October 21, 2019

Re: Request for Information (RFI) No. 0000287565
Video Analytics System

Prospective Proposers:

Please see attached Request for Information No. 0000287565 for a Video Analytics System.

The Metropolitan Transportation Authority (MTA) is soliciting information from the Video Analytics System (VAS) industry to help us understand available alternatives. The MTA is requesting that a Vendor propose a solution for replacing/upgrading/acquiring a VAS in its entirety including all hardware, software, installation and maintenance of such a system. The MTA desires a standard commercial off-the-shelf (COTS) VAS system with minimum customization although it recognizes that some customization and or configuration may be necessary to meet our needs.

Video Analytics System providers are requested to respond to this inquiry and have self interest in doing so. If the MTA is not made aware of specific functionalities and pricing structures, those specific functionalities and value proposition may not be factored into the MTA’s decision for future VAS contracts. However, any future VAS contracts may be subject to separate competitive procurement processes. Responsiveness to this RFI, although much appreciated, will not factor into the decision-making process during competitive procurements. Likewise, if a vendor decides not to respond to this RFI, it will in no way be counted against them during the subsequent competitive process.

Any questions regarding this Request for Information shall be made in writing by email to MTA Procurement, Colleen Spollen at cspollen@mtabsc.org no later than COB Friday, November 1, 2019. MTA will make all reasonable efforts to respond to questions before RFI response due date.

Please submit your response to this RFI by email to Colleen Spollen by COB Wednesday, November 7, 2019.

Sincerely,

[Signature]

Colleen Spollen
MTA Procurement

The agencies of the MTA
MTA New York City Transit
MTA Long Island Rail Road
MTA Metro North Railroad
MTA Bridges and Tunnels
MTA Capital Construction
MTA Bus Company
Request for Information
To Licensors and Distributors of
Software for a Video Analytics System

RFI NO. 0000287565

Responses Due:
November 7, 2019 at 5:00 PM
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General Information

Purpose

The purpose of this technical description is to provide to Vendors a portrayal of a Video Analytics (VA) system needed by the Long Island Railroad (LIRR), the Metro North Rail (MNR), the MTA Bus Company (Bus), MTA Capital Construction (MTACC), MTA Headquarters (MTAHQ), the New York City Transit Authority (NYCT), and the Triborough Bridge and Tunnel Authority (TBTA) (aka “Customer”). The Customer is requesting that a Vendor propose a solution for replacing/upgrading/acquiring a Video Analytics system in its entirety including all hardware, software, installation and maintenance of such a system to utilize existing customer cameras. The Customer desires a standard commercial off-the-shelf (COTS) Video Analytics system with minimum customization although it recognizes that some customization and or configuration may be necessary to meet each operating agency’s needs.

This technical description requires implementing a common Video Analytics system for the LIRR, MNR, Bus, MTACC, MTAHQ, NYCT and TBTA security departments existing infrastructure of thousands of security cameras. The desired system is an enhanced Video Analytics platform that will allow the agencies to receive a “real-time” alert or other action upon the fulfillment of certain use cases to be discussed below. Ideally the solution will be able to integrate with the MTA’s variety of Video Management Systems which include. Further integrations in would also be advantageous to several of the agencies.

Use Cases

Camera Tamper Detection

Objective

The detection of a change (movement/blockage) in a select camera’s field of view. Analytic should not be alarming upon debris, environmental conditions or biologicals entering the field of view.

Preconditions

Static indoor/outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers

- Fixed camera field of view is moved
- Fixed/PTZ camera field of view is blocked

Trigger Exceptions

- Bird, insect or other biological enters the camera’s field of view
- Environmental factors like clouds or water shimmer/ripple are in the camera’s field of view

Mandatory Criteria

- Integrate into VMS
- Integrate into VMS
Optional Criteria

- Integrate into

Notes

n/a

Facial Recognition Objective

The detection of a person's face within a defined area in a selected camera's field of view. Active comparison of the identified face with those in internal and external databases/sources.

Preconditions

Static indoor or outdoor digital camera field of MTA facility/property. This may include (but not limited to) offices, structures, parking lots, roadways, train/material yards, railways/tracks, and turnstiles. Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night lighting changes.

Triggers

- Person(s) enter camera field of view
- Images can be compared to other database images. Margin of recognition/comparison error should be provided.

Trigger Exceptions

n/a

Mandatory Criteria

- Integrate into VMS
- Integrate into

Optional Criteria

- Integrate into

Notes

- Analytics should function in open environment with defined traffic movement on multiple tracks/roadway lanes.
- Backpacks/Packaging entering scene should be identifiable from other debris and environmental items.

Fare Evasion Detection (General) Objective
The detection of a person(s) crossing a predefined line/boundary in a selected camera’s field of view without paying the necessary toll. Analytic should not be alarming upon debris, environmental conditions or biologicals entering the field of view.

Preconditions
Static outdoor/indoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers
- Person(s) cross an entry threshold without an indication from the turnstile or bus fare box that a fare was paid
- Person(s) cross an emergency exit threshold in the entry direction

Trigger Exceptions
- Exit door is remotely unlocked by a booth attendant
- Exit door is unlocked locally with a key
- VMS receives an alarm shunt
- Bird, insect or other biological enters the camera’s field of view
- Environmental factors like clouds or water shimmer/ripple are in the camera’s field of view

Mandatory Criteria
- Integrate into VMS
- Integrate into VMS

Optional Criteria
n/a

Notes
- Alarm should be able to be shunted from an access control system or other input source.

Fare Evasion Detection (NYCT Specific)
Objective
The detection of a person(s) crossing a predefined line/boundary in a selected camera’s field of view without paying the necessary toll. Metrics are provided to determine quantity of fare evaders per location. Four specific Fare Evasion behaviors are identified:

1. Jumping over the turnstile
2. Passing underneath the turnstile
3. Rotating the turnstile tripod arms in reverse and then forward to squeeze passed the turnstile tripod arms.
4. Reverse entry at emergency gates
Preconditions

Static outdoor/indoor digital camera field of view of a facility subway station. Scene may be subject to lighting, debris, construction, scene changes due to environment.

External input signal, such as turnstile arm movement signals or fare payment indicator, are not available

Triggers

- Person(s) cross an entry threshold without an indication from the turnstile or bus fare box that a fare was paid
- Person(s) cross an emergency exit threshold in the entry direction

Trigger Exceptions

- Exit door is remotely unlocked by a booth attendant
- Exit door is unlocked locally with a local key
- VMS receives an alarm shunt
- Child, animal or other enters the camera’s field of view
- Environmental factors are in the camera’s field of view

Mandatory Compatibility Criteria

- The Camera
- Camera
- Camera
- Client software must be compatible with and
- Server software must be compatible with the latest available Server Grade Operating Systems.
- At this time, there will be no physical modifications to the location, settings and point of view of the cameras and existing turnstile or gates to detect fare evasion. Cameras subject to this work are installed on the ceiling with an angled view of turnstiles. Video resolution is set and frame rate is set at fps. Codec used is (compression).
- The Fare Evasion Camera will stream video from the stations to VMS located at
- The Video Analytics solution will utilize the MTA VMS to process the video and meet the requirements of the SOW.

Optional Criteria

- Integrate VMS (Bus)

Other Requirements

1. The solution must demonstrate the ability to meet requirements of all 4 use cases
2. Alarm should be able to be shunted from an access control system or other input source.
3. The Video Analytics Software must be currently used in production at the vendor’s customers’ site(s) and providing valuable and verifiable metrics for identifying fare evaders for use in reducing fare evasion in environments similar to NYCT Subways.
4. The Video Analytics Software must perform analysis based on video data and Paid Fare turnstile data.

5. The VA solution, utilizing the cameras, must be able to count the number of individuals entering from the unpaid to the paid side of the fare array and emergency exit gates, and detect fare evaders. For purposes of data analysis/comparison, Paid Fare turnstile data (turnstile swipes) will be made available only in the following format and frequency: The swipe data is available online for developers (in plain text format) at the following link and is updated periodically. The data provides the total number of entries and exits through a control area.

6. The solution must be scalable to a minimum 800 Cameras.

7. The solution shall provide Real time alerts for all fare evasion use cases when fare evasion is detected by the VA.

8. The solution shall detect fare evasion with minimum Accuracy

9. The solution shall analyze video recorded in extreme conditions including low light and poor quality of images

10. The solution shall provide tools to quickly search and bookmark fare evasion Use Cases.

11. The solution shall utilize Machine Learning to further increase accuracy of all Use Cases

12. The solution shall include a watermark on the live and exported video including at minimum the Date & Time.

13. The solution shall enable users to focus on fare evasion activities on an exception basis and not have to continuously monitor all video feeds, therefore improving operational efficiency and reducing the workload on security and management.

14. The solution shall support point of view including top view, angled

15. The solution must integrate with Active Directory.

16. The solution shall provide administrative tools, so the system administrator can add, modify, disable user privileges and control viewing and exporting of fare evasion video and data.

17. The product must provide robust capabilities to manage/control permissions by agency, roles and/or groups. This includes the ability to create and assign user groups & create user profiles

18. Fare Evasion Data must be available for view and analysis for a minimum of days.

19. Robust search, sorting, and filtering capabilities are required to query the VA.

20. Metadata should be searchable and auditable.

21. Configuration data should be backed up without downtime - system must be available for active use 24/7.

22. The VA shall provide a tool for identification and reporting of (1) location, (2) timing and (3) frequency of fare evasion incidents so that further actions such as adding more staff at locations where such incidents occur often can be taken.

23. Fare Evasion Data must be presented via a desktop user interface that provides relevant summaries, by percentages and raw numbers, of fare evasion at a given fare array and station for defined timeframes (day, week and month).

24. The solution shall include all metadata sources available for reporting on all use cases and any additional fare evasion metrics required in the SOW.

25. The solution shall allow the export of reports to widely used file formats (e.g. Excel, PDF, etc.)

26. The solution shall provide the ability to extract data needed for ad-hoc reporting.

27. The solution shall provide a fully detailed audit log of transactions performed by both end users and administrative users.

28. The solution shall provide valuable and verifiable metrics for identifying fare evaders utilizing the USE Cases and Paid Fare turnstile data.
29. Technical support should be available during business hours Monday - Friday Standard EST MTA hours.

Notes

- Turnstile Fare Control Area or Arrays include a set of multiple turnstiles where customers enter and exit. Emergency Exit Gates are locations where customers may enter and exit the subway during emergencies. When held open, they are used by Fare Evaders to enter the subway.
- Alarm should be able to be shunted from an access control system ( ) or other input source.

Loitering Detection

Objective

The detection of a person(s) gathering in a select camera’s field of view over a predetermined timeframe. Analytic should not be alarming upon debris, environmental conditions or biologicals entering the field of view.

Preconditions

Static indoor/outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers

- Person(s) gather and remain in a selected camera field of view beyond a predetermined timeframe.

Trigger Exceptions

- Vehicle/pedestrian traffic awaiting entrance/vetting into property
- Bird, insect or other biological enters the camera’s field of view
- Environmental factors like clouds or water shimmer/ripple are in the camera’s field of view

Mandatory Criteria

- Integrate into VMS
- Integrate into VMS

Optional Criteria

- Integrate into
- Passing intrusion target coordinates for PTZ tracking

Notes

n/a
Object Left Behind

Objective

The detection of inanimate object(s) left behind by person(s) entering a selected camera’s field of view with inanimate object(s) and then exiting without inanimate object(s). Analytic should not be alarming due to environmental conditions or, debris or biologicals left behind by person(s) in the camera’s field of view.

Preconditions

Static indoor/outdoor digital camera field of view of a predetermined area. This may include roadways, platforms, mezzanines, or other facility locations. Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers

- Person(s) enter camera field of view with inanimate object(s) exceeding size threshold and leave it as they exit
- An inanimate object(s) exceeding size threshold are left in camera field of view

Trigger Exceptions

- [Redacted]
- [Redacted]
- [Redacted]
- Environmental factors like sunlight, shadows, reflections, clouds are in the camera’s field of view
- Bird, insect or other biological enters the camera’s field of view

Mandatory Criteria

- Integrate into VMS
- Integrate into VMS
- Integrate into

Optional Criteria

- Integrate into
- Passing intrusion target coordinates for PTZ tracking

Notes

n/a

Object Tracking

Objective
The detection and tracking of a distinct of a object(s) within in a select camera’s field of view. Analytic should not be alarming upon debris or environmental conditions entering the field of view

Preconditions

Static indoor/outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Objects appearing within the FOV (user defined/configurable) are tagged and various attributes (color, size, direction, speed) are noted and stored within a searchable database. Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers

- Object(s) enter and move across selected camera field of view

Trigger Exceptions

- Environmental factors like clouds or water shimmer/ripple are in the camera’s field of view

Mandatory Criteria

- Integrate into VMS
- Integrate into

Optional Criteria

- Integrate into
- Passing intrusion target coordinates for PTZ tracking

Notes

n/a

Over-height Vehicle Detection

Objective

The determination of a vehicle(s) height in a select camera’s field of view. Analytic should not be alarming upon debris, environmental conditions or biologicals entering the field of view.

Preconditions

Static indoor/outdoor digital camera field of view of a facility (roadway, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers

- Vehicle(s) enter a camera’s field of view and are determined to be in excess of preset height threshold

Trigger Exceptions
- Bird, insect or other biological enters the camera's field of view
- Environmental factors like clouds or water shimmer/ripple, reflections are in the camera's field of view

**Mandatory Criteria**

- Integrate into VMS

**Optional Criteria**

- Integrate into
- Passing intrusion target coordinates for PTZ tracking

**Notes**

n/a

**People Counting**

**Objective**

The counting of people in a select camera's field of view. Analytic should not be alarming upon debris, environmental conditions or biologicals entering the field of view.

**Preconditions**

Static indoor/outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

**Triggers**

- People within a camera field of view are counted
- People within a camera field of view are counted and determined to be in excess of a predetermined threshold.

**Trigger Exceptions**

- Bird, insect or other biological enters the camera's field of view
- Environmental factors like clouds or water shimmer/ripple, reflections are in the camera's field of view

**Mandatory Criteria**

- Integrate into VMS

**Optional Criteria**

n/a

**Notes**
• Analytic to assist in the determination if an ‘overcrowding condition’ exists based on preset count values for an FOV

People Panic Detection
Objective

The detection of multiple people moving rapidly through a select camera’s field of view. Analytic should not be alarming upon debris, environmental conditions or biologials entering the field of view.

Preconditions

Static indoor/outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers

• Multiple people begin rapidly moving across a selected camera field of view
• Multiple people enter a selected camera field of view, moving rapidly
• Multiple people enter and/or begin rapidly moving across a selected camera field of view

Trigger Exceptions

• Bird, insect or other biological enters the camera’s field of view
• Environmental factors like clouds or water shimmer/ripple, reflections are in the camera’s field of view
• Event(s) or area(s) that commands people gathering and/or moving at a slow rate of speed at one given direction (Cafeterias, Training rooms, etc.)
• Vehicle(s) or Object(s) traveling at predetermined rate of speed

Mandatory Criteria

• Integrate into VMS
• Integrate into VMS

Optional Criteria

• Integrate into
• Passing intrusion target coordinates for PTZ tracking

Notes

n/a

Person or Vehicle Detection
Objective
The detection of a person(s) or vehicle(s) in a predefined area in a selected camera’s field of view. Analytic should not be alarming upon debris, environmental conditions or biologicals entering the field of view.

Preconditions

Static outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

Triggers

- Person(s) and/or vehicle(s) move across the camera field of view
- Person(s) and/or vehicle(s) NOT meeting defined criteria (i.e. orange train or wearing orange vest) enter the camera field of view

Trigger Exceptions

- Bird, insect or other biological enters the camera’s field of view
- Environmental factors like clouds or water shimmer/ripple, reflections are in the camera’s field of view

Mandatory Criteria

- Integrate into [ ] VMS
- Integrate into [ ]

Optional Criteria

- Integrate into [ ]
- Passing intrusion target coordinates for PTZ tracking

Notes

- Alarm should be able to be [ ] from an access control system[ ] or other input source

Speed Monitoring

Objective

The detection of a person(s) or vehicle(s) moving in a selected camera’s field of view in excess of predetermined speeds. Analytic should not be alarming upon debris, environmental conditions or biologicals moving in the field of view.

Preconditions
Static indoor/outdoor digital camera field of view of a roadway, facility entrance, platform or mezzanine area. Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

**Triggers**

- Target(s) enter the camera field of view exceeding a predetermined speed threshold
- Target(s) exceed a predetermined speed threshold while already within the camera field of view

**Trigger Exceptions**

- Bird, insect or other biological enters the camera’s field of view
- Environmental factors like clouds or water shimmer/ripple, reflections are in the camera’s field of view

**Mandatory Criteria**

- Integrate into VMS
- Integrate into VMS

**Optional Criteria**

- Passing intrusion target coordinates for PTZ tracking

**Notes**

n/a

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**Tripwire Detection**

**Objective**

The detection of a person(s), vehicle(s) or object(s) crossing a predefined line/boundary in a selected camera’s field of view. Analytic should not be alarming upon debris, environmental conditions or biologicales entering the field of view.

**Preconditions**

Static outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

**Triggers**

- Person(s), vehicle(s) or object(s) cross a threshold in the camera field of view
- Person(s), vehicle(s) or object(s) appear beyond a threshold in the camera field of view

**Trigger Exceptions**

- Bird, insect or other biological enters the camera’s field of view
- Environmental factors like clouds or water shimmer/ripple, reflections are in the camera’s field of view

**Mandatory Criteria**

- Integrate into **VMS**
- Integrate into **[Redacted]**
- Integrate into **[Redacted]**

**Optional Criteria**

- Integrate into **[Redacted]**
- Passing intrusion target coordinates for PTZ tracking

**Notes**

- Alarm should be able to be **[Redacted]** from an access control system **[Redacted]** or other input source

**Wrong Way Detection**

**Objective**

The detection of person(s) or vehicle(s) by way of direction entering predetermined pathways in a selected camera’s field of view. Analytic should not be alarming upon debris, environmental conditions or biologicals entering the field of view.

**Preconditions**

Static outdoor digital camera field of view of a facility (roadway, tracks, office area, parking lot, train/materials yard, user specified restricted areas). Vehicle(s) (non-train, authorized, non-authorized) and/or person(s) appearing within the FOV (area is user defined/configurable) heading in wrong direction or against normal traffic flow. Scene may be subject to weather, vegetation movement, debris, transient animals, and day/night scene changes.

**Triggers**

- Person(s) and/or vehicle(s) crossing/entering directionally through a threshold in camera field of view
- Vehicle(s) (non-train, non-RR work car) crossing/entering directionally through a threshold in camera field of view

**Trigger Exceptions**

- Bird, insect or other biological enters the camera’s field of view
- Environmental factors like clouds or water shimmer/ripple, reflections are in the camera’s field of view

**Mandatory Criteria**
• Integrate into VMS
• Integrate into VMS
• Integrate into VMS

Optional Criteria

• Integrate into VMS
• Passing intrusion target coordinates for PTZ tracking

Notes

• Analytics should function in open environment with defined traffic movement on multiple roadways/tracks