NIJ UPDATE

Tapping into artificial intelligence:

Advanced technology to prevent crime and support reentry

By Eric Martin and Angela Moore

Authors' Note: All findings and conclusions reported in this article are those of the authors and do not necessarily represent the official position or policies of the U.S. Department of Justice.

There are approximately five million offenders under community supervision in the United States.[1] However, the nature of community corrections is changing, in terms of both who is likely to be serving a sentence in the community and the sheer number of offenders supervised. As jurisdictions implement sentencing reforms and decarceration policies, community corrections officers are supervising larger caseloads containing higher-risk offenders. In the past, probation caseloads largely consisted of relatively low-risk individuals who posed little threat to public safety and had few criminogenic needs (i.e., needs related to an individual's criminal tendencies).[2] Increasingly, individuals on community supervision have more criminogenic needs and consequently may require more services and increased supervision.[3]

Addressing the increasingly complex needs of their caseloads is a tall order for community supervision officers. With relatively limited resources, they monitor their clients' behavior and ensure that the offenders are actively participating with reentry programming.[4] The stakes are daunting. Recidivism rates remain high: a recent study tracked over 400,000 state prisoners released in 2005 and found a rearrest rate of 83.4% within nine years.[5]

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Fortunately, technology to address these issues is emerging.

Potential of artificial intelligence

Artificial Intelligence (AI) has the potential to be an invaluable resource to community supervision officers as they monitor offender behavior and

facilitate reentry programming. As officers are required to do more with less, AI can serve as a force multiplier, helping community supervision officers pinpoint those offenders under immediate risk of recidivating. It can also reinforce reentry programming activity for the offender between that offender's scheduled times with a clinician or the community supervision officer.

AI tools can help community supervision staff triage their limited resources to focus on offenders most in need, delivering a continuous stream of data. This information can enhance the officers' ability to identify and quickly respond to offender risks and needs. The process of identifying the offender's unique risk to reoffend, identifying their criminogenic needs that can be addressed, and evaluating their likely response to programming is referred to as Risk-Need-Responsivity (RNR).[6] Through wearable devices or smartphones, AI could reinforce programming with reminders, encouraging messages, and even warnings (depending on the mood and behavior of the offender) by monitoring the stress level of the offender or assessing the known attributes of the offender's physical location. A critical aspect of AI's support for community corrections is the use of advanced machine learning algorithms that are the foundation of AI technology. These algorithms can detect trends with more precision than conventional statistical methods. This enhanced monitoring capability helps ensure that offenders receive support when they need it most.

The National Institute of Justice (NIJ), the research and development agency within the U.S. Department of Justice, is seeking to expand the use of AI beyond structured risk assessments. The applications NIJ plans could use machine-learning algorithms to provide real-time guidance to community supervision officers and to intervene with offenders in periods of crisis. The precision of machine learning, coupled with the latest mobile communications and wearable technology, can give community supervision officers the ability to identify those most at risk and tailor timely interventions, thus preventing recidivism in real time.

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In fiscal year 2019, NIJ requested proposals from researchers to develop AI tools to assist community supervision officers and prevent recidivism. The funded projects will commence in early 2020 and will likely result in deployable technology in 2023. We discuss the projects in detail below, highlighting their potential benefits to the corrections field.

NIJ artificial intelligence research solicitation

NIJ solicited investigator-initiated research and development of AI solutions for community corrections agencies. NIJ sought field-tested and readily deployable solutions in three areas:

1. Providing real-time RNR assessments;

2. Promoting intelligent offender tracking; and

3. Enhancing programming through mobile service delivery.

Real-time RNR assessments

Evidence suggests that although higher community supervision caseloads can increase recidivism, reducing caseload size may not automatically reduce recidivism.[7] Community supervision officers can better reduce recidivism when they have time to identify unique triggers for offenders and to intervene to address their criminogenic needs.[8] AI can provide real-time information so that officers can direct resources to those offenders in immediate risk of recidivating.[9] For instance, an AI wearable device could monitor biological data assessing an offender's stress and mood, and send alerts to the community supervision officer that the offender may be in a risky situation. The technology could focus officers' expertise with surgical precision at times when recidivism is most likely.

Intelligent tracking of offenders

The danger of an offender violating the terms of supervision is not constant. Rather, it varies across different situations, spiking when risk is greatest. Geographical positioning systems (GPS) can easily identify some negative situations. GPS-based tracking devices, such as ankle bracelets, have been in use to monitor at-risk offenders in the community for quite some time.[10] AI has the potential to enhance these tracking practices by adding information on how risk differentiates across various spaces for an individual offender. Furthermore, the AI solution itself could intervene independently of any officer action, depending on the nature of the risk. Besides automatically notifying the officer, the AI intervention could also engage with the offender to mitigate the precarious situation — for example, by encouraging the offender to leave a risky location or engage in programming such as cognitive-behavioral therapy.

Mobile service delivery

AI offers the potential to expand access to programming for remote offenders and enhance standard programming by bringing those benefits into offenders' daily lives. AI technology could regularly engage with offenders, encouraging prosocial (as opposed to antisocial) behavior. AI has the potential to facilitate greater internalization of programming.

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NIJ-funded research and development projects

Real-time RNR assessments, intelligent offender tracking, and mobile delivery of programming are not mutually exclusive services. A robust AI solution can meet all three areas of need for community corrections.

Through its 2019 solicitation, NIJ funded two promising AI projects to advance development of all three applications. RTI International (RTI) and Applied Research Services, Inc. (ARS) proposed one project. Purdue University proposed the other.

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LEVERAGING BIG DATA TO HELP OFFENDERS IN NEED

While NIJ awaits AI solutions from the research teams, it will continue to engage the scientific community to rigorously evaluate reentry programs and refine algorithms for assessing risk. Those new resources will help triage services to those reentering offenders most in need. Trying to predict who is likely to fail on probation or parole is not new: risk assessment systems have evolved from structured judgment, to actuarial risk assessments using static risk factors only, to the inclusion of dynamic factors such as successful completion of programming. Now, the corrections field is primed for a fourth generation of risk assessment systems incorporating machine-learning algorithms.[11]

Emerging state-of-the-art AI algorithms and their applied technology will be able to sift through massive amounts of information to allow community supervision officers to home in on those offenders most likely to recidivate within each respective risk category. Moreover, the identities of those most likely to recidivate may be constantly changing as offenders encounter different personal and environmental triggers while navigating their reentry.

The use of risk assessments is continuing to diffuse throughout the criminal justice system. With the incorporation of dynamic factors, community supervision officers assess offenders more frequently to gauge how their individual recidivism risk may have changed, particularly through participation in reentry programming. Yet an individual offender's criminogenic needs, even with the inclusion of recently updated dynamic risk factors, present only a portion of the factors that lead to a specific re-offense.

An offender is going to have unique triggering responses to his or her environment. With AI algorithms advancing, it is now possible to incorporate more data, beyond static risk factors, to fine-tune risk assessments. Currently, most corrections agencies are assessing risk without capturing common dynamic crime and environmental data that reflect offenders' unique daily experiences.

NIJ has helped police practitioners understand the changing nature of risk when it comes to advancing tools to identify crime hot spots and developing other advanced crime analysis technology, such as risk terrain modelling.[12] To that end, NIJ hosted a crime forecasting "challenge" — a competition for forecasting-algorithm developers. We can apply these same concepts to community corrections — attempting to model the unique conditions that trigger reoffending. In much the same way that police departments monitor immediate trends in crime and call data, community supervision officers can monitor various streams of data on offenders' fluid risk for reoffending. This understanding could help community supervision officers better identify scenarios likely to trigger the commission of a new crime for each offender in their caseload. More importantly, new community supervision technology could alert officers to crime as it is occurring.

The availability of data, along with the analytical tools to make sense of the information, has advanced to a level where it may be possible for community supervision officers and clinicians to assist struggling offenders in their time of greatest need. When community supervision officers have the ability to practice their craft with offenders (i.e., engage in RNR programming and form prosocial mentoring relationships), they can make positive differences in offenders' lives.[13] It is ironic that something as impersonal as "big data" can actually help connect those in need with the people best suited to helping them.

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RTI and ARS are working with the Georgia Department of Community Supervision (DCS) to develop the Integrated Dynamic Risk Assessment for Community Supervision (IDRACS) software tool. The IDRACS software will rely on dynamic risk factors to model offenders' risk levels and provide real-time updates to supervision strategies. RTI plans to use data on over 400,000 supervised offenders from 2016 to 2019 to develop the IDRACS software. In addition, the research team plans to develop a dashboard that will integrate with DCS's case management system to provide a fully functional, fielded solution for Georgia's community supervision officers.

The researchers at Purdue University are collaborating with Tippecanoe County (IN) Community Corrections to develop a novel AI-based Support and Monitoring System (AI-SMS) to facilitate successful reentry of offenders. The AI-SMS is an integrated smartphone and health-tracking device that offenders will wear. Community supervision officers and third-party service providers will engage with user interfaces on a smartphone/tablet to engage with the offenders. The AI-SMS is expected to use offender data collected by the wearable device to alert community supervision officers when offenders are likely in immediate risk for recidivating and suggest appropriate interventions. Purdue will study the impact of the AI-SMS system through a randomized controlled trial with a sample of 250 Tippecanoe County offenders.

The RTI/ARS and Purdue projects commenced in January 2020. Practitioners can expect reports on the developed technologies within the next few years.

Conclusion

Artificial intelligence has unique potential to help community corrections officers meet offenders' criminogenic needs before they recidivate. Officers are supervising larger caseloads of more at-risk offenders while trying to combat historically high recidivism rates. NIJ has begun work on developing technological solutions to provide community supervision officers with a much-needed force multiplier to enhance and scale effective supervision strategies. With this new technology, jurisdictions can experiment with corrections reform while promoting successful reentry of more high-risk offenders.

For questions concerning this article, please contact Eric Martin at eric.d.martin@usdoj.gov.

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