Office of Technology & Innovation

CY2021

SUMMARY OF AGENCY COMPLIANCE REPORTING OF ALGORITHMIC TOOLS

Introduction:

This summary communicates the results of the City's second annual process for reporting on algorithmic tools. Pursuant to Mayoral Executive Order 3 of 2022, the City's Office of Technology and Innovation ("OTI") manages this process, providing guidance to agencies and ensuring that agency materials are prepared for public use. Previously under the guidance of Mayoral Executive Order 50 of 2019 ("EO 50"), and in the future under Local Law 35 ("LL 35")[1], the City continues its commitment to providing the public with a transparent view of these applications of agency data and technology.

Reporting for Calendar Year 2021 was completed using the definitions and requirements of EO 50 and related policies, included in Appendix A. Under this framework, the City defined an algorithmic tool as a partially or fully automated computerized system that uses an algorithm or series of algorithms to turn data ("input") into a result ("output") to be used to make a prediction, determine a course of action, or otherwise influence decision-making. Additionally, to be considered an algorithmic tool under these policies, a system needed to:

- Be derived from complex data analysis approaches, or routinely employ complex data analysis approaches to operate;
- Support agency decision-making; and
- Have a material public effect.[2]

Examples of algorithmic tools, as defined here, include but are not limited to risk scoring instruments, categorization or grouping algorithms, and optimization models. Often such tools incorporate artificial intelligence (AI) or machine learning (ML) techniques. Tools or systems that perform basic administrative tasks (like word processing, basic mathematic calculators, and report generation) do not count as algorithmic tools.

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[1] Executive Order 3 of 2022 moved responsibility for algorithmic tool management and policy under the newly created Office of Technology and Innovation ("OTI"), and Local Law 35, passed in 2021 mandates the reporting of algorithmic tools on a yearly basis. This 2021 report was initiated under the requirements of Executive Order 50, while future reports will reflect the requirements of LL 35.

[2] The City's policies relating to EO 50 defined a "material public effect" as "a discrete, discernible, or otherwise identifiable impact of a system's outputs or outcomes on individuals or populations, which relates to procedural or substantive rights under the law; individual or population protected status; eligibility, receipt, or denial of a City or agency program, service, or benefit; subjection to a specific City program or activity; or judicial, administrative, or other forms of redress." The full text of EO50 and related policies are included below in Appendix A.

For 2021, agencies were asked to report only high-priority algorithmic tools, meaning that those tools met one or both of the following criteria:

- It was developed with artificial intelligence (AI) or machine learning (ML) techniques;
- It collects or analyzes personally identifying information.

SUMMARY OF AGENCY REPORTS

The following table on pages 3-4 summarizes the reporting results from City agencies for 2021.

Agency	Number of Tools Identified	Number of Tools Reported
311*	0	0
Administration for Children's Services, ACS	2	2
Business Integrity Commission, BIC	0	0
Chief Technology Officer, CTO*	0	0
Civic Engagement Commission, CEC	1	1
Civilian Complaint Review Board, CCRB	0	0
Commission on Human Rights, CCHR	0	0
Conflicts of Interest Board, COIB	0	0
Cyber Command, Cyber*	0	0
Department for the Aging, DFTA	0	0
Department of Buildings, DOB	0	0
Department of City Planning, DCP	0	0
Department of Citywide Administrative Services, DCAS	0	0
Department of Consumer and Worker Protection, DCWP (formerly Department of Consumer Affairs, DCA)	1	1
Department of Correction, DOC	1	1
Department of Cultural Affairs, DCLA	0	0
Department of Design and Construction, DDC	0	0
Department of Education, DOE	3	3
Department of Environmental Protection, DEP	0	0
Department of Finance, DOF	0	0
Department of Health and Mental Hygiene, DOHMH	1	1
Department of Housing Preservation and Development, HPD	0	0
Department of Information Technology and Telecommunications, DOITT*	0	0
Department of Investigation, DOI	1	1
Department of Parks & Recreation, DPR	0	0
Department of Probation, DOP	0	0
Department of Records and Information Services, DORIS	0	0
Department of Sanitation, DSNY	0	0
Department of Small Business Services, SBS	0	0
Department of Social Services, DSS	1	1
Department of Taxi & Limousine Commission, TLC	0	0
Department of Transportation, DOT	0	0
Department of Veterans' Services, DVS	0	0
Department of Youth and Community Development, DYCD	0	0
Fire Department of New York, FDNY	6	6
Landmarks Preservation Commission, LPC	0	0
Law Department	0	0

Mayor's Office	0	0
New York City Housing Authority, NYCHA	0	0
New York City Police Department, NYPD	3	3
NYC Emergency Management, NYCEM	0	0
Office of Administrative Trials and Hearings, OATH	0	0
Office of Chief Medical Examiner, OCME	1	1
School Construction Authority, SCA	0	0
TOTAL	21	21

*Entity now falls under the Office of Technology and Innovation ("OTI").

ALGORITHMIC TOOL DIRECTORY

As a result of the 2021 agency compliance reporting process, the following algorithmic tools were identified and prioritized for public reporting. The directory that follows provides general information about these tools to facilitate transparency into the way agencies are leveraging relevant technologies for delivering services to New Yorkers. For each of the tools reported, the directory provides the name of the agency reporting the tool, the tool name and usage date, and narrative descriptions about the tool's purpose and how it functions to aid the agency in making decisions. All information is provided directly by the agency using the relevant tool.

Agency: Administration for Children's Services	
Name of Tool Severe Harm Predictive Model	**Date Tool Entered Usage** May 2018
Purpose of Tool The Quality Assurance Unit in the Division of Child Protection at ACS has the capacity to review about 3,000 investigation cases out of about 56,000 investigations annually. ACS developed a predictive model to support the selection of cases for review. Open investigation cases involving children with the highest likelihood to experience future severe harm -- substantiated allegations of physical or sex abuse in the following 18 months -- are selected for review. The tool does not support decisions about individuals or families involved with ACS, beyond the selection of the case for additional Quality Assurance review.	
Overall Function Predictions of Severe Harm (identifying likelihood of substantiated allegations of physical or sex abuse within the next 18 months) are based on Machine Learning methodology and are calculated for all children involved in active investigations. An investigation is assigned a numeric likelihood of this outcome based on the child in the case with the highest likelihood. The ACS Quality Assurance unit in the Division of Child Protection reviews about 3,000 active investigations annually with the highest likelihood of severe harm. If the review team identifies gaps in documentation or practice, the field office conducting the investigation is notified of these gaps so that they are addressed and is required to follow up with information on how these gaps have been addressed. No staff in Quality Assurance unit or in the investigative unit see these scores. The model only supports the decision which investigation cases will be prioritized for review ACS Quality Assurance unit.	

Agency: Administration for Children's Services	
Name of Tool STC Model	**Date Tool Entered Usage** July 2017
Purpose of Tool When a family is ready to exit ACS prevention services, an end of services conference is required (known as a "service termination conference"). ACS has limited capacity to facilitate these conferences. ACS developed a tool to prioritize cases for ACS facilitation based on the families' likelihood to be involved in a future indicated investigation. Service termination conferences that are not facilitated by ACS are instead facilitated by the prevention program provider.	
Overall Function Predictions of future indicated investigations are computed by machine learning methodology and evaluate the likelihood of a family to be involved in a future indicated child protective investigation. Staff at the ACS conferencing unit or at the prevention agency do not see these predictive scores.	

Prevention cases with the highest likelihood of a future investigation are assigned for ACS facilitation to ensure the family has received necessary services and has been prepared for case closing. Conferences not facilitated by ACS are facilitated by the prevention program. The model does not guide decisions about individuals or families or about the readiness to end prevention services. The model only supports the decision of which conferences will be facilitated by ACS.

Agency: Civic Engagement Commission	
Name of Tool Methodology for Poll Site Language Assistance	**Date Tool Entered Usage** November 2020

Purpose of Tool

This is a methodology for determining how the New York City Civic Engagement Commission (CEC) will provide interpretation services at poll sites for limited English proficient voters. The methodology explains how the NYCCEC will identify the languages and locations in which interpretation services will be offered during the November 2020 election and beyond. These services supplement the interpretation assistance provided by NYC Board of Elections in several languages. Under the Charter, the NYCEC can only provide interpretation services in a language if: (1) it is a designated citywide language; or (2) it is spoken by a greater number of LEP New Yorkers than the lowest ranked designated citywide language and at least one poll site has a significant concentration of speakers of such language with LEP. This methodology ensures service for all languages that are eligible under the Charter.

Overall Function

Since no dataset is currently available that reliably captures the number of limited English proficient (LEP) registered voters for all program languages, the CEC uses the percentage of LEP citizens of voting age (CVALEP) as a substitute or proxy measure of need. CEC ranks the Program Eligible Languages in order of magnitude of CVALEP and distributes poll sites to each language based on its ranking (excluding CVALEP persons that speak languages served by NYCBOE in certain New York City counties). The number of poll sites that will receive services in any given language will depend on each language's share of the total CVALEP in the population eligible to be served. For example, according to U.S. Census data, approximately 207,926 New Yorkers are CVALEP and speak a language that is served by this Program. This proportionality approach allows CEC to balance goals of including diverse language communities as well as fair access to the total number of eligible voters within each language community. The Program provides interpreters in Program Eligible Languages at poll sites based on U.S. Census data showing concentrations of CVALEP individuals who speak these languages and reside around each poll site. For each language, poll sites are chosen in descending order of concentration of CVALEP, until the language's share is met. This process is repeated for each language, thereby including the poll sites with the highest concentration of CVALEP for each Program Eligible Language until that language's share is met, and the total number of poll sites for which resources are allocated is reached. It may be possible, based on analysis of data, to reassign poll sites to languages with greater need; however, each language will receive a minimum of at least one poll site. Models used included the Thiessen polygon method to create a Voronoi diagram to determine CVALEP estimates.

Agency: Department of Consumer and Worker Protection	
Name of Tool Route Automation	**Date Tool Entered Usage** July 2020
Purpose of Tool DCWP inspectors conduct inspections based on a route, or list of businesses to be inspected on a specific day, which must be pre-approved by their supervisor. The Route Automation tool generates a route for an inspector on a specific date based on configuration variables and geographic area. All routes generated by the tool still require supervisor review and approval.	
Overall Function Inspection Supervisor selects an inspector, enters a date and the number of businesses to be inspected, and the geographic area to be considered. The system identifies businesses in the selected area and assigns them to the route based on inspection priority until the number of businesses entered has been reached. Then the tool runs a Simulated Annealling Algorithm to optimize the order businesses appear on the route based on proximity and method of travel.	

Agency: Department of Correction	
Name of Tool Housing Unit Balancer (HUB)	**Date Tool Entered Usage** April 2017
Purpose of Tool The Housing Unit Balancer (HUB) is used for informing housing decisions made by operational staff designed to produce less conflict in housing areas.	
Overall Function The HUB is comprised of two functions: (1) a classification tool based on decision trees that determines an individual's propensity for violence, and (2) a housing area risk assessment, which utilizes advanced predictive analytics (i.e., neural networks) to determine optimal housing areas based on the classification scores of people in custody. The primary operational use of the HUB is for the classification score, which is used to track populations and optimize housing arrangements. The Housing Unit Balancer process is seldom, if ever, used.	

Agency: Department of Education	
Name of Tool MySchools	**Date Tool Entered Usage** August 2018
Purpose of Tool MySchools is an application used to house online school directories, collect application choices, and run the admissions matching algorithm that is used for all centralized admissions processes (3K, pre-K, Gifted & Talented, middle school, and high school). The tool encompasses a family-facing portal, a school-facing portal, and an administrative portal.	
Overall Function The tool utilizes the Gale-Shapley deferred acceptance algorithm to match applicants to schools. This algorithm has been in existence for many years, used internationally for various purposes. Perhaps most common is its use in the National Resident Matching Program for medical school students. Deferred acceptance works as an iterative series of steps: students and programs are tentatively matched in each step, but nothing is finalized until the algorithm terminates (hence the deferred). 1. Each student “proposes” to their first choice • Programs assign seats to students one at a time • When all seats are filled, programs may reject previously accepted students in favor of new applications from students they prefer (e.g., students with a better lottery number) • Remaining students are rejected 2. Students rejected in the last step “propose” to the next choice on their list 3. The algorithm terminates when all students are matched or have proposed to all the programs they listed Layered on top of this algorithm are different admissions methods (screened versus unscreened), different admissions priorities (e.g., prioritizing students residing in a specific zone over those residing outside of it), and different diversity priorities (e.g., prioritizing a certain percentage of seats for students qualify for free or reduced priced lunch).	
Agency: Department of Education	
Name of Tool NYCDOE APPR Measures of Student Learning (MOSL) Growth Model	**Date Tool Entered Usage** September 2013
Purpose of Tool In accordance with New York state law and New York State Education Department (NYSED) regulations, the Department developed and maintains a "growth model" to produce Measures of Student Learning (MOSL) ratings for use in annual professional performance reviews (APPR) for teachers and principals. The MOSL ratings are combined with Measures of Teaching/Leadership Practice (MOTP/MOLP) ratings to produce an annual Overall Rating for each eligible educator.	
Overall Function The growth model uses a variety of student-level (assessment scores, English Language Learner, Disability, and Economic Disadvantage indicators) classroom-level (e.g., % Students With Disabilities), and school-level data (e.g., % English Language Learners, % Students With Disabilities, average prior achievement, school type) to estimate/predict a student's score on one of many possible course-culminating assessments. These predicted scores are used to either 1) identify "peer groups" of students, from which student growth percentiles (SGPs) are determined, or 2) compared to actual	

scores to determine student credit values. These units (SGPs or credit values) are then weight-averaged to generate a educator-level result - the MOSL Rating. The MOSL Rating is combined with the MOTP Rating to produce an Overall Rating. Per state law 3012-d, annual ratings "shall be a significant factor in HR decisions." This is often implemented by making ratings a qualifying/disqualifying element in decision-making concerning employment, tenure, salary, and other professional opportunities.

Agency: Department of Education

Name of Tool	**Date Tool Entered Usage**
NYCDOE APPR Measures of Teaching/Leadership Practice (MOTP/MOLP) Calculation	September 2013

Purpose of Tool

In accordance with New York state law and New York State Education Department (NYSED) regulations, the Department developed and maintains databases and calculation rules to produce Measures of Teaching/Leadership Practice (MOTP/MOLP) ratings for use in annual professional performance reviews (APPR) for teachers and principals. The MOTP/MOLP ratings are combined with Measures of Student Learning (MOSL) ratings to produce an annual Overall Rating for each eligible educator.

Overall Function

Throughout a school year, evaluators observe teachers/principals multiple times and use a rubric to provide a numerical rating on one or more rubric components. These rubric component scores are then weight-averaged according to collectively bargained rules to produce an MOTP/MOLP Rating. The MOTP/MOLP Rating is combined with the MOSL Rating to produce an Overall Rating for each eligible educator. Per state law 3012-d, annual ratings "shall be a significant factor in HR decisions." This is often implemented by making ratings a qualifying/disqualifying element in decision-making concerning employment, tenure, salary, and other professional opportunities.

Agency: Department of Health and Mental Hygiene	
Name of Tool Improving Foodborne Disease Outbreak Detection by Incorporating Complaints Identified in Social Media Data	**Date Tool Entered Usage** November 2016
Purpose of Tool Foodborne disease outbreaks are identified through many mechanisms. Restaurant associated outbreaks are often identified through complaints received via NYC's 311 non-emergent information system, however not all individuals report to 311. The New York City Department of Health and Mental Hygiene (NYC DOHMH) in collaboration with Columbia University developed a text classifier program which monitors Yelp and Twitter data to identify complaints of foodborne illness with support from the Alfred P Sloan Foundation and the National Science Foundation. These data are used in addition to complaint data received through NYC's 311 system to identify and respond to foodborne disease outbreaks.	
Overall Function The classifiers assign a "sick score" to each Yelp review or tweet indicating the likelihood that the review or tweet pertains to foodborne illness. The sick score is based on whether the review/tweet contains key words indicative of foodborne illness (e.g., "vomit"); the Yelp classifier also incorporates if the review indicates that multiple people became sick and if the review indicates a time between eating at a restaurant and illness onset (incubation period) that is consistent with foodborne illness. Each review and tweet with a sick score greater than or equal to a threshold value are reviewed and annotated by DOHMH foodborne disease epidemiology and environmental health staff to determine if the review/tweet was actually reporting foodborne illness possibly associated with a NYC restaurant; if yes, Yelp messages are sent to Yelp reviewers, requesting that they contact DOHMH, and a Twitter message with a survey link is tweeted back to Twitter users to confirm foodborne illness. Data from annotations are used to improve classifier performance. Foodborne disease complaints identified through Yelp and Twitter are combined with foodborne disease complaints reported to 311 to improve efficiency of outbreak detection.	

Agency: Department of Investigation	
Name of Tool Facial Recognition Technology	**Date Tool Entered Usage** March 2019
Purpose of Tool Facial recognition is a digital technology that DOI uses to analyze uploaded images or videos of people and objects obtained during an investigation by comparison with lawfully possessed images. Facial recognition generates possible matches of an object or individual from this analysis and comparison. The purpose of the tool is to assist DOI investigations of matters within its jurisdiction including fraud and other criminal activity.	
Overall Function The tool analyzes an uploaded image or video and searches and compares it with lawfully possessed images to generate a pool of possible matches. If possible, matches are identified, a trained DOI examiner visually analyzes and evaluates potential matches to assess reliability of a match consistent with agency policy and applicable laws. A match serves as an investigative lead for additional investigative steps and does not constitute a positive identification.	

Agency: Department of Social Services	
Name of Tool Homebase Risk Assessment Questionnaire (RAQ)	**Date Tool Entered Usage** June 2012
Purpose of Tool The Homebase program was created to prevent households from entering the DHS shelter system. Since NYC has a range of antipoverty programs and the number of households entering shelter is small compared to the pool of New Yorkers who enrolled in public assistance or have an eviction filing each year, the Agency had to ensure that the households who most needed additional homelessness prevention services were being enrolled in Homebase programs. Research showed that staff were not accurately able to predict who would or would not enter the DHS shelter system and that using a risk assessment would provide a much better way to match resources to the families who would benefit the most.	
Overall Function Homebase applicants answer questions about their current housing situation, history of disruptive experiences, and shelter history. Each of the answers is assigned a number of points, and applicants that reach a certain point threshold are eligible for additional Homebase services such as financial assistance and case management. Workers are able to override a limited number of model decisions with permission of a supervisor.	

Agency: Fire Department of New York City	
Name of Tool RBIS (Risk Based Inspection Program); ALARM (A Learning Approach to Risk Modeling)	**Date Tool Entered Usage** November 2019
Purpose of Tool ALARM creates risk scores for each building in the city. These scores are used to schedule our Fire Operations building inspections within the inspectable population of buildings in the City (~330,000 BINs), as a part of the Risk-Based Inspection Program.	
Overall Function ALARM is a combined approach using machine learning and risk ratios to assess the risk of a building for structural fire ignition (probability) and civilian fire injury/death (impact). The machine learning algorithm takes incident data, housing characteristics, and 311 data and creates a probability of structural fire ignition. This is combined with a civilian injury or death risk ratio for the building which is based on building characteristics, incident data and nearby felony crimes to create a risk score (range is 1-9), with 1 being highest risk and 9 being lowest. Buildings are prioritized within each of the nine risk scores according to the residential population in each building.	
Agency: Fire Department of New York City	
Name of Tool EMS Hospital Suggestion Algorithm	**Date Tool Entered Usage** March 2007
Purpose of Tool The EMS Hospital Suggestion Algorithm is used to determine the closest, appropriate hospital to the incident location based on the needs of a patient requiring transport.	
Overall Function The algorithm computes a list of hospitals in order of closest to furthest in time for each medical condition category as currently established. (For example, there is a list of hospitals computed in order of closest in time for all hospitals that accept General Emergency Department patients and for all hospitals that accept special conditions, such as burns). Depending on the medical needs category of the patient, the algorithm produces a pre-determined list of hospitals which is based on the location of the patient and then made available to the crew as a list of "closest, most appropriate hospitals."	
Agency: Fire Department of New York City	
Name of Tool EMS Unit Suggestion Algorithm	**Date Tool Entered Usage** March 2007
Purpose of Tool The EMS Unit Suggestion Algorithm is used to determine which order of geographic regions (known as atoms) to search in order for the EMSCAD system to select an appropriate EMS unit for dispatch to an incident.	
Overall Function The algorithm computes a list of geographic atoms in order of closest to furthest in time for each atom in the city. This list of ordered atoms is the output of an algorithm that relies on a calibrated network model to derive travel time estimates. The output is an excel file which is converted into an EMSCAD-compatible file and loaded into the system for real-time unit selection capabilities. The file is generated and implemented as a 24/7 source file, meaning, the recommended search order is not currently varying by time of day. The Department is intending to implement time-of day search orders in the near future.	
Agency: Fire Department of New York City	

Name of Tool EMS Hospital Load Balancing Algorithm	**Date Tool Entered Usage** January 2021
Purpose of Tool The hospital load balancing algorithm is designed to optimize hospital transports in a way that proactively avoids hospitals from being congested with too many patients, while at the same time minimize the total travel times as much as possible. The outputs of the algorithm are used in the EMS Computer Aided Dispatch (EMS CAD) system to provide EMS crews with an optimal hospital to transport patients.	
Overall Function The algorithm requires three data inputs: the estimated travel time from any ATOM to any hospital, the number of available beds for every hospital and the estimated number of transports that will occur the following day at every hospital. The algorithm first determines if any hospital is expected to receive more patients than available beds. If overload is expected, the algorithm reallocates the necessary ATOMs such that no hospital is overloaded, and the reallocation of any ATOM is done so with minimal additional travel time. The optimized output - known as a pattern - is directly input into the EMS CAD system for use in the following day.	
Agency: Fire Department of New York City	
Name of Tool EMS Ambulance Scheduling Tool	**Date Tool Entered Usage** June 2021
Purpose of Tool The purpose of the tool is to match the supply of EMS ambulances to the demand for ambulances (medical emergencies) over a 24-hour period for each EMS dispatch area. The tool uses an existing ambulance schedule for each dispatch area and optimizes their start times in order to match the demand for an ambulance. The tool supports FDNY EMS in developing an ambulance schedule citywide.	
Overall Function The tool requires the average number of medical emergencies per hour by dispatch area and the ambulance schedule of each dispatch area. Based on this information, the algorithm will optimize tour start times to maximize the minimum difference between the supply of ambulances and the demand for an ambulance.	
Agency: Fire Department of New York City	
Name of Tool EMD Schedule Optimization Tool	**Date Tool Entered Usage** June 2021
Purpose of Tool The purpose of the tool is to provide Emergency Medical Dispatchers (EMD) staff a tool to optimally allocate call takers during a 24-hour period. The tool uses an expected number of incoming calls and the number of personnel scheduled to work in order to allocate the call takers to different shifts such that the supply of call takers exceeds the demand for call takers.	
Overall Function The algorithm requires two datasets. First, the tool requires the average number of medical calls per hour for a 24-hour period. Second, the tool requires a user to specify the number of call takers assigned to each tour. Based on these two inputs, the tool provides a projection of supply (call takers) versus demand (medical calls). Additionally, the tool can take the total number of available staff and optimally allocate them across tours to maximize the minimum difference between supply and demand. Based on these outputs, EMD officers can identify times during the day when call taker utilization is high and reallocate staff to accommodate.	

Agency: New York City Police Department	
Name of Tool Facial Recognition Technology	**Date Tool Entered Usage** October 2011
Purpose of Tool Facial recognition is a digital technology that NYPD uses to compare images obtained during investigations with lawfully possessed arrest photos. The tool analyzes an uploaded image, known as a probe image, and searches and compares the image against a gallery of lawfully possessed arrest photos. The purpose of the tool is to enhance law enforcement's ability to investigate criminal activity as well as identify deceased persons and missing persons. When used in combination with human analysis and additional investigation, facial recognition technology is a valuable tool in solving crimes and increasing public safety.	
Overall Function The tool analyzes an uploaded image, known as a probe image, and searches and compares the image against a gallery of lawfully possessed arrest photos. The technology will generate a pool of possible match candidates. If possible matches are identified, trained Facial Identification Section investigators conduct a visual analysis to assess the reliability of a match and conduct a background check to compare available information about the possible match and relevant details of the investigation. If a possible match candidate is approved, the facial recognition investigator will prepare a possible match report and attach it to the requesting investigator's case file in the case management system. The match serves as an investigative lead for additional investigative steps.	
Agency: New York City Police Department	
Name of Tool ShotSpotter	**Date Tool Entered Usage** March 2015
Purpose of Tool Provides acoustic gunshot detection to assist with emergency call response. The tool supports Patrol operations in alerting units to potential gunfire and enhances investigations involving firearms.	
Overall Function Specialized software analyzes audio signals for potential gunshots, determines the location of the sound source, and once classified as potential gunfire sends the incident to acoustic experts for additional analysis. Notifications are sent for confirmed gunfire. ShotSpotter activations may result in evidence collection that can enhance case investigations. Problematic locations identified through alerts may require additional resource deployment and/or investigations.	
Agency: New York City Police Department	
Name of Tool Patternizr	**Date Tool Entered Usage** December 2016
Purpose of Tool Aids crime analysis in detection of potential crime patterns.	
Overall Function Patternizr compares features of crimes and finds ones that are similar and may be part of a crime pattern. Analysts will look at the candidate crimes and suggest the formation of crime patterns to a pattern identification module. If a pattern is formed, detectives often consolidate the investigative efforts (e.g., one detective investigates all the crimes in the pattern). The report filters non-normal trends in a spreadsheet and displays year-over-year counts of crimes that have non-normal trends.	

Agency: Office of the Chief Medical Examiner	
Name of Tool STRMix	**Date Tool Entered Usage** January 2017
Purpose of Tool STRMix is a probabilistic genotyping tool that is used to analyze mixtures of DNA profiles to help associate the crime scene evidence to potential victims or suspects of crimes.	
Overall Function STRmix™ combines sophisticated biological modelling and standard mathematical processes to interpret a wide range of complex DNA profiles. Using well-established statistical methods, the software builds millions of conceptual DNA profiles. It grades them against the evidential sample, finding the combinations that best explain the profile. A range of Likelihood Ratio options are provided for subsequent comparisons to reference profiles. Using a Markov Chain Monte Carlo engine, STRmix™ models any types of allelic and stutter peak heights as well as drop-in and drop out behavior. It does this rapidly, accessing evidential information previously out of reach with traditional methods. STRmix™ is supported by comprehensive empirical studies with its mathematics readily accessible to DNA analysts, so results are easily explained in court.	

Appendix A – Executive Order 50 of 2019, and related policies developed by the office of the Algorithms Management and Policy Officer

THE CITY OF NEW YORK
OFFICE OF THE MAYOR
NEW YORK, N.Y. 10007

EXECUTIVE ORDER No. 50

November 19, 2019

ESTABLISHING AN

ALGORITHMS MANAGEMENT AND POLICY OFFICER

WHEREAS, the City and its agencies must compile and analyze a significant array of data in order to develop and implement the strategies, policies, and operational practices necessary to deliver its numerous programs and services to benefit New York City's millions of residents and visitors, and its infrastructure, businesses, and communities; and

WHEREAS, to improve efficiency, accuracy, and coordination in such efforts, and to promote data-driven decision-making in the delivery of resources and services, City agencies use, develop, and leverage various technical tools and systems for collecting, synthesizing, and analyzing information; and

WHEREAS, in this digital age, vast amounts of data of all types are increasingly created, collected, integrated, used, and shared in new ways made possible through the use of algorithms and other emerging technologies, and thus traditional governance frameworks must evolve and adapt to ensure that principles of fairness, transparency, human-centered design, and privacy protection remain central to government practices, recognizing both the benefits to be gained, as well as the potential risks of inadvertent harm to individuals and communities that may result from the use of such tools and systems absent new understandings and guidance; and

WHEREAS, pursuant to Local Law 49 of 2018, in May 2018 a mayoral task force was established and convened relating to the use of automated decision systems ("ADS") in City government, which is composed of members of City agencies and external organizations and chaired by the Mayor's Office of Operations ("Operations"), and which in November 2019 issued a comprehensive set of recommendations to help guide the City in this emerging field, including, *inter alia*, a call to establish an organizational structure within City government to manage ADS; and

WHEREAS, informed by these recommendations, the City seeks to centralize leadership relating to the fair and responsible use of algorithmic tools and other emerging technologies in City agency decision-making, coordinate efforts to create and strengthen related best practices citywide, and support agencies in implementing such practices, with input and guidance from

experts both within and external to City government, and toward this goal, wishes to establish a dedicated, senior-level role to carry out such responsibilities; and

WHEREAS, Operations—which includes the Mayor's Office of Data Analytics, Mayor's Office of Information Privacy, and Mayor's Office for Economic Opportunity—develops, manages and coordinates multiagency programs and initiatives, and uses data to: help make informed policy decisions; promote efficiency, transparency, and accountability across City government; lead the City in privacy best practices; and advance equity and opportunity for all New Yorkers; and

WHEREAS, Operations has the breadth of relevant cross-agency project and performance management, information privacy, data analytics, and expertise necessary to house and manage this new citywide position and to help guide and support City agencies in this emerging field;

NOW THEREFORE, by the power vested in me as Mayor of the City of New York, it is hereby ordered that:

Section 1. Definitions. For purposes of this Order:

a. "Algorithm" means a sequence of instructions or rules or other problem-solving operation used to cause a technical tool or system to execute a set of actions.

b. "Decision-making" means the process by which information is considered by a City or agency official or employee which has the potential to influence or determine an agency's actions, policies, services, programs, employment, contracting, rulemaking, budgeting, or allocation of resources.

§ 2. There is established within the Office of the Mayor:

a. An Algorithms Management and Policy Officer ("Officer"). The Officer, reporting to the director of Operations, will serve as a centralized resource to help guide the City and its agencies in the development, responsible use, and assessment of algorithmic and related technical tools and systems ("algorithmic tools and systems"), and for engaging and educating the public on issues related to City use of these and other related technologies. The Officer will coordinate with relevant Operations staff, City officials, agency staff, and be guided by the expertise provided by the committees established herein, to carry out the following functions and duties:

(i) Establish governing principles to guide City agencies in balancing the ethical and innovative uses of data facilitated through the use of algorithmic tools and systems in agency decision-making, to ensure they provide the greatest benefit for New Yorkers and the City;

(ii) Design and implement a framework, including criteria, to help agencies identify, prioritize, and assess algorithmic tools and systems that support agency decision-making, considering their complexity, the benefits, impact, and any potential risk of harm to any individual or group arising from their use, and any other relevant characteristics;

(iii) Develop and implement policies and protocols to guide the City and its agencies in the fair and responsible use of such tools and systems, considering the unique mission, purpose, and operational needs of each agency;

(iv) Design and implement protocols for agency reporting to the Office on their use of algorithmic tools and systems in agency decision-making;

(v) Plan and implement a public engagement and education strategy related to the City's use of algorithmic tools and systems;

(vi) Create and maintain a public-facing platform that provides a mechanism for receiving public comments and questions, explains how members of the public can be connected with relevant resources, and in accordance with relevant legal, privacy, and cybersecurity considerations, makes available certain information about such tools and systems;

(vii) Establish and implement a citywide protocol for receiving requests for information from individual members of the public who have been affected by a City agency's use of an algorithmic tool or system, and for directing them to the appropriate City agency and other resources, including but not limited to the agency liaison designated pursuant to section 3 of this Order;

(viii) Establish and implement a citywide protocol for receiving, investigating, and addressing any complaints from individuals regarding any suspected or actual harm experienced in connection with a City agency's use of algorithmic tools and systems, and advising agencies on any further actions that may be appropriate under the circumstances;

(ix) Research new developments and best practices in managing the City's use of algorithmic tools and systems in agency decision-making, and remain current in this emerging field; and

(x) Prepare and submit a biennial report in accordance with section 4 of this Order.

Personnel and other resources to support the work of the Officer will be provided within 90 days of the effective date of this Order.

b. An Algorithms Management Steering Committee ("Steering Committee"), convened quarterly and chaired by the director of Operations or such director's designee, comprised of senior-level representatives from the following City agencies and offices: office of the first deputy mayor; corporation counsel; commission on human rights; chief privacy officer; office of data analytics; chief technology officer; department of information technology and telecommunications; cyber command; and any additional representatives with relevant expertise as the director of Operations or such director's designee may deem necessary to further the goals and efforts of the Steering Committee and Officer. The Steering Committee will advise the director of Operations and Officer on the functions set

out in subdivision (a) of section 2 of this Order, and contribute subject matter expertise from their respective domain areas to inform the cross-disciplinary work of the Officer.

c. An Algorithms Advisory Committee ("Advisory Committee"), convened at least twice per year, chaired by the Officer or such Officer's designee, and consisting of seven members, including the chair, with other appointees being members of the public with relevant expertise in any of the following areas: data and technology innovation, civil or human rights or criminal justice, advocacy, community-based organizing, education, technology, law, health and human services, computer science, finance, data analytics, information privacy, cybersecurity, or other relevant field. Four members will be appointed by the Mayor, and three will be appointed by the Speaker of the City Council. The Advisory Committee will:

(i) Advise the Steering Committee and Officer on the protocols and best practices related to City use of algorithmic tools and systems in agency decision-making;
(ii) Explore and discuss issues relevant to the development, use, assessment, and best practices concerning algorithmic tools and systems;
(iii) Serve as a mechanism for collecting and communicating questions, concerns, and relevant expertise from individuals and groups external to the City to the Officer; and
(iv) Hold at least one public meeting each year.

The Advisory Committee will be established within 120 days of the effective date of this Order.

§ 3. City agencies will fully cooperate with the Officer in carrying out the mandates of this Order. Each agency head will designate an employee to serve as a liaison to the Officer and as a point of contact within the agency for public inquiry.

§ 4. Beginning on December 1, 2020 and biennially thereafter, the Officer will submit to the Mayor and Speaker of the City Council, and publish online, a report on the progress made in implementing the directives set forth in this Order.

§ 5. No information that is required to be disclosed or reported by this Order will be done so in a manner that would violate any applicable provision of federal, state, or local law or that would interfere with a law enforcement investigation or other investigative activity by an agency or would compromise public safety.

§ 6. This Order is effective immediately.

Bill de Blasio
Mayor

Algorithms Management and Policy Officer

September 2021

ALGORITHMS MANAGEMENT AND POLICY OFFICER

POLICIES

Contents

Policies of the Algorithms Management and Policy Officer

Pursuant to the Requirements of Executive Order 50 of 2019

Alex Foard
Algorithms Management and Policy Officer

Contents

1. Introduction

1.1. Purpose

This document sets forth the collection of policies, protocols, best practice recommendations, and guidance ("Policies") of the Algorithms Management and Policy Officer ("AMPO"), in accordance with the AMPO's mandate to develop and centralize management practices around the fair and responsible use of algorithmic tools and systems ("algorithmic tools") by City agencies.

1.2. Authority

These Policies are issued pursuant to the duties with which the AMPO is charged under Executive Order 50 of 2019 ("EO 50").

1.3. Applicability

Unless otherwise specified by the Office of the Mayor, all mayoral agencies and offices are subject to these Policies pursuant to EO 50.

1.4. Modification

These Policies, and any associated materials, including Agency Compliance Guidance, may be amended by the AMPO from time to time. Any updated materials will be sent to agency liaisons.

1.5. Relationship to Other Relevant Laws and Policies

These Policies set forth the baseline requirements for City agencies relating to the management of algorithmic and other emerging technical tools, in accordance with the mandates of EO 50. City agencies may adopt supplemental policies and protocols that address topics specific to the unique needs of their agency and the agency's clients, or to comply with applicable laws and regulations governing the collection, use, disclosure, retention or development of data, algorithms, or other emerging tools by the agency and its contractors and subcontractors.[1]

Agencies are responsible for complying with the requirements of EO 50. Refer to Section 9 of these Policies for more information on agency compliance and reporting requirements.

Referenced below are additional laws and policies that may have relevance to agency use of algorithmic tools, or the data or policy decisions associated with algorithmic tools in use.

[1] Additionally, Section 5 of EO 50 states: "No information that is required to be disclosed or reported by this Order will be done so in a manner that would violate any applicable provision of federal, state, or local law or that would interfere with a law enforcement investigation or other investigative activity by an agency or would compromise public safety."

1.5.1. Relationship to Federal and State Law

Where a federal or state law or regulation conflicts with a local law or local executive action on the same subject matter, the federal or state law or regulation will govern. Questions about the applicability of other laws (including local laws and regulations) to the requirements of EO 50 should be directed to the agency liaison (see Section 5), agency general counsel, the AMPO, or the City's Law Department.

1.5.2. New York State Freedom of Information Law

The New York State Freedom of Information Law ("FOIL") establishes a process for members of the public to request copies of government records, and imposes a duty for City agencies to disclose such records in response to a request unless an exemption applies.[2] Such records may include information about the management and use of algorithmic tools as well as underlying data and other information held by an agency relating to compliance with EO 50. When FOIL requires an agency to disclose such information, the agency should disclose it unless an exemption applies. When an exemption to the disclosure requirements under FOIL is applicable, but the agency is considering whether to voluntarily disclose the requested information, the agency must consider the applicability of other laws, such as but not limited to the City's "Identifying Information Law," referenced below.[3] Agency liaisons should consult with their Records Access Officer regarding agency-specific practices and protocols for responding to FOIL requests.

1.5.3. New York City Identifying Information Law

New York City's Identifying Information Law ("IIL") restricts the collection, disclosure, and retention of "identifying information"[4] unless one of the Law's enumerated exceptions applies. It also establishes the position of chief privacy officer for New York City and a citywide privacy protection committee, and requires each agency to designate a privacy officer.

1.5.3.1. Citywide Privacy Protection Policies and Protocols of the Chief Privacy Officer

The Citywide Privacy Protection Policies and Protocols of the Chief Privacy Officer ("CPO Policy") sets forth citywide privacy protection policies and protocols that City agencies and certain City contractors and subcontractors must follow when collecting, retaining, and disclosing identifying information, as required by the Identifying Information Law. The CPO Policy provides baseline requirements for City agencies relating to the protection of identifying information and comprehensive guidance to agency privacy officers on their role and responsibilities for agency IIL compliance.

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[2] See Article 6 of the N.Y.S. Public Officers Law.
[3] See N.Y.C. Admin. Code §§ 23-1201 et seq, and N.Y.C. Charter, at § 8(h). For additional guidance on the relationship of the Identifying Information Law to other laws and regulations, contact appropriate agency counsel, the Chief Privacy Officer or the Law Department, as needed.
[4] "Identifying information" means any information collected by or on behalf of the City that can be used by itself or in combination with other information to identify or locate a person. See Admin Code, at § 23-1201.

1.5.4. New York City Open Data Law

Local Law 11 of 2012 (the "Open Data Law"), as amended,[5] mandates City agencies to make all public datasets accessible on a single web portal by the end of 2018. Determinations as to when information constitutes a "public dataset"[6] involves a legal determination that should be made in consultation with the agency liaison, agency privacy officer, or other designated agency counsel before such information is made publicly available.

1.5.5. Citywide Information Technology and Security Policies and Standards

The City's Information Technology Security Policies and Standards, as they now exist and may be from time to time amended, are issued by New York City Cyber Command ("Cyber Command") and the Department of Information Technology and Telecommunications ("DoITT") (collectively, the "Citywide IT Policies").[7] These policies relate to the classification, transfer, and storage of data and information, in relation to agency use of technologies and IT services. The following Citywide IT Policies may be especially relevant to the proper handling and management of algorithmic tools and underlying data:

- Data Classification Standard
- Encryption Policy
- Encryption Standard
- Digital Media Re-use and Disposal Policy
- User Responsibilities Policy Citywide Incident Response Planning (P-IR-01)
- Agency Incident Response Plan
- Portable Data Security Policy
- Citywide Cloud Policy[8]

Agency liaisons should coordinate with relevant agency IT/MIS units, Cyber Command, and DoITT, as needed, to: (1) identify and address the impact of any technical requirements for the agency's use of particular data, new and emerging technologies, and algorithmic tools, in accordance with the Citywide IT Policies; (2) identify agency specific information technology and security policies;[9] and (3) ensure that any guidance issued to their agency's employees in furtherance of compliance with EO 50 or the AMPO Policies incorporates information on relevant sections of the Citywide IT Policies, agency specific information technology and security policies, and any additional guidance from relevant IT/MIS leadership, Cyber Command, and DoITT, and provides appropriate guidance to their contractors and subcontractors, as appropriate.

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[5] See Admin. Code §§ 23-501 et seq.
[6] See Admin. Code § 23-501(g) for a definition of "public data set."
[7] All Citywide IT Policies are available on Cityshare. Agencies must also comply with any agency specific security policies.
[8] The Citywide Cloud Policy requires that City agencies and entities submit any plans to use cloud services to DoITT for review to ensure that appropriate security, legal, and operational measures are considered.
[9] Relevant agency-specific policies may include Acceptable Use policies, Acceptable Email Usage Policies, IT and Equipment Policies, and Remote Access Policies which may address an employee's use of City- or agency-issued devices, as well as an employee's use of personal devices or e-mail addresses for City business.

1.5.6. Mayoral Directive 2015-2: Uniform Records Management Practices

Agencies must comply with Mayoral Directive 2015-3,[10] which sets forth the City's Uniform Records Management Practices, as new records may be created or identified in furtherance of these Policies and of compliance with EO 50. Agencies are responsible for compliance with applicable information retention requirements, including but not limited to the agency's Records Retention and Disposition Schedule approved by the Department of Records and Information Services ("DORIS") in accordance with Mayoral Directive 2015-3. Agency liaisons should consult with their Records Management Officer regarding agency-specific practices and protocols for managing records.

1.6. Definitions

Definitions for key terms are provided in the Glossary (see Appendix B).

2. Governing Principles

EO 50 requires the AMPO to "establish governing principles to guide City agencies in balancing the ethical and innovative uses of data facilitated through the use of algorithmic tools and systems in agency decision-making, to ensure they provide the greatest benefit for New Yorkers and the City." The purpose of setting forth governing principles is to create a shared understanding of the ways that algorithmic tools can be used by City agencies to leverage data and promote data-driven practices to enhance the efficiency and quality of agency operations or service delivery for New Yorkers, while acknowledging that such use may, absent appropriate scrutiny, inadvertently carry risks of harm in certain instances for individuals, groups, and communities.

The principles outlined in these Policies are used to inform additional AMPO guidance and responsibilities required by EO 50; they should also be used by City agencies during the course of their development, modification, production, review, or procurement of new or existing algorithmic tools.

2.1. Transparency

Transparency is a cornerstone of democratic government. Transparency becomes all the more important when new or enhanced analytic methods and technologies make it more complicated for the general public to understand agency decision-making, while in some cases also reducing human involvement in the analytical or decision-making process. For these reasons, City agencies should think about, build, and procure algorithmic tools through the lens of transparency.

2.2. Fairness

While the use of data-driven practices to support decision-making by City agencies is not new, algorithmic tools have the ability to amplify the challenges and risks that have long been associated with statistical models, data analytics, and other practices that rely on the analyzing

[10] See Section 6 of Mayoral Directive, available at https://www1.nyc.gov/site/records/about/records-management-policies.page.

of data in conjunction with technology. Given this possibility, agency use of algorithmic tools should be oriented toward promoting fairness, pro-actively preventing harm, and remediating any instances of inequity if and where they are found.

2.3. Innovation

Since government funding and resources are typically limited, and because government must also stay current with the evolving expectations of the residents it serves, agencies should seek to innovate the ways they streamline their own operations and deliver services. Algorithmic tools can be an essential part of that innovation. When developing or procuring algorithmic tools, agencies should ensure that the use of these tools is consistent with promoting an innovative approach to problem-solving.

2.4. Responsible Data Governance

During development, procurement, and production, algorithmic tools should adhere to all applicable laws, regulations, City policies, and standards surrounding the privacy and security of data collection, storage, disclosure, and utilization.

3. Steering Committee

EO 50 defines the composition of the AMPO Steering Committee and its responsibilities.

3.1. Composition

The Steering Committee is chaired by the Director of Operations, and includes the heads of the following agencies and offices (or their delegates): Office of the First Deputy Mayor, Corporation Counsel, Commission on Human Rights, Chief Privacy Officer, Office of Data Analytics, Chief Technology Officer, Department of Information Technology and Telecommunications, Cyber Command, and any other department or office designated by the Director of Operations.

3.2. Duties

The Steering Committee must meet once every quarter, and is responsible for advising the Director of Operations and the AMPO on their required duties per EO 50.

4. Advisory Committee

EO 50 defines the composition of the AMPO Advisory Committee and its responsibilities.

4.1. Composition

The Advisory Committee is chaired by the AMPO and consists of six additional members who are members of the public. Three of those members are appointed by the Mayor, and three are appointed by the City Council.

4.2. Duties

The Advisory Committee must meet at least twice a year, and hold at least one of those meetings publicly. The Advisory Committee is responsible for advising the AMPO on protocols and best practices for agency use of algorithmic tools, discussing with the AMPO topical issues related to algorithmic tools, and serving as a channel for collecting and communicating public commentary.

5. Agency Liaisons

EO 50 requires each agency to identify a liaison to serve as a primary point of contact between the AMPO and the agency; agency liaisons will be responsible for working with the AMPO to help ensure agency compliance with EO 50 requirements. Agency liaisons may be selected from any relevant agency division, including data analytics, information technology, information privacy, or legal affairs. Agency liaison responsibilities include:

- Communicating information received from the AMPO to relevant agency stakeholders, including agency heads, general counsels, agency privacy officers, and chief information officers.
- Convening or coordinating communication between agency personnel to complete required actions and documentation for annual compliance reporting (see Section 9).
- Submitting or ensuring submission of compliance reporting materials (see Section 9).
- Providing feedback, or sharing comments or questions to the AMPO related to any EO 50 obligations.

6. Identification and Prioritization of Algorithmic Tools and Systems

The AMPO's role is to establish and support a centralized management apparatus to ensure that City agency use of algorithmic tools is fair and responsible. To support agencies in understanding how EO 50 affects their computerized tools and systems, these Policies include an Identification and Prioritization Framework that provides guidance on which of their tools and systems qualify as "algorithmic tools," and of those that do qualify, what specific practices apply to them for purposes of the management requirements outlined in these Policies. The first set of criteria ("Identification Criteria") outlines a number of additional characteristics about computer-based tools and systems to focus the interpretation about which of those systems qualify as algorithmic tools for EO 50 purposes. The second set of criteria ("Prioritization Criteria") places qualified algorithmic tools in an ordinal ranking, and clarifies how ongoing management practices may differ for a specific algorithmic tool, depending on its place in that priority ranking.

These sets of criteria were developed through academic and operational research, contributions of professionals with relevant expertise through the AMPO Steering Committee and Advisory Committee, feedback of expertise and experiences from City agencies, and community/interest group input obtained through ongoing public engagement practices.

See Appendix A for the current Identification and Prioritization Framework.

7. Assessment

These policies are currently in development. They will focus on helping to ensure that relevant algorithmic tools used by City agencies are promoting equity, fairness, and accountability. They will include a framework to help agencies assess algorithmic tools, considering their complexity, the benefits, impact, and any potential risk of harm to any individual or group arising from their use.

8. AMPO Biennial Reporting

EO 50 requires the AMPO to produce a report for the Mayor and City Council, and to be made public, once every two years, the first of which was submitted on December 1, 2020. That report must describe the progress made in implementing the directives of EO 50.

9. Reporting

9.1. Annual Compliance Reporting

In order to meet the requirements of Section 2.a (v) and 2.a (vi) of EO 50, there will be an annual agency compliance reporting process, during which City agencies will compile and report relevant information about their algorithmic tools to the AMPO. Certain information from such reports will be made publicly available through the AMPO's public-facing platform.

9.1.1. Compliance Reporting Process

The compliance reporting process will run from September to December in each calendar year, with the following general milestones:

September: Agencies notified of beginning of compliance reporting process; agencies provided with necessary documentation and forms for completion.
October-November: Agencies hold internal discussions about systems to find algorithmic tools that must be reported pursuant to EO 50 and the criteria set forth in the Identification and Prioritization Framework; agencies complete documentation.
December: Agencies submit documentation to the AMPO.
December-January: Agency reports are reviewed and relevant information is published on the public-facing platform.

Specific requirements, deadlines, and overall timelines will be provided to agencies each year in the Agency Compliance Reporting Guidance.

9.1.2. Scope

Each year's Agency Compliance Reporting Guidance will inform agencies of the scope of required reporting. The scope of reporting is subject to change between reporting periods based on evolving policies and any changes to the Identification and Prioritization Framework.

9.1.3. Documentation

Each year's Agency Compliance Reporting Guidance will identify all the necessary documentation to assist agencies in preparing for compliance reporting, and the requisite forms to be completed and submitted.

9.2. Assessment Reporting

These policies are in development. They will be developed in conjunction with the Assessment policies cited in Section 7.

10. Public Engagement

These policies are in development. They will focus on identifying core components of ongoing AMPO public engagement, including target approaches, formats, and schedules.

11. Public Education

These policies are in development. See Section 10.

12. Requests for Information

These policies are in development. These policies will include a citywide protocol for receiving requests for information from individual members of the public who have been affected by a City agency's use of an algorithmic tool, and for directing them to the appropriate City agency and other resources.

13. Complaints

These policies are in development. These policies will include a citywide protocol for receiving, investigating, and addressing any complaints from individuals regarding any suspected or actual harm experienced in connection with a City agency's use of algorithmic tools, and advising agencies on any further actions that may be appropriate under the circumstances.

Version Control

Version Number	Date Approved	Approved By	Brief Description
1.0	9/14/2020	Jeff Thamkittikasem	Inaugural policies
1.1	9/21/2021	Alex Foard	Reflect change in AMPO personnel

Appendix A

Identification and Prioritization Framework

Issue Date: September 21, 2021[1]

An **algorithmic tool** is a partially or fully automated computer-based system that uses an **algorithm** or series of algorithms to turn data ("input") into a result ("output") to be used to make a prediction, determine a course of action, or otherwise influence decision-making ("outcome"). While this definition describes an algorithmic tool generally, this guidance provides additional criteria to clarify which systems qualify as algorithmic tools particularly for the purposes of Executive Order 50 ("EO 50"). These criteria are provided in **Section 1. Identification Criteria.**

Additionally, this guidance provides a second set of criteria for qualifying algorithmic tools to determine each tool's priority level. A tool's priority level determines particular requirements outlined elsewhere in the AMPO policies. These criteria are provided in **Section 2. Prioritization Criteria**.

Section 1. Identification Criteria

An agency's system qualifies as an algorithmic tool for the purposes of EO 50 if **all three** of the following Identification Criteria are met:

Identification Criterion 1: Data Analysis	
Description	The system is derived from **data analysis** approaches, or routinely performs data analysis to operate.
Explanation	Data analysis is the use of techniques to derive inferences or conclusions from datasets. Relevant forms of data analysis may be described as: • **Artificial intelligence** ("AI") or an application of AI, which includes topics such as **machine learning**, deep learning, speech and **natural language processing**, and **computer vision**; • Various categories of algorithms including those used for optimization or matching; • Predictive analytics; • **Statistical regression** or **classification**; • Heuristic approaches for tasks such as creating indices, rankings, or scores. Data analysis does not include producing descriptive statistics or applications of descriptive statistics in the form of data summaries or key performance indicators. Data analysis also does not include **data processing**, which is the use or manipulation of system data by software to perform required operations or render data in a form that can be used by a human.

[1] This Framework and the criteria outlined herein are subject to periodic modification. The criteria set forth in this Framework are valid for the current version of this Framework, issued on the above date.

Examples That May Meet This Criterion	• A risk calculator that applies a score to a client, the inputs for which were determined through a machine-learning algorithm. • A risk calculator that applies a score to a client, the inputs for which were determined by operational considerations. • A logistic regression model that uses client data to evaluate suitability for an agency program. • A tool that provides agency staff with a list of assets to inspect based on characteristics identified through a regression analysis. • A chatbot with which clients can interface to ask questions or submit inquiries. • A tool that groups users based on a schema developed by an algorithm that was trained on historical data of user profiles. • A system that analyzes faces, fingerprints, or other biometric datapoints to authenticate a client's identity.
Examples That Do Not Meet This Criterion	• Software that generates a profile of a client by aggregating inputted data. • A tool that determines client eligibility for a program based on criteria defined by law. • A system or tool that permits the operations of basic computer processes such as opening programs, sending messages, autocorrecting, or using a calculator. • A database management system that performs ETL (extract, transform, load) functions. • A dashboard of agency key performance indicators used in executive planning and strategy.

Identification Criterion 2: Decision-Making Use	
Description	The system is currently **in use** to support agency **decision-making**.
Explanation	Agency **decision-making** is the process by which information is considered by a City or agency official or employee which has the potential to influence or determine an agency's actions, policies, services, programs, employment, contracting, rulemaking, budgeting or allocation of resources. The support for agency decision-making may occur at any point in the decision-making process, and includes both **full automation**, in which the system's output is final and determinative for a particular outcome, and **partial automation**, in which the system's output is advisory or preliminary for use by a human decision-maker to determine an outcome. To be considered as an algorithmic tool, a system must have moved from being **in development** to **in production**, and once in production, the system must then be currently **in use**: • **In development** refers to an operational status of an algorithmic tool in which that tool is not reliably ready, and is in fact not used, to support agency decision-making, due to ongoing creation or refinement of models; testing of data; agency business decisions related to purpose, scope or scale; or ongoing design and build. • **In production** refers to an operational status of an algorithmic tool in

	which that tool has been developed to such a point that it may reliably support agency decision-making. Reliable support may include regular or routine use, infrequent or irregular use of at least once in a 12-month period, and pilots of limited scope or scale. • **In use** refers to a subset of in-production algorithmic tools in which the outputs or outcomes of such a tool are included in a discrete and identifiable instance of agency decision-making. Such term does not include data analysis processes of which the outputs are exploratory or inform ongoing research.
Examples That May Meet This Criterion	• A score calculator from which the resulting scores are used to determine levels or types of services available to clients. • A tool that produces an asset inspection list used by agency personnel determine inspection targets, where agency personnel may override the tool's selections. • A tool that analyzes imagery to identify or label a person or physical asset to aid in a human analyst's decision-making. • A tool that groups all incoming users, where those groups are used to define levels or types of service delivery.
Examples That Do Not Meet This Criterion	• An analysis investigating user characteristics associated with risk, the conclusions of which have been shared within the agency, but with no operational decisions made therefrom. • The development of an algorithm to predict asset failure that is still being trained with datasets. • A research study that explains historical client outcomes as a function of service delivery to inform policy decisions.

Identification Criterion 3: Material Public Effect	
Description	The outputs or outcomes derived from the outputs of the system have a **material public effect**.
Explanation	All agency business is conducted in the public interest. However, a tool meets the public effect criterion only if its effect on the public is material. A **material public effect** is a discrete, discernible, or otherwise identifiable impact of a system's outputs or outcomes on individuals or populations, which relates to procedural or substantive rights under the law; individual or population protected status; eligibility, receipt, or denial of a City or agency program, service, or benefit; subjection to a specific City program or activity; or judicial, administrative, or other forms of redress. Such term does not include instances in which the output of a tool (or outcomes resulting from the use of those outputs) directly affects only the internal administration of an agency, or where the effect of the use of a tool's outputs has an indirect effect on the public.
Examples That May Meet This Criterion	• A score calculator that creates scores or rankings for individual clients of an agency. • A tool that produces an inspection list of the City's physical assets that are used by residents around the City. • A tool that creates a typology of NYC neighborhoods to determine levels of delivery of services.
Examples	• A tool that optimizes agency staff postings based on administrative

That Do Not Meet This Criterion	needs and personnel variables. • A process that matches users to a basic administrative outcome such as time slots for appointments or next available client services specialist. • A tool that is used to model economic outcomes for the City as a whole. • A tool that predicts failure in individual agency vehicles.

Section 2. Prioritization Criteria

For tools that meet all three Identification Criteria listed in Section 1 (Data Analysis, Decision-Making Use, Material Public Effect), use the criteria outlined below to determine an algorithmic tool's priority level. Refer to the AMPO Policies and other guidance for additional information related to the impact of priority levels on EO 50 compliance.

Outcome	**Priority Level**
Tool meets no Prioritization Criteria	Level 0
Tool meets one or both Prioritization Criteria	Level 1

Prioritization Criteria:

1. The data analysis from which the system is derived, or that the system performs, is considered a form of:

    - Artificial intelligence (including machine learning, deep learning, speech and language processing, and computer vision); and/or

    - A category of algorithm including those used for optimization and matching.

2. The system/tool collects or analyzes "identifying information," as such term is defined under New York City's Identifying Information Law ("IIL"), in section 23-1201 of the N.Y.C. Administrative Code:

    Identifying information. The term "identifying information" means any information obtained by or on behalf of the city that may be used on its own or with other information to identify or locate an individual, including, but not limited to: name, sexual orientation, gender identity, race, marital or partnership status, status as a victim of domestic violence or sexual assault, status as a crime victim or witness, citizenship or immigration status, eligibility for or receipt of public assistance or city services, all information obtained from an individual's income tax records, information obtained from any surveillance system operated by, for the benefit of, or at the direction of the police department, motor vehicle information or license plate number, biometrics such as fingerprints and photographs, languages spoken, religion, nationality, country of origin, place of birth, arrest record or criminal conviction, employment status, employer information, current and previous home and work addresses, contact information such as phone number and email address, information concerning social media accounts, date and/or time of release from the custody of the administration for children's services, the department of correction, or the police department, any scheduled court appearances, or any scheduled appointments with any employee, contractor, or subcontractor.

Version Control

Version Number	Date Approved	Approved By
1.0	9/14/2020	Jeff Thamkittikasem
1.1	9/21/2021	Alex Foard

Appendix B

Glossary

Issue Date: September 21, 2021

This glossary includes terms defined within Executive Order 50 of 2019 ("EO 50") and additional terms that appear in EO 50 or the Algorithms Management and Policy Officer ("AMPO") Policies.

Terms Defined by EO 50	
Algorithm	A sequence of instructions, rules, or other problem-solving operations used to cause a technical tool or system to execute a set of actions.
Decision-making	The process by which information is considered by a City or agency official or employee which has the potential to influence or determine an agency's actions, policies, services, programs, employment, contracting, rulemaking, budgeting or allocation of resources.
Terms Included in EO 50	
Algorithmic Tool	A partially or fully automated computer-based system that uses an algorithm or series of algorithms to turn data ("input") into a result ("output") to be used to make a prediction, determine a course of action, or otherwise influence decision-making ("outcome").
Identification	The process by which a City agency evaluates the characteristics of a computerized process in use by that agency to determine if it meets the definition of an algorithmic tool as set forth by the criteria in the Identification and Prioritization Framework, and therefore subject to EO 50 and AMPO Policies.
Prioritization	The process by which the City uses select criteria to order the universe of identified algorithmic tools along an ordinal ranking and to group tools of similar importance, to enable more expedient, tailored, and appropriate management practices.
Terms Included in AMPO Policies	
Artificial Intelligence	An umbrella term without precise boundaries, that encompasses a range of technologies and techniques of varying sophistication that are used to, among other tasks, make predictions, inferences, recommendations, rankings, or other decisions with data, and that includes topics such as machine learning, deep learning, supervised learning, unsupervised learning, reinforcement learning, statistical inference, statistical regression, statistical classification, ranking, clustering, and expert systems.
Computer Vision	An application of AI involving images or video, including photographs, video, medical imagery, or infrared, 3D LiDAR, and other imagery outside the visible light spectrum, for purposes including object detection, object recognition, object tracking, pose estimation, image restoration, image classification, and motion estimation or planning.
Data Analysis	The use of techniques to derive inferences or conclusions from a data set. Relevant forms of data analysis may be described as artificial intelligence ("AI") or an application of AI, which includes topics such as machine learning, deep learning, speech and natural language processing, and computer vision; various categories of algorithms include those used for

	optimization and matching; predictive analytics; statistical regression or classification; or heuristic approaches for tasks such as creating indices, rankings, or scores.
Data Processing	The use or manipulation of system data by software to perform required operations or render data in a form that can be used by a human.
Full Automation (Fully Automated)	A characteristic of algorithmic tool where the system's output is final and determinative for a particular outcome. See also the definition for "Partial Automation" in Terms Included in AMPO Policies.
In Development	An operational status of an algorithmic tool in which that tool is not reliably ready, and is not in fact used, to support agency decision-making, due to ongoing creation or refinement of models; testing of data; agency business decisions related to purpose, scope or scale; or ongoing design and build.
In Production	An operational status of an algorithmic tool in which that tool has been developed to such a point that it may reliably support agency decision-making. Reliable support may include regular or routine use, infrequent or irregular use of at least once in a 12-month period, and pilots of limited scope or scale. See also the definition for "In Development" in Terms Included in AMPO Policies.
In Use (Used)	A subset of in-production algorithmic tools in which the outputs or outcomes of such a tool are actually directly or indirectly included in a discrete and identifiable instance of agency decision-making. Such term does not include data analysis processes of which the outputs are exploratory or inform ongoing research, or have not yet been included in agency decision-making. See also the definition for "In Production" in Terms Included in AMPO Policies.
Machine Learning	A means of building software or designing algorithms that learn from data or improve through experience using training data to make predictions, decisions, or other inferences without the relationships between input data and predicted outputs being explicitly programmed.
Material Public Effect	A discrete, discernible, or otherwise identifiable impact of a system's outputs or outcomes on individuals or populations, which relates to procedural or substantive rights under the law; individual or population protected status; eligibility, receipt, or denial of a City or agency program, service, or benefit; subjection to a specific City program or activity; or judicial, administrative, or other forms of redress. Such term does not include instances in which the output of a tool or outcomes resulting from the use of those outputs directly affect only the internal administration of an agency, or where the effect of the use of a tool's outputs has an indirect, aggregate effect on the public.
Natural Language Processing	An application of AI involving language, including text and spoken works, for purposes including machine translation, document classification, speech recognition, speech-to-text, natural language understanding, information extraction, and natural language generation.
Partial Automation (Partially Automated)	A characteristic of an algorithmic tool where the system's output is advisory or preliminary for use by a human decision-maker to determine an outcome. See also the definition for "Full Automation" in Terms Included in AMPO Policies.

Statistical Regression	The process of using mathematical models to estimate a relationship between one or more independent variables and a dependent variable.
Statistical Classification	The use of a statistical model to produce a predicted output for a given input that belongs to a defined set of categories.

Version Control

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1.0	9/16/2020	Jeff Thamkittikasem
1.1	9/21/2021	Alex Foard