The contributions of artificial intelligence technology in solving California's college student homelessness for future public policy solutions

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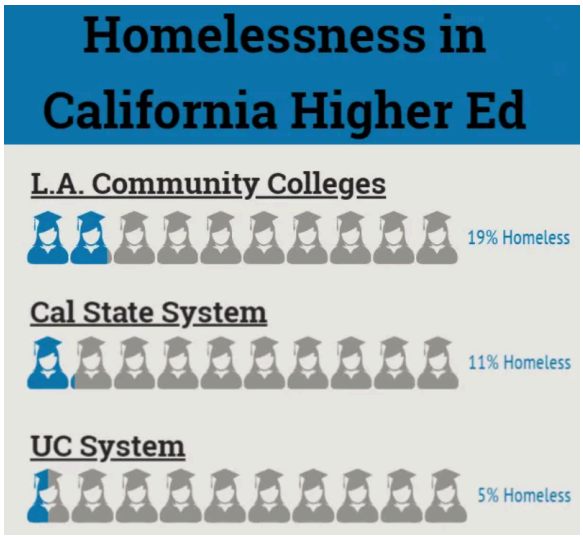
ABSTRACT

Using analysis of past machine learning models and various studied factors among different college campuses, this paper looks at the advantages of using artificial intelligence for approaching college student homelessness in California, in contrast to current human social work programs. The paper specifically outlines accurate identification and subsequent prioritized resource allocation as major issues inhibiting current policies from becoming effective. The currently flawed identification measures prevent homelessness liaisons and university resources from reaching the specific needs of specific people, in a specific prioritized order, while also exacerbating issues such as human bias, fear of judgment, and suspension and punitive measures. This nullifies potential effectiveness of state grants and college aid programs, as thousands of students fail to be properly identified. The paper finds that artificial intelligence is able to identify students in a timely, efficient, and accurate manner that is superior to human case workers in avoiding certain biases and inconsistencies. Finally, artificial intelligence models had more success—as they were found 3.5 times better in the Los Angeles policy lab model and with 93% accuracy in the Toronto, Canada CHAI model—at predicting chronic homelessness and working with massive data groups for hundreds of unique risk factors that human workers currently struggle with. This also reveals additional improvements that AI can simplify, such as legal qualifications for federal aid under the McKinney-Vento Homelessness Assistance Act, rent assistance programs, food vouchers, health care accessibility, and calculating holistic risk analysis based on a combination of many factors found in a single individual.

INTRODUCTION

California is undoubtedly the most prosperous U.S. state. While boasting the highest subnational GDP and fifth highest GDP in the world, California outcompetes entirely developed countries. Therefore, on a surface level, it seems intuitive to assume that all dwellers within this great state should go on to prosper. In fact, just a decade ago, we were promised a path to a comfortable life in the middle-upper class. If we got a college education, maybe even a graduate degree, and pursued a steady job, we could have a house, a family, and a meal on the table. Today, this dream feels more like a fantasy, because the Golden State no longer seems so "golden" for a vast number of its residents.

California has a substantial student homelessness issue, specifically within the scope of college students. In the last decade, California's student homelessness has increased by 48% (Calmatters 2020). A recent UCLA study found that 20% of California community college students, 10% of California State University students, and 5% of University of California students are homeless, and these are likely to be an underestimate.



Many of the generational youth, who were promised bright futures from their college education and subsequently guaranteed jobs, are now receiving quite the opposite of life's necessities and comfort: homelessness. This is exacerbated because the cost of things in higher education, such as tuition, rooms, fees,

etc., have increased by 32% (at public four-year institutions) in the past two decades. This cost growth has also risen over two and a half times faster than the median family income (Butler, Torres 2023).

The college student homelessness problem is uniquely important because it causes a critical fracture in the path to higher education. This specific education is often decisive in many aspects of an individual's future quality of life, career, and socioeconomic mobility. However, when young college students become homeless before they can even step into the knowledge economy, it can produce many harsh disadvantages for the rest of their lives. For example, in Los Angeles, California, “Delainey spent the first five weeks of classes at the University of California, Santa Cruz, last year living on a friend’s couch and out of her car…the episode took a toll on her health and affected her academic performance”. She stated “I ended up dropping about half of my courses. I struggled because of all the mental strain” (Osgood 2022). According to a report by the UCLA Center for the Transformation of Schools, “homeless college students report lower GPAs, lower likelihood of persisting in studies, and higher dropout rates than their peers” (Soika 2021). The America’s Promise Alliance 2016 report “Hidden in Plain Sight” says that homeless students are 87% more likely to drop out of school than their peers.

These negative impacts on homeless students’ higher education show substantial detriments as they block future opportunities and social mobility. Unity Environmental University states that people with a bachelor’s degree earn $765,000 more on average in their lifetime, and are also exposed to new people, new ideas, and new opportunities.

Estimated lifetime earnings based on education level:

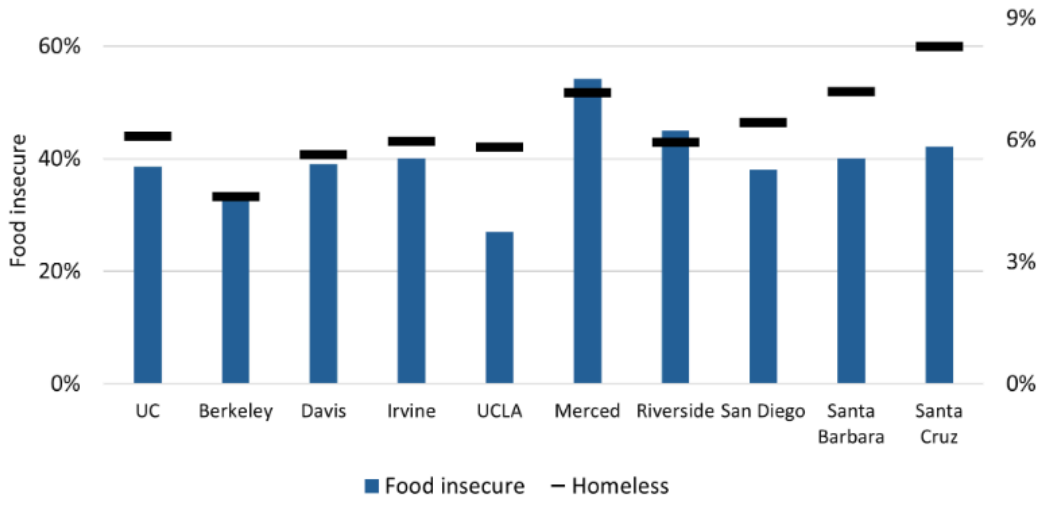
	Men	Women
High school graduate	$1.54 million	$800,000
Bachelor’s degree	$2.43 million	$1.43 million
Graduate degree	$3.05 million	$1.86 million

Source: Social Security Administration

Brookings Institution also adds that “college graduates are much more likely to climb the economic ladder” (P. Kelly 2014). Therefore, this increase in homeless college students–who largely lose access to these future possibilities–is an increase in extremely impactful disadvantages.

Despite many past policy attempts, there remains a gap. Previous solutions to combat the student homelessness issue functionally shared a common obstacle: With 2.58 million college students (Hansom 2023), how can institutions possibly find—and then also retain—every single college student who is homeless or at risk of being homeless? Just one example from the nonprofit Hechinger Report (Center for Public Integrity, The Seattle Times, Street Sense Media, Wamu) shows that “Thousands of schools fail to count homeless students”. It states that “A Center for Public Integrity analysis of district-level federal education data suggests roughly 300,000 students entitled to essential rights reserved for homeless students have slipped through the cracks, unidentified by the school districts mandated to help them. Some 2,400 districts — from regions synonymous with economic hardship to big cities and prosperous suburbs — did not report having even one homeless student despite levels of financial need that make those figures improbable” (Dipierro, Mitchell 2022). There are even federal laws like the McKinney-Vento Homeless Assistance Act (1987) that require school districts to report information about homeless students and coordinate better services for those children. However, even with policies, laws, and many schools establishing their own programs to identify and help homeless students, they aren’t successful. These same concerns are likely exacerbated in the college student demographic because when adolescents turn 18, many lose the support of legal guardians or foster care systems, and are now tasked with larger financial burdens such as rent, insurance, food, transportation, healthcare, etc. Across the University of California Schools, a 2020 study showed that 44 percent of students reported being food insecure and five percent reported experiencing homelessness (UCUES 2020).

2.3.2 Percent of students who are food insecure or are experiencing homelessness, Universitywide and by campus, 2020



Source: UCUES 2020

The issue preventing our policies and reforms from success begins at the root because even the highest quality homeless aid is fruitless if it is never given. Most institutions struggle to identify homeless students, and then also retain contact and access to identified homeless college students. “1 in 10 California State University students, and 1 in 20 UC students are experiencing homelessness. These are alarming numbers, but they likely underestimate the severity of the problem, because limited resources prevent schools and other agencies from accurately identifying all students experiencing homelessness” (Calmatters 2020). Some main reasons that colleges and institutions are unable to efficiently and accurately identify and retain homeless college students are because of a lack of resources, inability to objectively and quickly identify students at risk, constant address changes, contact and internet changes, language barrier, etc. Additionally, there are just many homeless college students who – like the normal layperson – lack the intricate legal understanding of complex programs, school services, aid packages, and other help that they may qualify for.

The inability to identify, retain, and efficiently evaluate the risk of every unique college student for homelessness, poses a major logistical gap to our policy progress attempts on college homelessness. Even when identified, given that every student has different circumstances, there are minimal ways to determine their risk

effectively, and it is even harder to optimize our solutions accordingly. With poor ways to identify, evaluate, and prioritize optimal solutions for homelessness/risk of homelessness, colleges in the status quo cannot effectively help their homeless students: it isn't clear who to help, when to help, and what to help.

Perhaps researching the use of AI data machine learning to bridge these logistical obstacles will help solve the problem of college student homelessness in California. How can artificial intelligence technology positively contribute to solving college student homelessness for future public policy solutions in California government?

Artificial intelligence machine learning is a branch of artificial intelligence (AI) and computer science that focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. This AI machine learning has become an extremely powerful tool for fast, consistent, and accurate data analysis in vast quantities, which is exactly what may be lacking here. Among the types of AI, a conditional classifier AI is a discriminative model, also referred to as a conditional model, which is a class of logistical models used for classification or regression. A conditional classifier distinguishes decision boundaries through observed data by giving probability distributions of categorical values, rather than simply assigning data to a certain categorical label like binary sorters. Specifically, a classifier machine learning AI could help analyze these differing circumstances, such as addressing factors people experience that correlate to homelessness probabilities, how urgently vulnerable individuals are to homelessness (conditional classifier AI), and then consequently, what solutions or plans should be prioritized for them as feedback. These can all account for the diverse, immense circumstances and data that surround college students that humans would not be able to reliably assess. If AI can bypass our inability to process the immense number of data factors involved, then we can finally reassess how we should approach the overall youth homelessness issue.

This potential solution may help solve California's current struggle to accurately diagnose and treat college homelessness, without letting more students fall through the cracks. There exists a gap in the overall understanding and potential of AI models for needs-based assessment and prioritization in California's college

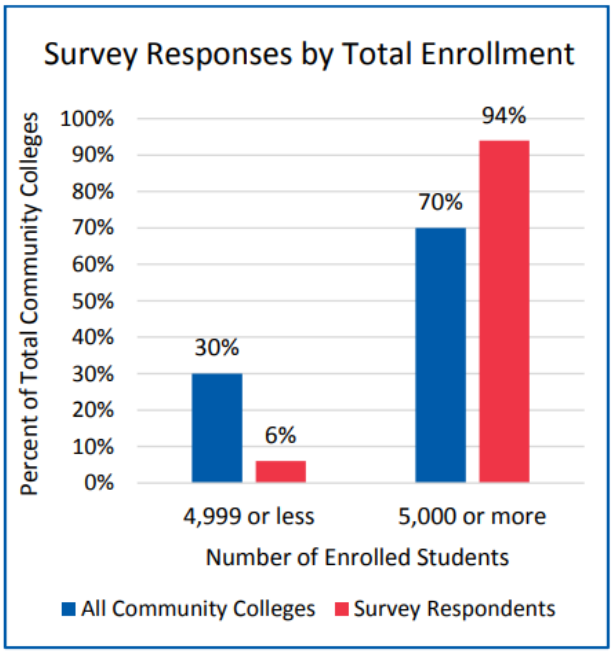
institutions. Therefore, this research will conduct a literature review, comparing past AI model studies to identify similarities, variables, patterns, successes, failures, limitations, etc. within existing methods, as well as the AI's potential improvements or capabilities in the future. In addition, this project will analyze the existing data and problems that exist in college youth homelessness, focusing on the needs and factors specifically experienced by college students. By contrasting the results of existing AI models in different areas, environments, occupations, and ages, this literature review aims to identify possible benefits and future suggestions for an AI model specialized for college students.

METHODOLOGIES

My project approach involved conducting a literature review that encompasses needs assessment and evaluation research. I explored how artificial intelligence technology can positively address college student homelessness, informing potential public policy solutions for the California government, and my data was gathered through a literature review of prior case studies, AI implementation tests, and other relevant tools and research. I employed qualitative methods for data analysis, examining existing literature, and evaluating research conclusions. Since I primarily compared and evaluated data collected by others, I used a descriptive approach to extract relevant studies, statistics, conclusions, and overall information from the existing research. The goal was to identify common themes, perspectives, and results reflecting on current public policy and potential solutions to improve college homelessness in California. I worked with data already found by existing AI models tested in different experiments. This data is used for my literature review by comparing the AI functions and identifying similarities, successes, failures, and limitations, all while analyzing their applicability to California's college student homelessness.

FINDINGS & ANALYSIS

In *Supporting Students Experiencing Homelessness* (California Homeless Youth Project Alexis Piazza, Shahera Hyatt & Nancy LePage, ACLU Foundation of Southern California 2019), the CHYP and the ACLU collaborated to organize a survey of California's community colleges, in the spring of 2018. The survey received responses from staff at up to 61% of California's community colleges. This report presents the insights of those who work most directly with this student population and provides recommendations to enhance practices. This focused on homeless liaisons, college efforts, and the needs of homeless youth, ultimately suggesting methods to create greater resources for them. The report revealed a few key findings and recommendations that explicitly implicate potential AI solutions.



The study first identifies a few key points of background. "Until recently, the California Community Colleges had not systematically identified students experiencing homelessness". Now, newly available data is displaying roughly 1 in 5 California community college students qualifying as "homeless". This is also accompanied by students' unique needs being unmet. Additionally, there is an important legal background that affects the current policy execution. In 1987, the McKinney-Vento Homeless Assistance Act federally solidified

the rights of K–12 students who were homeless and set up a system of liaisons within school districts to offer them greater support. Similarly, California college students facing homelessness gained a commitment to additional assistance with the approval of Assembly Bill 801 in 2016, also known as the Success for Homeless Youth in Higher Education Act (AB 801). One of AB 801's key provisions is that it mandates the California State University (CSU) and California Community Colleges (CCCs), and encourages the University of California (UC), to appoint at least one homelessness liaison on each campus to assist students who are homeless.

Findings:

"5. California Community Colleges are not methodically identifying students experiencing homelessness across the system or at individual campuses". One of the study's five main findings is the identification and high-quality data collection struggle that California Community Colleges face. "The CCCs lack a system for assessing, compiling, and reporting overall rates of student housing instability and homelessness across their 114 campuses", which is deeply hurting the liaison's abilities to connect students with assistance programs, food and aid packages, and comprehensive student services. Additionally, the majority of college liaisons do not consistently and thoroughly identify students facing homelessness at the school level. Only five respondents indicated that their campus screens every student at the start of the year to identify those at risk of or currently experiencing homelessness. The study demonstrates how current systems of identification may not be reliable or extensive enough where "Respondents also rely heavily on passive systems of identification, such as referrals from other offices", and 93% of the survey respondents relied on referrals from other offices to identify students during the school year, rather than a consistent methodological system.

The study's fifth finding illustrates the prominent issue of poor identification, substandard data collection, and deficient CCC system capabilities for compiling those massive amounts of necessary data.

Recommendations:

"3. Community colleges should implement systematic and effective ways to identify students experiencing homelessness". The study concludes that CCCs need to establish a clearer understanding of the extent of the issue. For instance, the study suggests that community colleges integrate standardized questions about housing stability into their general application for all students and regularly conduct surveys to identify students whose situations change during the academic year.

These surveys and data samples are a generalized process that could be simplified and executed far more efficiently and quickly with the use of artificial intelligence. Additionally, AI could even improve upon the study's regularly conducted surveys, as machine learning classifiers could give deeper risk assessments and specific suggestions for each student's unique scenario, or allocate specific aid resources, assistance packages, and liaison services to lower the burdens put on CCCs one minimum mandated homelessness liaison.

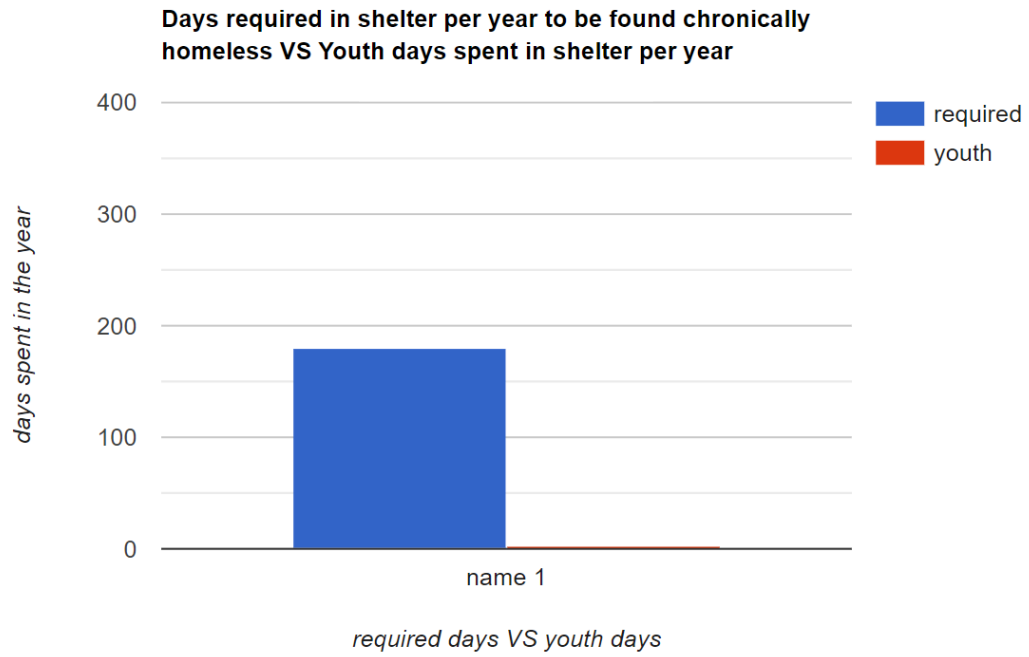
Can Artificial Intelligence Help End Homelessness (Messier 2022) offers a couple of main advantages for artificial intelligence machine learning models that would differ from current human systems.

Machine learning is able to make predictions from a vast amount of distinct risks to form one overall risk evaluation, which would allow models to draw separate risks for issues such as substance lacing versus other issues like violent police encounters.

Currently, chronic homelessness is an urgent state of homelessness that would call for direct and immediate attention. However, the study explains that these methods of assistance are still showing flaws because the definition of chronic homelessness first requires someone to spend a long time in a shelter, or in one specific place, specifically "defined as spending at least 180 out of 365 days of the year in a shelter" (USC Viterbi, Nussbaum 2023). This creates issues for youth at risk of homelessness because youth often do not first reach out to shelters or programs by themselves, for different reasons such as long standing mistrust, lack of knowledge or education about their rights, or missing personal identification and legal records. As a result, "Youth stayed a total of only 13.8 days over 6 years for an average of 9.1 days per episode. These youth used

shelters for an average of 2.3 days per year" (Jadidzadeh & Kneebone 2021). This means that current systems for homelessness prioritization have flaws that seem to exclude youth from receiving a better quality of help.

(Fig#1)



required days VS youth days

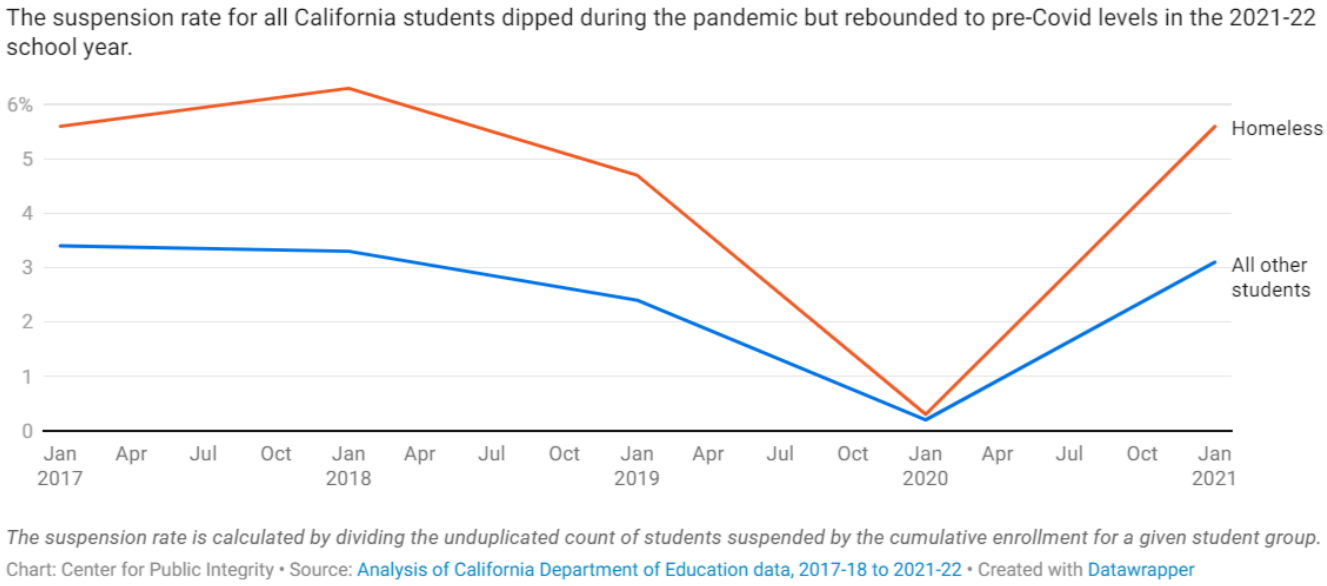
The study collaborated with The Calgary Drop-in Centre to develop a rule set searching AI tool that could offer a better middle-ground, where aid results could be delivered to more people at a better speed and efficiency. The AI tool was especially helpful in spotting people who were "under the radar", using people's check-in data to form overall evaluations on chronic homelessness risk.

The study also found possible drawbacks. The first was the accessibility of machine learning to a staff person, as "Staff making important decisions for vulnerable people will be reluctant to use tools they cannot understand". This is a potential issue because many machine learning algorithms are hard to explain methodologically, even by data experts.

Overall, the study shows that the use of AI machine learning tools has the potential to not only improve homeless solutions as a whole but also ones that would specifically incorporate homeless youth who are often

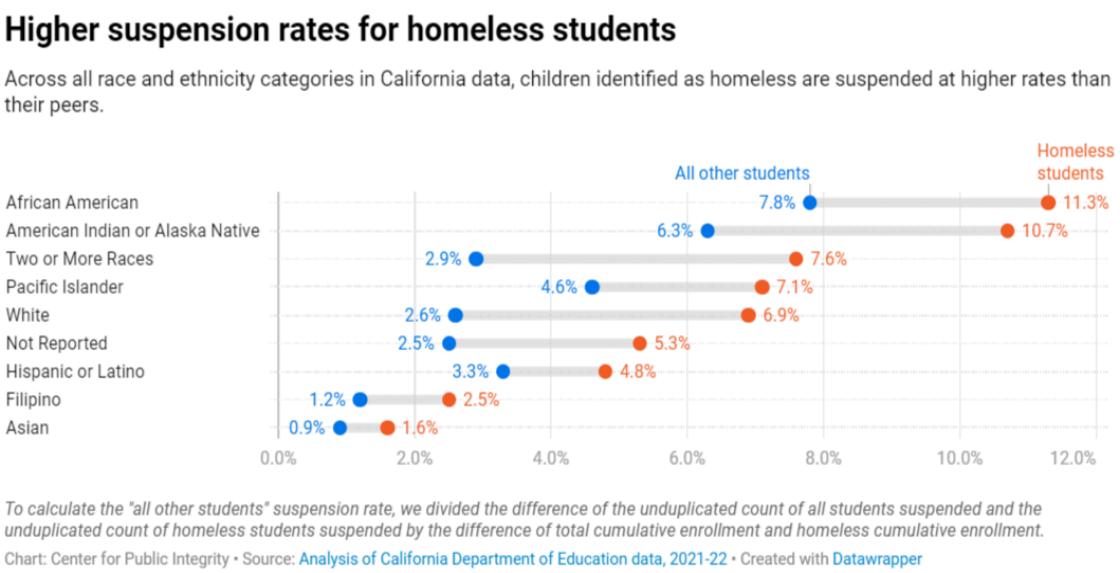
missed in the status quo. This advantage of focusing on youth homelessness would be especially useful for California's college campus systems.

Across the past and current failures to tackle homelessness, the large trend is the difficulties with identifying homeless students in the first place, which is the prerequisite to being able to treat them at all. However, upon further research, *Homeless and Suspended in California* (DiPierro 2023) adds an additional list of consequences from failed identifications. These further studies show that the current failure to identify homeless students is not only allowing the homelessness epidemic to continue spiraling, but it is also independently proliferating a whole new set of issues that are dragging policy responses back more.
The study by the Center for Public Integrity analyzes a multitude of school districts and examples to ultimately show that homeless students are being punished and suspended at higher rates than their housed peers, largely because schools have failed to identify them or identify their qualifications for federal homelessness aid. First, it is important to understand that current federal law for education, namely the McKinney-Vento Homeless Assistance Act that grants equal access to education for homeless students, explicitly wants to keep homeless children in class and in school to increase their prospects for opportunity. However, "California schools suspended more than 12,000 students who were identified as homeless in the 2021-2022 school year, according to a Center for Public Integrity analysis of the most recent data available. That means nearly 6% of all homeless students were suspended compared to roughly 3% of all other students" (DiPierro 2023). In approximately 20% of school districts throughout the state, homeless students faced suspension rates that were at least twice as high as the district's average in recent academic years, and these numbers got significantly higher in other instances. This is hugely in contradiction with the purpose and spirit of the federal laws in place to ensure homeless students will gain access to social mobility like their housed peers.



On top of this, homeless students were found unwilling to reach out for aid, and the specific reason pinpointed in this study was a fear of human or peer judgment and backlash against students who revealed their homelessness. “Earl Edwards, an assistant professor at Boston College, said that when he interviewed students experiencing homelessness, he found that the threat of school discipline often discouraged them from telling teachers or other staff about their housing status” (DiPierro 2023), which aligns with data revealing that youth without stable housing are more likely to receive disciplinary punishment, both in California and other states. In 2022, The Seattle Times produced data that homeless students in Washington were suspended and expelled at a rate almost three times that of housed students, and these similar results persisted in states such as Florida, Indiana, Michigan, New York, and Texas. This bias against homeless students is further shown as the study finds that students receiving services under the Individuals with Disabilities Education Act are both more likely to receive a suspension than peers and are more likely to experience homelessness. The study reveals that these windows of bias are especially bad when there are estimated hundreds of thousands of students who are qualified for aid but fall under the radar and never get identified, which means that there are schools unknowingly suspending and further isolating students who need the most help and qualify for aid. Additionally, there is also a racial bias that may also be added to the issue of homeless student inequalities and

behavioral disciplines, as African American students are overrepresented in the homeless youth population. All of these reasons explain why students are currently hesitant to reveal their unhoused status or reach out for aid programs that they qualify for, out of fear of backlash and discrimination by their human peers.



The alternative reform method offered by the study is the use of social workers to counsel and offer restorative action talks with homeless students who committed punishable offenses rather than suspending them, and attending disciplinary meetings that address possible methods of support. However, there are a few main flaws with this, as the study itself points out that not every teacher or administrator would know of a given student's housing status, especially if they were failing to be detected or too scared to tell the school and reach out for aid. This means that this method circles back to the same initial issue of proper identification and data systems that can actually account for all the students, their differing circumstances, and unique factors. Additionally, as this method was implemented in the Fresno school district, there were many flaws found in implementation as well. The president of the Fresno Teachers Association said that these policies often isolated teachers and educators, as the "restorative practices' would often fail to amend or rebuild trust over the broken school policy, causing a general lack of accountability. Lastly, it showed that many times the liaisons and social workers still struggled to offer homeless students the most useful resources, which really come from aid, food assistance, housing assistance, job programs, etc. rather than disciplinary school meetings.

The Fresno trial can show that even with these alternative methods, there remained many flaws that rendered the solution disorganized and currently ineffective. Liaisons who could ask social worker counselors for student housing information, there was still an overall lack of this information and organization, as many students currently already lack identifying information that indicates their homelessness, which meant there was very limited success for this mode of reform until the root issue of homelessness data collection and risk assessment was resolved. Only then would they be able to use this data and accurately pinpoint and deliver these restorative action courses and support systems to homeless students. This mass form of data collection and assessment of student housing risks is an essential prerequisite that AI could vastly improve.

Moreover, it is important to remember the issue of bias in the status quo. Many of these college and younger school students intentionally did not reach out for the aid and support that they qualified for, because they were afraid their unhoused identification would receive backlash from their human peers. This bias is also featured in the racial divide and disproportionate disciplinary responses from educators toward homeless students. This is significant because it means a potential AI approach to homelessness would require a drastic emphasis on anti-bias training, diverse input data, and potentially self-correcting pattern learning. AI currently still has flaws in bias and is certainly not impartial. However, it is also important to consider that specific data training of diverse homeless information and risk correlation may yield a result that could be less biased than our current human responses that are already showing failure in the status quo, which would still give AI an advantage over our current systems. Many studies also find that AI bias is still easier to correct and reform than human biases and is often more grounded (Information Technology and Innovation Foundation, Moschella 2022). It is important to consider the high standards and diverse data measures that must be in place to develop an AI that optimally avoids bias, while also recognizing the potential advantages that AI holds in eliminating realms of current human biases.

Improving How We Identify and Support Students Experiencing Homelessness (Brookings, Dhaliwal & Gregorio 2022) additionally looks into evidence regarding the importance of identification and a list of proposed solutions, both of which have a lot of potential for artificial intelligence optimization. The main background of the study surrounds the lack of educational outcomes of students experiencing homelessness, such as academic achievement in math, reading, attendance, and graduation. Brown University released a recently published study centered around students in the Los Angeles region that solidifies a certain cause, as well as a priority that must be addressed first when it comes to the academic opportunities of homeless students or students at risk of homelessness. The study finds two main things. First, students experiencing or once experiencing homelessness have associations with lower achievement and attendance, and these negative trends continue for years even after the student has been housed, as lower state test scores and more missed days of school were found in those who were previously homeless compared to those who were never homeless. Second, and most importantly, "Interestingly, we see that students' academic performance and attendance stabilize after they are identified as homeless and eligible for services for multiple years. This suggests to us that being identified as homeless is itself helpful for students" and "highlights both why we should be concerned with students experiencing housing loss and why it's important to identify these students and provide support" (Brookings, Dhaliwal & Gregorio 2022).

Additionally, another recent study showed that students who ultimately become homeless frequently changed schools and addresses in the years before being identified, which suggests that there is a specific window and timeframe of urgency to proactively identify students who are experiencing homelessness.

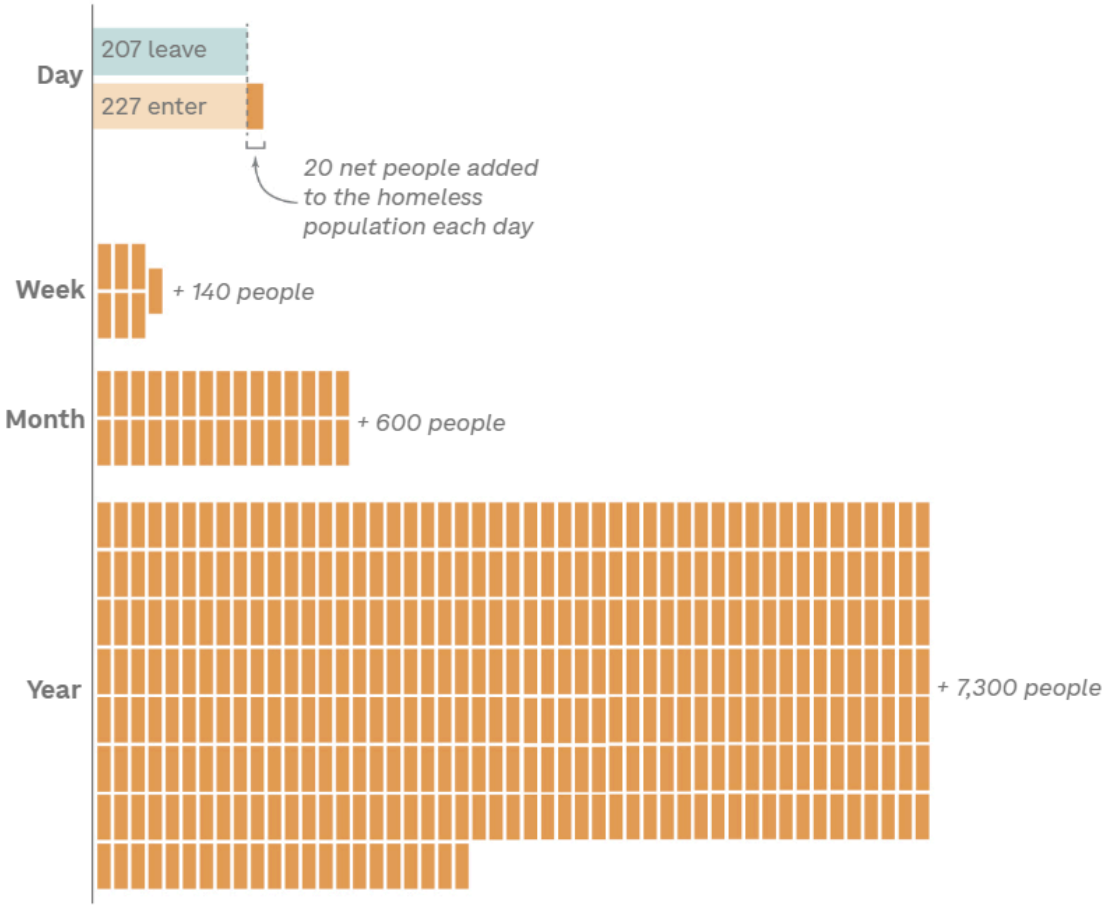
In response, the study proposes a few main solutions, however many of them have shown flaws in previous studies, or are nonoptimal without greater technological capacity from tools such as AI. It mentions "Asking families to update their housing status each time they change addresses or schools—while informing them of the rights and resources associated with homeless identification—could help to find homeless families who qualify for services but have not yet been identified" (Brookings, Dhaliwal & Gregorio 2022). There are

also other strategies proposed by SchoolHouse Connection including sending constant emails to families, following up with students identified as experiencing homelessness in prior years, having non-threatening conversations about identification and the rights of students and families, translating materials, having bilingual staff available, engaging with community partners and posting information at highly visited sites, such as laundromats, libraries, motels, grocery stores, and campgrounds, and connecting with local eviction courts and sheriff's offices so they can provide information to evicted families. However, this may overlook many college student circumstances where many are unable to rely on family support or backgrounds, especially those exiting foster care systems as they become legal adults. Additionally, these recommendations for constant emails and communications to homeless students still leave gaps regarding how these students would be sufficiently identified in the first place. Especially given the previous studies that show the difficulties and lack of total identification, plus the additional student fear of reaching out to school administration, there still seem to be obstacles surrounding the pressing issue of accurate and efficient identification of student homelessness, as well as the risk assessment and prioritization that occurs after identification.

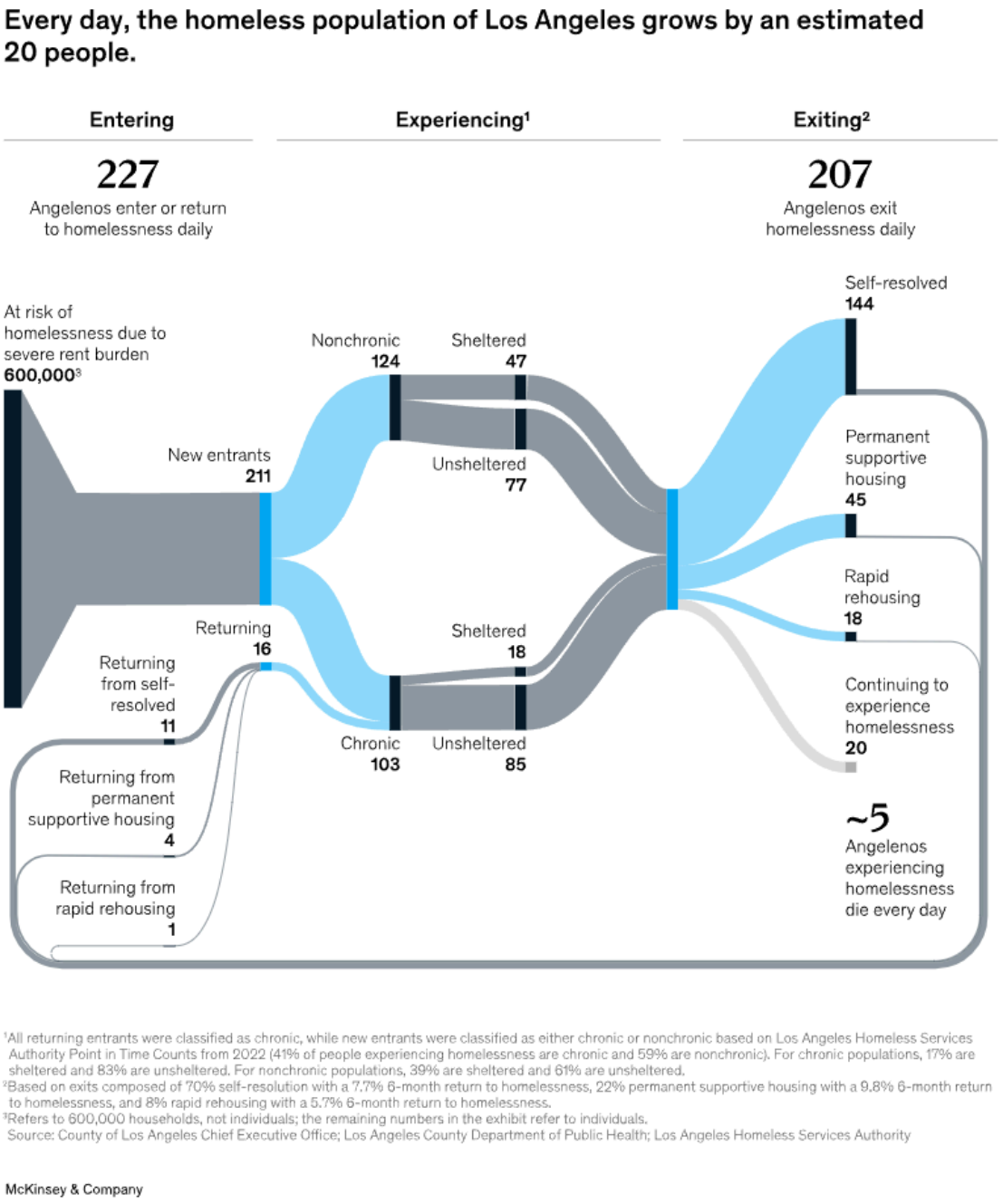
The final conclusion shows that regardless, it is still "imperative that we improve the identification of students experiencing homelessness and housing instability to support them more swiftly", especially given that identification is a crucial prerequisite to solving the overall college student homeless crisis. (Brookings, Dhaliwal & Gregorio 2022).

Past studies of artificial intelligence experiments, machine learning models, and the success of their implementation, all help conceptualize how a potential AI for college student youth homelessness may operate, and the precedent to design, develop, and improve such models.

The first group of artificial intelligence experimental models and studies are conducted surrounding Los Angeles, California, where the homeless rate was observed to have 277 new people enter homelessness for every 207 who exit homelessness (NPR, Ludden 2023).



Source: 2020 Greater Los Angeles Homeless Count Results, Los Angeles Homelessness Services Authority
Credit: Daniel Wood/NPR



The Los Angeles research began multiple years back starting in 2019 from UCLA's labs. As shown in *Can AI Help Solve the Homelessness Crisis?* (Nicolas 2024), UCLA kickstarted a program that utilizes AI to predict who has the greatest risk of being homeless, and subsequently prioritize those individuals. The American Rescue Plan funded the program with a Covid-era grant of $26 million. The program tackled the crucial issue of identification with large-scale individual data collection, as UCLA's California Policy Lab had been "feeding information on 90,000 people who utilized the services of the county's Health Services or Mental

Health departments into machine learning programs to determine the most efficient use of resources" (Nicolas 2024). After collecting this data, the AI assigns each person a ranking, giving the highest risk rankings to those who show up in emergency rooms and jails. Additionally, the study realizes that human case workers and aid liaisons can display bias for individuals whom they have previously interacted with or those who have recently lost a job, over others suffering from mental health and addiction issues, whereas the AI model holistically scores individuals based on their specific factors while also trying to avoid this potential bias. Out of the 10,000 people that the AI algorithm ranked highest, 24% became homeless. Now, the overall model has served over 700 clients since 2021, with 86% of them not homeless.

With UCLA's initial risk assessment research and predictive models, *Los Angeles is Using AI to Predict Who Might Become Homeless and Help Before They Do* (NPR, Ludden 2023) shows the first stages of the experiment that was originally launched in 2021 with a small-scale team of workers to lead the initiative. The Los Angeles County Department of Health Services started the original program by tracking "data from seven county agencies, including emergency room visits, crisis care for mental health, substance abuse disorder diagnosis, arrests, and sign-ups for public benefits like food aid" (NPR, Ludden 2023). This data was then processed by an artificial intelligence machine learning model, which produced a risk assessment for a list of people, prioritizing based on the people possessing the greatest risk of losing their homes. Additionally, the Los Angeles experiment began with unconventional methods to reach clients, as they individually reached out to each identified person of risk through letters and cold calls. If program workers were successful in convincing clients to sign up for the program, clients were then given around $4,000 to $6,000 dollars in aid (and $6,000 to $8,000 for families) that went to third-party vendors for things such as rent, groceries, or other monthly expenses. Rather than sending the money straight into a client's bank account, by giving the aid in the form of item-specific funds, vouchers, or directly paying off necessities such as rent to third-parties, the program could avoid poorly allocated spending or increasing a client's income that might nullify their aid benefits. This

concept of delivering aid in the form of item-specific payments or vouchers could be an option for a potential AI model for college student homelessness for these same positive reasons. Instead of using conventional methods to reach clients, Los Angeles individually reached out to each person through letters and cold calls. Funds have been allocated to loan debt, appliances, laptops, rent, transportation, etc. Despite the promising outlook of this new solution, there have been gaps in application. The experiment was conducted within a small team, making it difficult to account for specific circumstances—like those facing eviction or domestic abuse—before they became homeless. Although the AI technology worked successfully, this experimental gap in timely accuracy and accommodations was somewhat insufficient to help enough people. This likely indicates an optimistic future for the AI model itself, but also the need for greater development and improvement to support a similar AI technology system in reaching higher capacities and helping greater volumes of people.

Three years after the original Los Angeles program launched in 2021, *This California County is Testing AI's Ability to Prevent Homelessness* (Kendall 2024) releases an update on the program with greater details about its implementations. When training the AI, in addition to the data list of 90,000 people who recently used the county's Health Services or Mental Health Services, the AI also applied 580 risk factors to each individual's unique circumstance. This method of using large amounts of data to run specific risk-associated factors is the exact type of method, as predicted in the introduction, that seems best suited for helping large quantities of college students. Given that California colleges currently struggle with overwhelmed human liaisons when handling student homelessness, failures to get and keep students identified, lack personalized solutions that are structured towards each student's specific needs, and lack an order that best utilizes resources in a timely and efficient manner, this method of data usage and machine learning has strong advantages. "The people deemed to be highest-risk tend to show up in emergency rooms and jails at high rates and have high usage of services such as CalFresh food benefits. But the model takes many more data points into consideration", which is specifically important for students because including risk factors that consider aid and welfare programs—such as FAFSA,

CalFresh, and Cal Grant—would particularly apply to college students. However, this also poses potential issues because many homeless college students in California often qualify for a variety of federal aid or government assistance packages, but still do not receive the actual aid due to difficulties with paperwork, legal identification, or an overall lack of knowledge regarding the aid packages. This means there would likely need to be other ways to consider latent signs of homelessness that do not fall into the groups of people already utilizing aid. The researchers found that the AI was able to continuously develop and learn new predictive signs over time. For instance, an algorithm was trained by showing the AI data for a list of people who became homeless and the services they had been using previously. After the algorithm practiced predicting this aspect of homelessness using this data and checked for accuracy, the researchers started implementing it on real predictions for factors such as geographic tracking and service usage for signs of homelessness.

After training and accuracy tests, the efficacy and accuracy of the LA model were strongly improved. From the 90,000 people that the researchers began data with, "7% became homeless in 18 months. Among the 10,000 people the algorithm deemed to be the highest risk, 24% became homeless" (Kendall 2024), and if the AI was targeting a sample size of fewer people, the researchers found the accuracy would be even higher. The successes of the LA model show that an AI could truly be better at predicting who would become homeless, and when directly comparing this AI to "human social workers trained in this work" the researchers found AI "3.5 times better, to be exact". (Kendall 2024). The "why?" behind this was found to be largely due to bias that human workers hold, especially for people they know, as "It's just human nature to want to help the people that you're in contact with. They all seem unstable and at high risk. You want to help those individuals or those families in front of you. But not all of them are going to become homeless and be on the street or use shelter if they do not get assistance" (Kendall 2024). Additionally, human case workers often prioritize people with lower needs or less urgency or deliver more help to those who are in more stable situations simply because they seem easier to help. For example, "Someone who recently lost their job but otherwise is stable gets preference over someone facing ongoing struggles with their mental health or addiction, because the stable person is easier to

help. But the stable person may not be the one who needs the help the most" (Kendall 2024). Other reasons for this inaccurate bias among human social workers also stemmed from the unconscious assumption that those with higher needs and greater risks would not spend aid and money wisely, whereas AI does not have this bias and ensures the money is distributed based on urgency and priority. LA's other traditional methods of homeless programs all continue to use human case workers who refer and reach out to people to offer resources for homelessness, but the research found that the people targeted by human-based programs have almost no overlap with those targeted by AI. Moreover, this success can be widely seen, as "people the (AI) algorithm targets are much more likely to have been incarcerated, sought substance use treatment, had mental health issues or been hospitalized than the people who seek aid through LA County's other homelessness prevention programs", which also helps to fill the role of many of LA's lacking social services.

For future purposes, this AI model does see a strong potential for wider usage. In the Los Angeles study, the AI is more accurate, objective, consistent, and fast. This explicitly solves the main issue of human liaisons struggling to identify homeless individuals quickly, accurately, or with a timely priority of when they become homeless, especially because "new people are becoming homeless faster than aid workers can find existing homeless residents housing" (Kendall 2024). The Los Angeles AI model has also drawn greater attention from other governments seeking to improve their homeless policies. Santa Clara and San Diego counties have all met with the Los Angeles AI model policy team, in addition to many other government agencies from around the country. During Santa Clara County's meeting with the California Policy Lab, where Consuelo Hernandez, the director of the Office of Supportive Housing, stated "The county has its own homelessness prevention program, which relies on human triaging clients. If artificial intelligence can do that work more efficiently, it's worth exploring" (Kendall 2024).

The implementation of the AI model is still partially human-assisted, as after the AI calculates and determines a list of high-risk individuals, the data is then sent out to human social workers to contact and call those respective individuals: "Four times a year, the Policy Lab researchers send LA County a list of residents

the AI program has deemed most likely to become homeless. The county then mails those people letters, telling them they've been selected to participate in the program. After that, a social worker cold-calls them to tell them the good news", and "Frequently, the person at the other end of the line is convinced it's a scam", but once convinced that the aid program is real, "nine out of 10 people agree to sign up" (Kendall 2024). This likely means that the specific implementation of this program would require greater tests on the best ways to reach and contact individuals of high risk, such as through email. This further research should also consider methods of communication among college students specifically, such as the provided school portal accounts or social media.

Toronto, Canada has also utilized AI to predict who may become homeless. Matt Ross, an information technology expert who helped build the program, stated "The AI system analyzes the personal data of participants to calculate who faces having nowhere to sleep for an extended period" (Thomson Reuters Foundation, Arsenault 2020). This system, the Chronic Homelessness Artificial Intelligence model (CHAI), tracked a group of people for six months before its formal launch. "CHAI saw a 93% success rate in predicting when someone would become chronically homeless" (Arsenault 2020). The city used the system to prioritize help, accommodate safe housing, and give health services. Additionally, the Toronto experiment has also delved into the transparency of this new AI, as the city is working with local shelters, community groups, and homeless people to best use the AI data. "The AI program is only applied to consenting individuals…Participants can quit the program at any time and their data will be removed from the model" (Arsenault 2020). Additionally, the program does not collect the names of individuals, instead using an identifying number with the rest of their data for race, gender, military status, shelter frequency, use of city services, etc.

Now, some college students are showing an increased sense of trust and willingness to connect with AI chatbots over sensitive issues rather than humans, due to lack of human judgment. *California College Students*

Confide in AI Chatbots (LA Times, Agrawal 2021) shows how students across California State University campuses are using AI chatbots launched in 2019, originally designed to help keep students on track to graduate, as popular ways for students to seek "information, guidance, or company without judgment" (LA Times, Agrawal 2021). AI chatbots like "Billy Chat", "CougarBot", and "Csunny", watch and learn from student messages and social media interactions. Student responses are tracked and stored as data to teach these chatbots that use AI to text and generate messages. These chatbots, like Billy, became used as more of a friend rather than a technological tool after the COVID-19 pandemic struck and sent the students home, causing a loss in human touch and connections. Now, these college students are opening up about more sensitive and interpersonal topics to seek advice or emotional support from these AI chatbots. Tara Hughes, the voice of Ekhobot at CSU Channel Islands stated "We have these students saying these things that I did not expect them to so openly share", mentioning things like how much they missed their roommate, or their struggles with being their parents' caregiver, or going home and becoming a sole breadwinner. Additionally, each of these bots is programmed with massive knowledge bases to respond to hundreds of student needs, and human liaisons can give these chatbots specific tasks or groups of people to contact. 90% or more of the students on campuses were found passively or actively interacting with these AI chatbots, with expressions of gratitude like "thank you" ranking the highest among student messages sent. Bots such as Ekhobot were also designed to be an always available empathetic friend, even creating Spotify playlists called "quarantunes" over the pandemic. Specifically, "Students texted (the AI chatbot) with worries about becoming homeless, not being able to pay for school, caring for family members — and their own experience with COVID-19…The students do not tell their professors — they tell the bot" (LA Times, Agrawal 2021). These are all important features that show an increasing trust between certain groups of college students and artificial intelligence, which would become extremely important when designing AI models that are designed to interact with students, survey students, or directly message and reach out to students themselves. This may also bring optimism to potential college student engagement levels when it comes to an AI model or bot that is designed to tackle their homelessness

risk factors. Additionally, this helps to address the earlier issue found, where students at risk of homelessness did not reach out for aid or ask for help due to a fear of backlash and judgment, especially for students of color (DiPierro 2023).

CONCLUSIONS

In regards to objectivity and consistency, existing AI models, such as the Los Angeles California Policy Lab model, show greater objectivity and consistency than human case workers. The AI model had a stronger ability to create lists of prioritized individuals based on objective probabilities and high-risk factors, while humans tended to be biased towards specific risk factors, such as job loss, and prioritized the people that they had interacted with or talked to more times. Additionally, human case workers tended to allocate the most urgent resources to individuals that were simply easiest to help, rather than most urgently in need. These advantages in objectivity and consistency were found to be directly connected to final accuracy in the California Policy Lab experiments. This resulted in the Los Angeles AI model being 3.5 times better at accurately predicting who and when someone would become homeless, in comparison to human social workers trained in this work. In the Toronto, Canada study, CHAI saw a 93% success rate in predicting when someone would become chronically homeless after tracking a group of people for 6 months before the first launch of the program.

In regards to timeliness and efficiency, the AI was objectively faster and more efficient, as the computational speed to calculate and perform the regression tasks was drastically reduced. Additionally, the AI models were able to handle the massive amounts of different, diverse, and circumstantial factors that had previously challenged human liaisons when it came to processing student data or homeless individuals. The Los Angeles AI model applied 580 different risk factors to every individual's circumstance, allowing it to survey and manage large quantities of data based on unique combinations of their factors.

In regards to final resource allocation, the AI models also turned out to be promising. The CHAI model provided vast networks for health services, housing aid, and prioritized assistance, and the Los Angeles model provided grants and vouchers for specific needs. However, despite their successes, these models have minimal interaction with specific college student needs because they were not designed with the specific context relevant to college students. These would include resources that connect students with existing college grant programs, such as Cal Grant, FAFSA, and CalFresh, while additionally accounting for needs regarding textbooks, commute, job assistance, foster care, drug abuse, and mental health to name a few. This would also require additional testing to detail the specific implementation for each college campus or institution. For example, institutions must determine if it is most straightforward and effective to provide students with direct monetary assistance—resembling current federal aid and monetary benefits—or indirect assistance through vouchers that can only be spent on their specific intended purpose.

In regards to autonomy, the AI models still need partial human assistance, which would mean keeping the human liaison (and likely additional human teams specializing in AI response management) but changing their purpose from deciding the prioritized individuals to instead helping the AI effectively reach out to them.

IMPLICATIONS AND NEXT STEPS

Additional next steps for specific college student contexts include further tests for specific college student needs in resource allocation. This would narrow the AI's context to evaluate homelessness and recommend assistance based on the struggles, needs, and available resources specifically for college students. This also means that the AI model needs to be trained while considering the current legal qualifications, federal programs, and existing aid programs for college students. This would require an investigation into the current legal standards for definitions such as "chronic" homelessness that currently excludes young people. Other next steps would involve experimenting with implementation to ensure that there are proper human liaisons or AI

management teams that can help increase AI's reliability for reaching students. It is also important to continue exploring AI's usage in simplifying other tasks, such as paperwork complexities, filing for grants, and legal qualifications for aid because many students are prevented from accessing their full assistance because of these difficulties. There is a current lack of precedent for AI models that are specifically trained with data that accommodates certain programs that already exist on university campuses, such as Cal Grant, CalFresh, and FAFSA. Additionally, a potential AI model specific to college students would need to consider the limited timeframe before high-risk students drop out of college, especially given that homeless students are 87% more likely to drop out than their housed peers. This would challenge the methods that an AI model would require to effectively and quickly communicate with students, and consistently deliver the necessary assistance.

It is also crucial to continue the next steps to place a really large emphasis on actively combating bias. Anti-bias training and bias self-correction are both valuable ways to prevent potential bias or inequities in AI models. This is especially true for disadvantaged students or students of color who have historically faced bias in this process.

Data collection and storage regulations also need further development. The data regulations in the Canada and LA model are both different which shows that there is a lack of consistent standards for data management between different AI models. There needs to be more work done in partnership with school institutions and college liaisons to establish consistent student information and data collection procedures, confidentiality from third-parties beyond the school, and potential investigations into partial anonymity.

The final steps would require individual institutions to find a baseline for how much to give and what exactly to give a student based on their needs and the institution's capacities. For example, schools could give direct monetary aid or offer indirect vouchers that limit purchase and usage.

RECOMMENDED READINGS

An Open-Source Interpretable Machine Learning Approach to Prediction of Chronic Homelessness (VanBerlo 2021)

Risk Factors Associated with progression from first-time homelessness to episodic and chronic homelessness (Mathur)

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