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# Heat Mapping Crime: A Data-Driven Approach to Policing in New York

Beruktawit Gebreamlak  
*Portland State University*

Daniel Ochoa  
*Portland State University*

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**[00:00:01.100] - Daniel**

Welcome. Today, we're delving into an intriguing project that aims to shed light on crime patterns in the bustling city of New York. Joining us today is me, Daniel, our faculty advisor, Khunpeng Lu and Beruktawit. Welcome. Let's start off here, Beruktawit. Could you tell our listeners about our project and what we decided to achieve?

**[00:00:31.870] - Beruktawit**

Absolutely, Daniel. In this project, we aim to create a heat map that visually represents the top seven crimes across the different boroughs in New York City. Our goal was to analyze crime data to identify patterns and understand which areas that have the highest crime rates and pinpoint the specific types of crimes that are prevalent. By doing this, we had hoped to provide insights so that we could help the public for safety awareness and also draw attention to law enforcement agencies to areas that might need more attention. Speaking on this, our final results of the heat map showed that in the year 2000, most of the boroughs were safe, except for Manhattan. Surprisingly enough, between the years 2000 and 2010, while Manhattan stayed the same as the hotspot for crime, other parts of the borough, such as Brooklyn, experienced a high increase in crime rates. Between the years 2010 and 2015, Manhattan experienced a significant amount of decrease in crime, while Brooklyn increased a higher rate of crime rate. This suggested that the precincts and the police departments in Manhattan were implementing good laws and good policing, and were maintaining it while other parts of the borough, such as Brooklyn, were not.

**[00:01:59.040]**

My question back to you is that how is notifying the public of crime rates around the borough is done today and what are the limits of the current practice?

**[00:02:16.940] - Daniel**

Thank you for your question. Yeah, there are two components to this question, one of which is an app that's called Citizen. Citizen is one of the most popular apps right now that people in the and I should say worldwide can use. What Citizen is, is that it's able to

tell the user of crimes happening either in the moment or it just tells you to see crimes happening or that happen in the past 24 hours, this can range from just simple robberies happening or something as simple as a cat stuck in a tree. It's very wide. But the limitation of this is that when you just go on the app, they don't have an exact idea of just how dangerous the neighborhood they're walking in is. They don't know that the borough they're visiting, they don't know how the crime rate has been. The second component of this question is that the databases. With the databases, the NYPD actually does post data on major crimes that have happened in neighborhoods and boroughs, specifically, precincts. It's available online in Excel data, as well as their CompStat 2.0, which is a database that publishes weekly, and it's also with boroughs and precincts and whatnot.

**[00:03:58.670] -**

But the position here is that the average community member is not going to be able to interpret this data meaningfully. What I mean by that is that, yes, we can analyze just how much of a percentage change crime increased or decreased the weeks prior or the years prior, but we don't actually have a meaningful representation of that data to better inform us in our everyday lives.

**[00:04:28.020] - Beruktawit**

Thank you for that, Daniel. I think your answer also covered my next question, but if you have something to add on to it, feel free to do so. I was going to ask how this approach was or is different than what we were trying to do with the heatmap.

**[00:04:54.860] - Daniel**

Yeah. With crime, it's a little complicated. Just by typing into the Excel data, we see that it's not very organized and yes, although it's very, very accessible to the average user, once again, they're not going to be able to, I guess I should say, dissect that data. There's no graphics that the NYPD currently makes public. For incoming tourists or any native New Yorkers, even long-time New Yorkers, there's no way for them to actually, I guess I should say, make a pattern of how much their neighborhood or how much their

borough crime rate is increasing or decreasing. That has significant impact as to how their living standard actually changes.

**[00:06:07.560] - Beruktawit**

Thank you. Thank you for that insight, Daniel.

**[00:06:10.800] - Daniel**

Yeah. Moving on to my questions, given our project status, what difference do you think our project will actually make to the community?

**[00:06:24.620] - Beruktawit**

Good question. As mentioned earlier, the purpose of this project was and is to help citizens of New York to visualize the crimes that happen in different boroughs and to, at the end of the day, make a better decision and be better aware of their surroundings. As someone who is not a native to New York, I think I would have found this... If I had this resource before moving to New York for schooling, I would have found it more useful in navigating. Our school does send us emails and text saying that, Hey, and so on, so forth. There is this robbery, and stuff like that. But I never really understood how close or how near it was to me. Having seen this beforehand would have made me more aware. I think it'd also help other people who come to New York, maybe for visiting or even school, to be better aware of their surroundings and help them stay safe. Also, again, it would help law enforcement have better decisions on allocating resources in specific precincts that experience high crime rates in comparison to others.

**[00:07:42.500] - Daniel**

All right, thank you so much for your insights. This is the end of our segment. Moving on to the next part of this podcast, we will be interviewing our faculty mentor, Dr. Khunpeng Lu, who has helped to make this project possible, and a community member whose name is Ethan Shu.

**[00:08:05.260] - Beruktawit**

Thank you so much for your time. Before we begin with this segment, could you please introduce yourself to the audience?

**[00:08:13.240] - Khunpeng**

Yeah. My name is Khunpeng Lu. I am currently an assistant professor at the CS Department of Portland State University. I joined PSU one year ago, and before that I obtained my PhD degree from the computer science at the University of Central Florida. My research interest focuses on data mining, machine learning and big data analytics. I'm extremely interested in applying the reinforcement learning and other machine learning technologies to the real-world applications.

**[00:08:59.920] - Daniel**

Okay, so what was your first impression when you heard about this project that we were conducting?

**[00:09:08.510] - Khunpeng**

I was very excited because I'm always trying to incorporate my research into the real-world scenarios, real-world applications. And besides, while my research focus was urban computing that we were extremely interested in what was happening in the urban area and what can we do to contribute to better facilitate the manipulation of the urban facilities. And then I felt it could be challenging because first, I'm not an independent researcher now. I'm a team leader and a mentor for us.

**[00:10:00.090]**

For our small group. And so, I need to consider more instead more about the teamwork instead of the research independently. Yeah, so that's my first idea about the project.

**[00:10:21.200] - Beruktawit**

Thank you for that insight and continuing off of that, although our final project has changed, how do you think having a visualization of a crime rates can help citizens in York?

**[00:10:35.400] - Khunpeng**

Yeah, firstly, I think the realization is SEO can help the interpretation of what is happening in the city and which can help the police stations or other practitioners know what is happening there. And also as our realization is a dynamic changing heat map, so it can clearly demonstrate that the change or the trend of the primaries in the New York City and beyond that, it could be integrated into the systems for place enforcement, allocation or other scenarios. Yeah. Overall, I think it is very important and what's more, it is also doable and it is also a good project that we can manage at this time point.

**[00:11:44.150] - Daniel**

Thank you.

Okay, thank you. So, on the other side of the spectrum, how do you think law enforcement specifically can incorporate the heat map into an already existing system?

**[00:12:01.930] - Khunpeng**

Yeah, incorporating heat maps into existing law enforcement measures can enhance situational awareness, resource allocation, and decision making. So specifically, there could be some areas that are in need of the heatmaps. So, for example, the data collection and analysis gather relevant data from variety sources such as crime reports, in the incident records, and social media. And it can also contribute to the data processing, clean and process the data to ensure accuracy and consistency. It can also help to identify hot spots and finally, as we mentioned before, that it can also help to

allocate the resources such as patrol officers, investigators and community to identify the hot spots.

Thank you.

**[00:13:17.900] - Beruktawit**

Before we wrap up, do you have any final thoughts on the project or anything else you like to say about yourself that you would like to share with the audience?

**[00:13:29.440] - Khunpeng**

Yeah, so the first thing I would like to say is to thank my teammates that they really work hard and contribute a lot to the project and from which I learned a lot because myself is a fresh faculty in the sales department. And it is also very helpful for me to work with such diligent young people. And speaking of the project itself, I think further, it could be integrated with reinforcement technology to help the automatic decision-making scenarios. And finally, I'm trying to wrap up the results we got and maybe in the future we can write the report or even a research paper on that.

Yeah, thank you.

**[00:14:43.850] - Beruktawit**

Yes, definitely. Continuing this project is something we're looking forward to during our school year.

**[00:14:52.250] - Khunpeng**

Thank you.

**[00:14:54.810] - Daniel**

We have a special guest joining us today so that he can talk to us a little bit about his experience growing up as a New Yorker. So, I am happy to introduce Ethan Chu of New York. Ethan, would you mind telling us a little bit about yourself?

**[00:15:12.210] - Ethan**

Hello, my name is Ethan chu. I currently go to Wesley university studying right now mathematics and east Asian studies. I grew up in Brooklyn around eiffel avenue, sort of like around the Chinatown of Brooklyn, so to speak. And yeah, I currently live in Staten Island, but for most of my life I've lived in Brooklyn, New York. Yeah.

**[00:15:47.630] - Beruktawit**

Okay, Ethan, so to my understanding that you are not studying in New York for your time during college. However, you did spend a lot of time in New York city and have lived there. So how would you describe the crime scene in New York.

**[00:16:07.730] - Ethan**

I would describe the crime scene in New York as pretty compared to different cities, like mean, like Connecticut, Middletown, or different states in general. The crime scene in New York is overall pretty high. Describing it, I would feel like it's very violent and also unexpected. These crimes happen out of nowhere almost all the time, and it's very dangerous around these streets, I would say, because you never know what's going to come your way.

**[00:16:54.290] - Daniel**

And do you feel safe or confident navigating the city? I mean, we know you've been in the city for your entire life, but have moments where you're concerned of your safety?

**[00:17:07.750] - Ethan**

So, I mean, recently I was in New York for the summer, and coming back into New York, I definitely felt what I would say is, like, if you were traveling to New York for the first time, I re. Felt that feeling of just having to lock into the pressure of having to always look behind my back, having to always look around for people who not people who are crazy, but obviously people who appear as though they could potentially harm you. So, I would say that definitely not safe navigating New York city. It is something else. It's someplace that you always have to watch your back. Of course, it's not east Asian country where you could just relax and walk at night with no worries whatsoever.

**[00:18:05.450] – Beruktawit**

And in your opinion or also in your experience as well, is there a clear distinction between your perception of crime in this current year compared to past years you've been in New York.

**[00:18:22.830] - Ethan**

This year? I would say when I growing up in city in Brooklyn around the 2000, definitely was less prevalent.

**[00:18:45.570] - Ethan**

Yeah, less prevalent. But now in recent years has sort of surged more and more. I'm not sure why, but I've definitely seen almost a day news reporting about some stabbing, some pushing, maybe not necessarily crime, but more like accidents happening in the city, too.

**[00:19:15.690] - Daniel**

Okay. And so as a new yorker, do you currently use any resources or apps such as citizen that help you in times when you're uncertain?

**[00:19:28.370] - Ethan**

As a New Yorker, I would say that it's very hard to keep up in time with recent crime that's going on unless you have some app like Citizen besides Citizen. I don't know of any other app that records crime on a very fast basis. And even Citizen is I wouldn't say it's not that reliable, but it really depends on who is using Citizen. If there are a lot of people at the time using it, or people even think to use Citizen and upload those videos of crimes or report on them. Because most of the time when the crime happens, obviously there's a lot of pressure and it just seems like you will hear the information later. But at the moment it takes some time for the media to pick it up.

**[00:20:32.570] – Beruktawit**

Adding on the resources, what is your opinion on the law enforcements in New York overall? Do you think the city's administration has a true understanding of the severity of the crimes in New York?

**[00:20:48.670] - Ethan**

I think they know that there of course, crime in New York City, but I think that they to focus on certain types of crime that might benefit them if they focus on it more. For example, right now there's a lot, of course, people doing fare evasion in the MTA system, so there have been much more police put in train stations for those reasons. But you don't often see a lot of police. I mean, of course you see police out on the streets since it's New York City, but in areas where crime is a lot in neighborhoods, there is that much supervision or much police there to remedy those crimes. Instead, they're focusing on areas of petty theft or smaller crimes that they can perhaps seek to gain more money from as a result, putting more police there, like what I just mentioned about them.

**[00:22:00.690] - Daniel**

All right, thank you for your insights. So, we're here to tell you about our project that we're working, running crime in New York City. So essentially, we've created a heat

map that visually represents the number of crimes of which there were certain categories account. So, this map spans from the year to 2022, and we have plans to update the map with data in 2023 and so forth. So, in short, you made it easier to visually see the areas or I guess say police things as well. Option to analyze any trends in past years. Do you see yourself in the future?

**[00:22:46.930] - Ethan**

I would see myself using this resource in the future if it would constantly, of course, be updated. Obviously, most recent up to date information is the best. So potentially, yeah.

**[00:23:07.690] - Beruktawit**

And with, let's say, the updating feature added, do you think it would be helpful for law enforcements to utilize this resource as well?

**[00:23:18.670] - Ethan**

I think it would just be helpful in general for law enforcement to utilize what you guys are essentially doing, like researching the trends and inputting how much time is happening within certain locations. I think that just in general is useful. So, I could see law enforcement having a use for this, and I think that they should be employing more statistics-based research and applying that into deploying which areas need more help.

**[00:23:56.890] - Daniel**

Okay. We are so glad you feel this way towards our project, and we hope that we will be able to make a lasting impact member of it for the community.

**[00:24:07.310] - Beruktawit**

Is there anything else you would like to say about our project or any other features or you want to see are being done?

**[00:24:17.650] - Ethan**

So, with this sort of project that you're doing, is it sort of similar to how this app sort of similar to Citizens app where people can report on crimes and then you guys would put in that information? Or would it just be entirely based on crime reported and the news reporting onto the news and based on news information, how would that information be accessed?

**[00:24:54.670] - Daniel**

So essentially what epidemiology is, is that the NYPD posts weekly reports of crimes happened. So, our idea or eventually updating so that the map changes weekly. And yeah, it wouldn't really be self-reported since we were using the data a little close by the NYPD. So, does that answer your question?

**[00:25:24.940] - Ethan**

Yes, that does.

**[00:25:27.030] - Daniel**

Okay.

**[00:25:28.310] – Beruktawit**

Our larger goal, besides the heat map is that we want to create a website or an app similar to Citizens, but instead of just telling you notify you about a crime that just happened maybe a day or at their earliest convenience, it would tell the user. It will tell the user where their nearest help or police officer is. So if they are feeling unsafe or if they are, or if they find themselves in one of these places or near the precincts with the highest crime, they know how to protect themselves and be able to stay alert in their surroundings.

**[00:26:07.410] - Ethan**

Yeah, I think it's much more helpful than what has currently. I mean, the idea of nearest help centers or police stations is definitely helpful, and I think that NYPD or app should be implementing this. But it's nice that you guys are doing this.

**[00:26:32.090] – Beruktawit**

Thank you. And thank you so much for your time.