

Dr. Juyoung Song

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Criminal Justice**

Title of your research project.

Theoretical and empirical reexamination of adolescent delinquency in the fourth industrial revolution society: With big data and artificial intelligence.

Description of research. Please provide a few sentences that explain the question and the methods employed in this research project.

The crime phenomenon of modern society is more complex and diverse than in the past. There are many ways to predict and analyze crime phenomena. The current era of the fourth industrial revolution is experiencing innovative changes as cutting-edge information and communications technology are incorporated into all areas of the economy and society; for example, artificial intelligence (AI), the Internet of Things, big data, and mobile technology. Criminologists (crime-data scientists) play a very important role in this process. They create or assemble high-quality data that can be used to train machine-learning systems, find machine-learning algorithms that are suitable for the data, and perform modeling. The discussions of politics, economy, and culture posted on social media outlets represent the opinions of the era. The method of collecting and analyzing the unstructured data from online channels, including the Social Network Service, can interpret the actual phenomenon in our society. The current study uses structured and social big data to predict crime and preemptively respond to it. The result of this study provides a detailed description of the entire research process, which consisted of gathering big data, analyzing it, and making observations to develop a crime-prediction model that uses actual big data. The study also contains an in-depth discussion of several processes: text mining, which extracts useful information from online documents; opinion mining, which analyzes the emotions contained in documents; machine learning for crime prediction; and visualization analysis. Machine learning will be applied to finally suggest a prediction model. The results of the analysis and policy implication will be discussed.

Did this project include Penn State students as researchers?

Yes

If yes to the above question, please state where it was published.

Book

Juyoung Song and Taemin Song (2019). *Big Data Analysis Using Machine Learning for Social Scientists and Criminologists*, Cambridge Scholars Publishing, Cambridge, UK. ISBN-13: 978-1-5275-3388-2

Journal Articles

Song, T. M., & Song, J. (2021). Prediction of risk factors of cyberbullying-related words in Korea: Application of data mining using social big data. *Telematics and Informatics*, 58, 101524. <https://doi.org/10.1016/j.tele.2020.101524>

Na, C., Oh, G., Song, J., & Park, H. (2021). Do Machine Learning Methods Outperform Traditional Statistical Models in Crime Prediction? A Comparison Between Logistic Regression and Neural Networks. *Korean Journal of Policy Studies*, 36(1), 1-13.

Han, Y., Lee, S., Cho, E., Song, J., & Hong, J. S. (2021). Individual-and school-level predictors of latent profiles of bullying victimization: comparing South Korea and the United States. *Journal of interpersonal violence*, 0886260521997950. <https://doi.org/10.1177/0886260521997950>

Song, J., Han, Y., Kim, K., & Song, T. M. (2020) Social Big Data Analysis of Future Signals for Bullying in South Korea: Application of General Strain Theory. *Telematics and Informatics*. 54, 101472. <https://doi.org/10.1016/j.tele.2020.101472>

Song, J. (2020). Patterns and explanations of delinquency among Korean youth using general strain theory. *Children and Youth Services Review*, 105080. <https://doi.org/10.1016/j.childyouth.2020.105080>

Song, J. *, Song, T.M. (2019) Social Big Data Analysis of Particulate Matter, Health, and Society. *International Journal of Environmental Research and Public health*, 16(19), 3607. <https://doi.org/10.3390/ijerph16193607>

Kim, H., Han, Y., Song, J., & Song, T. M. (2019). Application of Social Big Data to Identify Trends of School Bullying Forms in South Korea. *International Journal of Environmental Research and Public Health*, 16(14), 2596. <https://doi.org/10.3390/ijerph16142596>

Han, Y., Kim, H., Ma, J., Song, J.*, & Hong, H. (2019). Neighborhood Predictors of Bullying Perpetration and Victimization Trajectories among South Korean Adolescents. *Journal of Community Psychology*. 47(7): 1714-1732. <https://doi.org/10.1002/jcop.22226>

Han, Y., Ma, J., Bang, E., & Song, J *. (2019) "Dynamics of Bullies and Victims among South Korean Youth: A Propensity Score Stratification Analysis", *Children and Youth Services*

Review. 98, p. 252-260. <https://doi.org/10.1016/j.childyouth.2018.12.029>

Han, Y., Kim, H., Song, J.*, & Song, T. M. (2019). Ontology Development of School Bullying for Social Big Data Collection and Analysis . *The Journal of the Korea Contents Association*, 19(6),10-23. DOI : 10.5392/JKCA.2019.19.06.010

Song, J. *, Song, T. M., Lee, J. (2018). Stay alert: Forecasting the Risks of Sexting in Korea using Social Big Data. *Computer in Human Behavior* 81: 294-301. DOI: <https://doi.org/10.1016/j.chb.2017.12.035>

Song, J., Song, T. M., Seo, D.-C., Jin, D.-L., & Kim, J. S. (2017). Social Big Data Analysis of Information Spread and Perceived Infection Risk During the 2015 Middle East Respiratory Syndrome Outbreak in South Korea. *Cyberpsychology, Behavior, and Social Networking*, 20(1), 22-29. <https://doi.org/10.1089/cyber.2016.0126>

Song, J., & Song, T. M. (2016). Future Signals of Health and Welfare Policies and Issues using Social Big Data. *Journal of Health Informatics and Statistics*, 41(4), 417-427. DOI: <https://doi.org/10.21032/jhis.2016.41.4.417>

Song, J., Song, T. M., Seo, D.-C., & Jin, J. (2016). *Journal of Adolescent Health*. Data Mining of Web-Based Documents on Social Networking Sites That Included Suicide-Related Words Among Korean Adolescents, 59(6), 668–673 DOI: 10.1016/j.jadohealth.2016.07.025

Song, J. *& Morash, M. (2016). “Materialistic Desires or Childhood Adversities as Explanations for Girls’ Trading Sex for Benefits” *International Journal of offender Therapy and Comparative Criminology*, 60(1) 62–81 <https://doi.org/10.1177/0306624X14543769>

Jang, S.& Song, J. (2015). “A “rough test” of a delinquent coping process model of general strain theory” *Journal of Criminal Justice*, 43(6) 419–430. DOI: 10.1016/j.jcrimjus.2015.08.003

Yingling, J., Morash, M., & Song, J. (2015). “Outcomes Associated with Universal and Immigrant Group Specific Responses to Intimate Terrorism” *Violence Against Women*, 21(2) 206–228. DOI: 10.1177/1077801214564769

Jang, H., Song, J.*, & Kim, R. (2014). “Does the Offline Bullying Victimization Influence Online Bullying Behavior among Youths? Application of General Strain Theory” *Computer in Human Behavior* 31: 85-93. DOI: 10.1016/j.chb.2013.10.007

Song, T., Song, J., An, J., Hayman, L., & Woo, J. (2014). “Psychological and Social Factors Affecting Internet Searches on Suicide in Korea: A Big Data Analysis of Google Search Trends” *Yonsei Med J* 55(1):254-263. DOI: 10.3349/ymj.2014.55.1.254

What problem do you address with your research?

To examine how machine learning can be used to predict crime.