short video
  - Details about the application packages are provided in slides at the end of this deck. These slides will be available at <u>https://mdtf.org/Rally2021</u>
- DHS will have sole discretion in selecting acquisition and matching systems for inclusion
  - DHS S&T will be advised in this process by a panel of biometric experts
  - Space is limited, so DHS S&T will select only some of the acquisition system applicants
  - DHS S&T will only select matching system white papers that clearly demonstrate competitive biometric performance and applicability to DHS use-cases



### **Rally Test Location**

- The 2021 Biometric Technology Rally will be held at the Maryland Test Facility (MdTF)
  - Located just outside the DC Metropolitan Beltway (near FedEx Field)
  - Designed for testing large groups of volunteers in configurable scenarios
  - Provides software API for integrating biometric systems
- The VIP Day will be held **IN PERSON** at the MdTF
- All acquisition systems to be delivered to the MdTF for the Rally
- All matching systems to be deployed on an isolated network at the MdTF





# Acquisition System Responsibilities – Before Test

- Acquisition system providers are responsible for:
  - Procuring all hardware to maintain and operate their system
  - Integrating their device/system within the MdTF API
    - MdTF staff will provide minimal assistance
  - Any/all hardware/software testing, including proper communication with the MdTF API
  - The full installation and breakdown of their own equipment within the MdTF
- Steps to be taken in between conditional acceptance and final acceptance will be briefed in detail after conditional acceptances are distributed
  - System safety information
  - Human subjects ethics training



### **Matching System Provider Responsibilities**

- Create a Docker image that conforms to the Rally matching system API, application, and computational resource requirements
- Provide a set of score thresholds associated with specific required false match rate (FMR) settings
- Deliver the Docker image to the MdTF. Docker images will be uploaded via a webpage at <u>https://mdtf.org/</u>
- Test and packaging scripts are available at <u>https://github.mdtf.org</u>

Please consider ease of integration into the MdTF infrastructure upon receipt of the algorithm. DHS has sole discretion in disqualification if the algorithm requires an excessive effort to achieve functionality. • System requirements:

- The implemented matching algorithm must be commercially available from the provider
- Docker image is less than 1.5 GB in size
- The Docker image will reliably return a template in less than 1000 milliseconds
- A list of 1000-templates will reliably return a list of 1000 comparison objects in less than 300 milliseconds.
- All functionality will work for at least one calendar year without access to external networks and without license constraints.
- Operate without internet access



# Acquisition System Responsibilities – During Test

- Acquisition system providers will be able to stay in a designated area and view data sent to Rally API by their system following each volunteer pass through their station
- Acquisition system providers will be responsible for informing MdTF staff of any issues with their system's performance during testing
  - MdTF staff will log these issues and determine whether intervention is allowable
  - Up to two usability / human factors adjustments to acquisition systems will be allowed during the first two days of testing
  - Acquisition system providers may make repairs to their systems in case of breakage

All modifications or repairs must be made when volunteers have left the test environment



### **Human Factors Considerations**

- Acquisition systems should include signage or instructions to guide the volunteers
  - Systems must operate in an unmanned mode, i.e., without an operator/instructor
- MdTF staff will not provide any assistance to volunteers asking for help using the system
- Consider the following when creating instructional signage:
  - Size of display
  - Complexity of instructions
  - Amount of text
  - Complexity of text
  - Location of signage in relation to the system

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# Metrics



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### **Acquisition Metrics – Overview**

- Designed for a high-throughput, unattended use-case
- Core rally performance measures:
  - Efficiency Refers to the amount of time required to complete a biometric transaction
  - Satisfaction Refers to positive system ratings by volunteers
  - Effectiveness Refers to the ability of biometric systems to acquire and/or match images from volunteers
- Disaggregated results:
  - Biometric Systems Metrics computed separately for each tested system / system combination
  - Face Masks Metrics computed separately for volunteers with and without masks

### **NEW FOR 2021**

Demographics – Metrics computed separately for volunteers in different race and gender groups



# **Acquisition Metric – Efficiency**

### Average Transaction Time

- The time, per volunteer, spent using the system
- Calculated as the difference between the EXIT beam break time and ENTRY beam break time





### **Acquisition Metric – Satisfaction**

### Percent Satisfaction

 Proportion of positive ("Happy" or "Very Happy") satisfaction scores provided by volunteers after each system use Threshold: > 90% Goal: > 95%





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## **Acquisition Metric – Effectiveness – FtAR**

### Failure to Acquire Rate (FtAR)

- Calculated, per modality, as the proportion of volunteers using the system for which an image of sufficient quality is not submitted
- An image of sufficient quality will generate a biometric template using the MdTF in-house matching system





# Acquisition Metric – Effectiveness – mTIR

### MdTF True Identification Rate (mTIR)

- Proportion of volunteers correctly identified using acquired images
  - Calculated per modality using the MdTF in house matching system
  - A true identification is counted if the last
     capture can be identified as the volunteer





### **Matching Metrics – Overview**

- Matching systems will template and match biometric images:
  - Collected on a variety of acquisition systems
  - >2,000 unique individuals acquired using MdTF systems over seven years
- Metrics will measure:
  - Effectiveness Refers to ability to identify individuals using probe images from Rally acquisition systems
  - Disaggregation Refers to ability to maintain high effectiveness across different groups





# Matching Metric – Effectiveness – TIR

### True Identification Rate (TIR)

- Percentage of volunteers correctly identified using acquired images for each acquisition-matching system combination
  - Multiple match thresholds:
    - FMR in {1:1,000, 1:10,000, 1:100,000, 1:1,000,000}
- A true identification is counted for a volunteer if they can be correctly identified using the captured images at the specified threshold
- Reported separately including and excluding failures to acquire





Correct identification includes:

- Identifying in-gallery volunteers at rank-1 above threshold
- 2. Returning no scores above threshold for out-ofgallery volunteers



### **Metrics – Disaggregation**

- Metrics will be computed and reported separately (disaggregated) based on different factors
- All Rallies have reported separate metrics for each biometric system / system combination
- The 2020 Rally reported metrics separately with face masks and without face masks
- The 2021 Rally will also report metrics separately by self-reported race and gender

	NEW FOR 2021		
<ul> <li>Biometric System</li> </ul>	<ul> <li>Face Masks</li> </ul>	<ul> <li>Race (self-reported)</li> </ul>	<ul> <li>Gender (self-reported)</li> </ul>
<ul> <li>Acquisition System (MdTF Matching System)</li> <li>Acquisition / Matching System Combination</li> </ul>	<ul><li>With Mask</li><li>Without Mask</li></ul>	<ul> <li>Black or African American</li> <li>White</li> <li>Asian (as a group)</li> </ul>	<ul><li>Male</li><li>Female</li></ul>



### **Metrics – Disaggregation**

- Report variation in system performance across groups
  - For example, the range of observed TIR values at a set threshold
  - Each TIR value will be reported separately in association with the appropriate group







# API



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### **Acquisition System API- Overview**

- All images will be submitted using the MdTF Rally API:
  - RESTful, HTTP based
  - http://github.com/TheMdTF/mdtf-public
- Prior to the Rally, acquisition system providers will be given:
  - Detailed API documentation
  - An API instance available publicly for testing / debugging prior to the Rally
  - Limited troubleshooting support via Slack
- During the Rally, the API will be available only on the MdTF LAN:
  - Acquisition systems will be able to perform integration effort over a cloud-based API but will have to configure the API server address and their Station ID when arriving at the MdTF



### **Acquisition System Requirements**

- The acquisition systems must:
  - provide one face biometric image volunteer on each pass (Required)
  - maintain an average transaction time of at most eight seconds per volunteer
- The acquisition systems may:
  - provide one set of individual iris images per volunteer on each pass (Optional)
  - provide one set individual fingerprint images per volunteer on each pass (Optional)
- NOTE: If multiple images/sets are provided on a pass, only the last will be considered



### **Acquisition System API- Face Capture**

- **face-captures** POST request endpoint:
  - FaceImageData is a base 64 text representation of a face portable network graphics (PNG) image
  - StationID is configurable text and will be provided on Rally acquisition system installation
- POST only one face capture per volunteer

#### POST /v1/face-captures

"FaceImageData": "iVBORw0KGgoAAAANSUhEUgAAAAEAAAABCAIAAACQdlPeAAAAEElEQVR4nGJiYGAABAAA//8ADAADcZGLFwAAAABJRUSErkJggg=="; "StationID": "MdTF\_Station"

- System requirements satisfied:
  - provide one face biometric image per volunteer (Required)



## **Acquisition System API- Iris Capture**

- **iris-captures** POST request endpoint:
  - LeftIrisImageData is a base 64 text representation of the left iris PNG image
  - RightIrisImageData is a base 64 text representation of the right iris PNG image
  - StationID is configurable text and will be provided on Rally acquisition system installation

#### POST only one iris capture per volunteer

Left and right iris images captured for the same volunteer-pass should be posted together

POST /v1/iris-captures

"LeftIrisImageData": "iVBORw0KGgoAAAANSUhEUgAAAAEAAAABCAIAAACQd1PeAAAAEE1EQVR4nGJiYGAABAAA//8ADAADcZGLFwAAAABJRU5ErkJggg==", "RightIrisImageData": "iVBORw0KGgoAAAANSUhEUgAAAAEAAAABCAIAAACQd1PeAAAAEE1EQVR4nGJiYGAABAAA//8ADAADcZGLFwAAAABJRU5ErkJggg==", "StationID": "MdTF\_Station"

- System requirements satisfied:
  - provide one set of individual iris images per volunteer on each pass (Optional)



# **Acquisition System API- Finger Capture**

- finger-captures POST request endpoint:
  - ImageCaptures array of individual finger json objects
  - FingerImageData is a base 64 text representation of a single fingerprint PNG image
  - FingerType the type of individual fingerprint image, one of:
    - {RightThumb, RightIndex, RightMiddle, RightRing, RightLittle, LeftThumb, LeftIndex, LeftMiddle, LeftRight, LeftLittle}
  - StationID must be configurable and will be provided on Rally acquisition system installation
- POST only one fingerprint capture per volunteer
  - Finger images captured in the same volunteer-pass should be posted together as ImageCaptures



- System requirements satisfied:
  - provide one set individual fingerprint images per volunteer on each pass (Optional)



# Acquisition System API- When to Submit Images

- All images must be submitted while the volunteer is using your acquisition system
- Images submitted at other times may be mis-assigned and may reduce the measured performance of your system

- After the volunteer enters the station
- Before the volunteer exits the station
- One capture (per modality if multi-modal) per volunteer



### **Matching System API- Overview**

- All matching system providers will submit a Docker image .tar file created via docker save
- The Docker image must:
  - Provide an HTTP server on port 8080 for handling API requests
  - Conform to MdTF resource constraints (CPU/memory):
    - 8 i7 CPUs, 8 GB RAM, NO GPU
  - Operate without internet access
  - Implement the MdTF API specification documented on https://github.com/TheMdTF/mdtf-public
  - Satisfy the following requirements:
    - accept individual, base 64 encoded, PNG image data and return a template (Required)
    - accept templates, performs matches, and return similarity score (Required)
    - provide information on the algorithm (Required)



### **Matching System API- Template Generation**

- /v1/create-template POST request endpoint:
  - Accepts individual (single), base 64 encoded, PNG images
  - Returns biometric feature templates in the form of a byte array
  - Note:
    - No option to provide an image type, algorithms should be agnostic to specific image types (i.e., right and left iris treated the same)
    - Failure to generate a template should set an appropriate status code indicating a failure and return an explanatory error response
- Requirements satisfied:
  - Accept individual, base 64 encoded, PNG image data and return a template (Required)



# **Matching System API- Template Matching**

- /v1/compare-list POST request endpoint:
  - Accepts:
    - (1) A single template byte array as returned from create\_template
    - (2) A list of template byte arrays as returned from several create\_template calls
  - Returns matching scores of template (1) to list of templates (2)
- Requirements satisfied:
  - accept templates, performs matches, and return similarity score (Required)



# **Matching System API- Algorithm Information**

- /v1/info GET request endpoint:
  - Returns an object with:
    - AlgorithmName
    - AlgorithmVersion
    - AlgorithmType
    - CompanyName
    - TechnicalContactEmail
    - RecommendedCPUs
    - RecommendedMem
    - Test ("MDTF\_2021\_RALLY")
    - Thresholds ({... "1:1e4" : "0.96", "1:1e5" : "0.86", "1:1e6" : "0.753" })
- Requirements satisfied:
  - provides information on the algorithm (Required)



### What to Expect

- After submitting your application package, you will be notified if your system has been selected to participate in the 2021 Biometric Technology Rally by July 30, 2021
- Acceptance for participation in the 2021 Biometric Technology Rally will be considered conditional until you complete training and various administrative tasks
  - Those selected for participation will be required to attend a conditional acceptance webinar that reviews this information



# Details on Acquisition System Application Packages



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### **Acquisition System Application Package**

- Submission deadline: July 15, 2021, 11:59 PM EDT
- Provide a white paper (5-page limit) that addresses all of the following:
  - 1. Brief overview of provider
  - 2. Overview of the acquisition system
  - 3. A description of the complexity and maturity of the acquisition system
  - 4. Description of the imagery acquired by the system
  - 5. Description of user interaction with the system
  - 6. Estimates of performance
  - 7. System safety information, including eye safety
- Demonstration video of system functionality



# Detailed Acquisition System Application Package

### **White Paper Requirements**

- 1. Brief overview of provider
  - a) A brief history of the provider's experience in the biometric community
  - b) Location, including country of provider's headquarters
  - c) Contact information (name, email, telephone number, citizenship) of a business representative
  - d) Contact information (name, email, telephone number, citizenship) of a technology representative

### 2. Overview of the acquisition system

- a) Description of cameras and/or sensors utilized, and other equipment necessary
- b) Expected layout of all equipment within the specified footprint (6' W x 8' L)
- c) Network and power requirements
- d) Example use case and workflow
- 3. A description of the complexity and maturity of the acquisition system
  - a) When was the system first conceived and developed? Is it still under development?
  - b) Known acquisition issues (height, weight, disability restrictions, etc.)
  - c) Has a third party integrated your system into a larger system? If so, how much effort was needed?
  - d) A description of any past or present operational deployments



# Detailed Acquisition System Application Package (continued)

### White Paper Requirements, continued

- 4. Descriptions of the imagery acquired by the system
  - a) Formats (jpg, png, wsq, etc.)
  - b) Quantity and Quality
- 5. Description of user interaction with the system
  - a) Actions the users perform to complete a transaction
  - b) Instructions / feedback provided to users
  - c) Are there any exception processes?
  - d) Any known usability issues or concerns and expected workarounds so that all users can complete a transaction with the system

#### 6. Estimates of performance

- a) Estimated failure to acquire rate
- b) Estimated true positive identification rate using a top 3 recognition algorithm at a threshold consistent with a false match rate of 1:100,000
- c) Estimated transaction time
- d) Estimates of performance stability relative to face masks, race, and gender



# Detailed Acquisition System Application Package (continued)

### White Paper Requirements, continued

- 7. System safety information, including eye safety
  - a) Demonstrate why system is safe for human users
  - b) Does your system use specific wavelengths for illumination?
  - c) Are there any sources of exposed current?
  - d) Are there any exposed sharp edges or moving parts that could cause physical harm?

### **Demonstration video of system functionality**

- a) Provide up to two minutes of video demonstrating your system in use
- b) Video should reflect information included in white paper
- c) Should video file be too large to be included in an email, provide a URL and instructions to reviewers for access



# Details on Matching System Application Packages



DIVERSE PERSPECTIVES + SHARED GOALS = POWERFUL SOLUTIONS

### **Matching System Application Package**

- Submission deadline: July 15, 2021, 11:59 PM EDT
- Provide an application package (limit 5 pages) in the form of a white paper that addresses all of the following:
  - 1. Brief overview of provider
  - 2. Overview of the matching system
  - 3. Descriptions of the complexity and maturity of the matching system
  - 4. Estimates of performance
  - 5. Algorithm training



## Detailed Matching System Application Package

### **White Paper Requirements**

- 1. Brief overview of provider
  - a) A brief history of the provider's experience in the biometric community
  - b) Location, including country of provider's headquarters
  - c) Contact information (name, email, telephone number, citizenship) of a business representative
  - d) Contact information (name, email, telephone number, citizenship) of a technology representative
- 2. Overview of the matching system
  - a) Modalities and acceptable biometric sample types (slap vs. individual finger for example)
  - b) High level overview of the underlying technology (CNN, Gabor wavelets, Haar cascades, etc.)
  - c) Recommended CPU, RAM, disk, operating system, and runtime dependencies
  - d) What programming languages does the matching system SDK support?



# Detailed Matching System Application Package (continued)

### White Paper Requirements, continued

- 3. Descriptions of the complexity and maturity of the matching algorithm
  - a) When was the algorithm first conceived and developed? Is it still under development?
  - b) Known processing issues (image size, pixels between the eyes, occlusion, pose, or gaze angle restrictions, etc.)
- 4. Estimates of performance
  - a) Failure to process rate (unable to create a template)
  - b) True match rates and matching thresholds for the following false match rates:
    - i. @ 1:10,000 FMR. What is the match threshold and the expected TMR?
    - ii. @ 1:100,000 FMR. What is the match threshold and the expected TMR?
    - iii. @ 1:1,000,000 FMR. What is the match threshold and the expected TMR?
  - c) Estimates of algorithm stability to pose, motion blur, low contrast and images from a diverse range of acquisition systems
  - d) Estimates of algorithm stability to face masks, race, and gender
- 5. Algorithm Training
  - a) Describe methods used to develop algorithm or measure algorithm's performance over time
  - b) Describe data used to train it open sourced, private data set, etc.



# **Rally Timeline Reminder**

9/27/2021

### **Before Testing**





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9/28/2021

9/27/2021-

10/14/2021

### **Thank You!**

- Questions?
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- For more information:
  - peoplescreening@hq.dhs.gov
  - https://mdtf.org
    - 2021 Biometric Technology Rally Information
    - All prior Biometric Technology Rally Results
    - Material from all webinars, briefings
  - <u>https://www.dhs.gov/science-and-technology/BI-TC</u>



