# Towards the Development of Urban Crime Metrics that Match Perception

*Abstract*   This project involves using a data-driven approach to develop crime models and metrics that better match perceived safety indicators. The often-used metrics for studying urban crime, such as murder rate, typically do not match the perceived safety threat that comes from these crimes occurring. This causes a disconnect between anr5,)8g(t)-2M)4(iss)-(t)1(e)-5)4m)1-4t)8(e)-5)8s)7Tm0g(G)]TJQ019reW*nBAI)f10Z5at)8c)-5h)6(e-5t)8y )7Tm0

such a case, people who argue that human perception of crime is irrational would likely state that the proper perception of crime levels should also be a tenth of the smaller city. The argument is that, assuming crime happens at random, a higher population would linearly scale the chance of being a victim. People should thus feel a lot safer in a more populated city than a smaller one with

the total effect of crime on individuals. To see this, consider the scenario where a violent crime has recently occurred in front of a high-rise residential building. Since this crime is so close to people living in that building, it will likely affect each resident equally. Every resident may now be more careful about leaving the building and may also invest in protection and surveillance devices. Now, consider a different scenario where the same residents are now living in several smaller buildings, spread over a large area. If we still have a single crime occurring in front of one of the buildings, the residents of other buildings may not be affected as much. In both scenarios, the crime rate would have been the same, but the perceived safety threat would have been much lower on average in the

the circle formed by the dotted outline, we take the square root to estimate the distance value $r$, within constant of proportionality (

[13] H.W. Kang and H.B. Kang, Prediction of crime occurrence from multi-modal data using deep learning *PloS one*, *12*(4), e0176244. 2017.

[14] K. Jenga, C. Catal, and G. Kar, Machine learning in crime prediction *Journal of Ambient Intelligence and Humanized Computing*, *14*(3), 2887-2913. 2023.

Funding related to your proposed research: **none**

Criteria for student applicants: **some programming experience (esp. Python) required**

List of seminar topics you are willing to cover (Selecting from list below or suggesting your own):
- Ethics in Research/Scholarship
- Literature Search and Library Resources
- Problem-Solving Skills and the Scientific Method
- Presentation Skills
- Technical Writing
- Resume Writing and Marketing
- Preparing for Graduate School
- Interview Skills
- Mock Presentation Supervisor (Practice for Symposium)
- Other: **Data Analysis and Data Management**