APA

WHITE PAPER

AI in Planning

Opportunities and Challenges and How to Prepare

Conclusions and Recommendations from APA's "AI in Planning" Foresight Community

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Cover photoillustration by FrankRamspott/E+/Getty Images.

1. Introduction

As stated in the American Planning Association's *2022 Trend Report for Planners*, over centuries, professions have evolved with changing environments, shifting eras, new challenges, societal shifts, and technological innovations. While some professions have become obsolete or or were replaced by technology, others have adapted or readjusted and stayed relevant in an ever-changing world. What is different today is the pace of change, which requires faster, even proactive, adjustments—including new tools, processes, and skills.

Artificial intelligence (AI) has been in development since the 1950s. However, due to the availability of big data and increased computing power, the AI market has grown substantially over the last decade and is expected to grow more than 20 percent annually over the next few years. AI is expected to be one of the biggest disruptors of the 21st century, with impacts affecting the economy, the built environment, society, and most professions, including the planning profession. Planners and allied professionals should have a strong understanding of the potential impacts and benefits posed by AI on the profession and the communities they serve. AI is already reshaping the local landscape, and it is important to understand how planners can use AI equitably and productively.

If deployed responsibly, AI has the potential to assist planners in their work, improve existing planning processes, create efficiencies, and allow planners to refocus their work on the human factors of planning (i.e., human interactions, connecting with community members, and related human skills). However, the use of AI also poses the risk of exacerbating existing inequalities in society if its user is unprepared and doesn't understand and question the systems and algorithms in place.

AI shouldn't be used for AI's sake. The goal of using AI (and ultimately collaborating with AI) in planning should be to improve what we are currently doing. Understanding what tasks can be done more efficiently by a machine than a human being (e.g., processing and analyzing big datasets and strenuous and repetitive tasks, such as traffic counts) and what tasks are important to be done by a human, face-to-face with community members, are important questions that need answers.

In addition, and most importantly, the development of intelligent systems that planners can collaborate with may help us understand current planning processes (and their shortcomings) better. The discussion about AI in planning needs to start around the question of which planning processes are currently working well and which aren't. We need to make sure that we start by improving existing processes and ensuring their outcomes are equitable and sustainable before we can program a machine to do them for us. Therefore, it is crucial for planners to be involved in the development of AI in the planning field to focus the discussion on challenges we want to resolve and planning goals we need to achieve and to develop tools that can support planners in creating great communities for all.

As part of APA's foresight practice, APA hosted an "AI in Planning" Foresight Community, a multidisciplinary group of experts in planning, computer science, data analytics, sociology, geography, and engineering, among other disciplines. The Foresight Community met 10 times over the course of one year, from June 2021 to June 2022, to discuss

Over the course of ten meetings, the "AI in Planning" Foresight Community discussed a wide range of topics.		Discussion of general pain points related to planning and technology	**JULY 2021** Building bridges between tech and planning and academia and practice
AUGUST 2021 Sense-Making I: Connecting AI and planning—definitions and similarities	**SEPTEMBER 2021** Sense-Making II: Connecting AI and planning—using AI in planning	**OCTOBER 2021** Planning-related implications for equity, diversity, and inclusion	**DECEMBER 2021** Potential AI-related implications for equity, diversity, and inclusion
FEBRUARY 2022 Ethical AI in planning tools for equitable outcomes	**APRIL 2022** Upskilling needs	**MAY 2022** The role of APA—what can APA do to help prepare planners?	**JUNE 2022** Conclusion and final discussion

potential impacts from AI on the planning profession, the need for ethical AI, and how planners can prepare for AI. This white paper summarizes the findings and suggests initial ideas on how planners can prepare for AI and its potential impacts, how planners can ensure AI-based planning tools are used in equitable and inclusive ways, and what the role of the planner should be in developing and using AI-based planning tools.

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We want to thank all "AI in Planning" Foresight Community members for their valuable contributions.

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When done well, AI can allow us to elevate public engagement through real-time analysis of various design scenarios. As impacts are estimated, the public can better see the trade-offs of their many ideas and designs. RENDERING BY HOUSEAL LAVIGNE ASSOCIATES.

2. Sense-Making: AI and Planning

2.1 What is planning, and what does a planner do?

Planning is our collective effort to invest scarce public resources wisely and manage the complexities of human settlement. Like most knowledge work in the modern era, this effort contains two distinct, fundamental components. Planning is one part quantitative and one part qualitative. A significant portion of work is based on data and fact. An equal (or sometimes greater) portion is built on social and political exchanges that translate emotions and intuitions into values and opinions. Planning combines both types of information to make the best decisions possible.

The process to do so will vary from one project to the next. Likewise, the problems vary from one locale to another. Even so, the synthesis and underlying solutions are always built on the fundamentals of logic to be as rational and understandable as possible. Facts, opinions, values, predictions, and other forms of information are infused—through logic—into a series of principles and rules that are then used to consistently evaluate the options that a community might face.

For experienced planners, this process often happens within seconds. They will evaluate proposals for change against the community's vision for the future and its rules for the present. Unlike laypersons, planners can use a deep knowledge of principles and laws to identify the strengths and weaknesses of the proposal in ways others cannot replicate. They can then recommend a course of action that allows some form of the proposed change, while adhering to the community's laws and vision, retaining the upsides of the proposal, and mitigating the downsides. They will often do this by referring to any number of "if this, then that" conditional actions derived from practice, policy, and common sense. For example, if this street project doesn't meet basic standards to provide safe access to pedestrians, then it will be rejected. This happens thousands of times a day in every planning office across the world, often so quick

as to nearly be considered automatic.

For nearly a century now, this work has been refined through rigid processes like the Rational Planning Model, flexible processes like disjointed incrementalism, and best practices in the public engagement strategies we see today. Then there are the classic quantitative methods of data-driven analysis. This work began with common statistical techniques (linear regression and central limit theorem) and has evolved to include state-of-the-art software that combines remote sensing data with cartography to deliver everything from land-use suitability analysis to traffic models to digital twin cities stored in the data cloud.

Throughout every iteration of the practice, the planner's logic remains the same. The logic accounts for the cause and effect of a potential change against a large host of systems often referred to as the "triple bottom line" of economic, environmental, and social needs. The logic incorporates facts, opinions, projections, and other forms of information into a sequence of prioritized values. These values are reflected in local policies that protect the "health, safety, and welfare" of a community, all of which have been tested and proven against thousands of legal challenges and remain today as powerful rules that shape cities in notable ways. And when such a rule causes unintended consequences, planners and their logic are there to work with the community to find better solutions, rationally, one project at a time.

2.2 What is AI, and what can AI do?

AI possesses the potential to provide this same basic value to the community. This technology serves as an automated decision-making tool. It is artificial because it is something that we humans create, typically through software. It is intelligent because it contains mechanisms that allow it to make decisions without our deliberate command.

In general terms, an AI can assess information, identify patterns, translate the patterns into prescribed variables, measure the variables against thresholds for action, identify the highest valued option, and make a decision. For example, a common word processor will regularly autocorrect the most common typos (so that

> **In every circumstance, the technology demonstrates that the right data and right rules can allow an AI to predict courses of action based on the patterns it reads.**

the word "reciept" [sic] is instantaneously replaced with "receipt"). This is a rudimentary expression of AI. All it requires is a clear goal (i.e., to ensure that all words are written correctly) and a series of automated conditional actions built on the logic of "if this, then that," which leads the software to recognize that if the "I" and "E" in a common English word are misplaced, this mistake should be rectified with the correct spelling of the "E" before the "I." This is not magic. It can be, however, magical.

This simple example of the autocorrect function is an operationalized gesture of the logic that is regularly enforced in writing. This logic has been created through language, grammar, and writing standards. Human-created, artificial resources such as the *Oxford Dictionary* and *The Blue Book of Grammar and Punctuation* are turned into digital information and infused into the word processor's codebase. The information is then used by the software to continually monitor every new change in the text against these rules and standards. If a mistake is detected, then the autocorrect makes a change. This allows users to avoid the more embarrassing typos that they can never seem to avoid on their own. Best of all, this frees them from the drudgery of having to check all their spelling. In this way, AI is helpful because it does this task in a more consistent, and immediate, fashion.

This simple example of how AI works can be extrapolated to capture the fundamentals of a modern airplane's autopilot system and the image recognition machines that can identify cancer in a CT scan with greater reliability and speed than a professional radiologist. In every circumstance, the technology demonstrates that the right data and right rules can allow an AI to predict and prescribe courses of action based on the patterns it reads.

This idea is straightforward, but there is often tremendous challenge in aligning the correct data and rules to make the AI function as intended. To continue with the autocorrect example, this function helps a typist overcome errors—but it remains fallible. There are many instances where the AI's algorithm incorrectly replaces words like "drive" with "drink" or "married" with "murdered." Context is crucial and common sense is difficult to define in an algorithm. Nonetheless, within the realm of quantitative data, clear logic, and simple rules, the AI does what we tell it to do in a consistent, immediate fashion that fixes a typist's "I" and "E" vowel combinations according to data, code, pattern recognition, and pre-established "if this, then that" commands. Best of all, this thread of logic can be easily understood and transparently shared by another user engaging with the AI in repeated trials or simply opening the software to review the code that shapes the commands.

This is not always the case, however. Big data and machine learning techniques continue to grow in complexity, leading to more emergent behaviors from a given algorithm. (According to APA's *PAS Memo*, "Artificial Intelligence and Planning Practice," machine learning is defined as "algorithms based on applied statistical models that can learn without following explicit instructions [by basing] decisions on inferences drawn from patterns in data.") Recent history is full of many instances where machine learning delivers unexpected, and unintended, results that are derived not only from our programming but also from our own conclusions. For example, language learning models are orders of magnitude more advanced than the autocorrect example highlighted above. With little more than a single set of directions (i.e., prompts), the language learning model GPT-3 can generate text that has led the uninitiated to believe it is written by humans.

This goes well beyond the conditional statements and rules found in more rudimentary forms of the technology. Nonetheless, at the heart of an AI, there remains a dataset, rules for using it, and results predicated on what researchers and developers instill within. Unintended results and unexpected errors often occur. When fixes must be made, they will come from the designers and users—us humans—for the foreseeable future.

2.3 Similarities and synergies between AI and planning

The right logic and the right data are also what allow planners to solve local problems rationally. Thus, we can see where some of our practice is similar to the work of an AI and, therefore, ripe with opportunities for collaboration. Some fear that such collaboration will lead to our replacement, that the "machines" will take over our jobs. We could look at how many AI systems have defeated the world's finest chess players and naturally conclude that we, too, will be unable to match a computer's speed and ability. However, planning is not a game, and the work of a planner is inherently creative and human-centric.

An AI cannot replace a writer's expressions and styles and meandering use of metaphor. It can, however, ensure that every sentence fits the proper syntax. The AI doesn't replace, it augments. In this way, a better use of the acronym "AI" might be "augmented intelligence." This is particularly true for tasks outside the realm of board games that are highly complex.

Consider the autopilot navigation systems in a Boeing 777. The AI is extremely advanced, yet it remains dependent on a partnership with the pilot. The pilot handles tasks that are highly

Even in the most advanced applications, AI relies upon a vigilant expert hand to guide the system, even as the expert relies on the system to perform most of the tasks.

variable, such as inputting routes, taxiing, and intervening in moments of extreme turbulence. The pilot also continually monitors the AI's behavior in the event that an intervention is necessary. This is crucial, as an autopilot system may not perform a task as expected. A capable pilot must be able to recognize and intervene in such situations, which is one of many reasons why the U.S. continues to require a pilot or copilot to remain at the ready during all moments that an autopilot function is engaged.

AI is becoming increasingly capable of automating processes—but it cannot do it all. Even in the most advanced applications, AI relies upon a vigilant expert hand to guide the system, even as the expert relies on the system to perform most of the tasks.

As stated earlier, a planner's work combines quantitative and qualitative information. This is a creative process, and, like AI, it can always improve. AI researchers have made incredible strides improving the ways by which AI improves its quantitative analysis and predictions. Planning researchers, meanwhile, have made great strides improving the ways we develop and value qualitative information outside the realm of facts and absolutes.

A useful synergy can be found between these two areas of progress. In 2019, APA's *Zoning Practice* published an issue on decision algorithms. The examples provided a basic illustration of how planners can formalize their expertise in decision-making through a series of conditions, numerical weights, and variables that translate their intuitions into reliable formulas for analysis. The simple schematics represented the basic logic flow that planners often use to make their reasoned judgments. Parsing the flow out clearly, in an orderly sequence that weighs all our many variables against the representative values of the community, and turning this information into quantitative numerical data, gives a software developer the blueprint they need to create programs that mimic our way of thinking. All that is left is to add the same data, run the algorithm, and see the results.

The algorithms from that 2019 issue could not have been written as effectively by any other profession. None of it was perfect but the examples showed a holistic picture of distilled planning practice—at least on the technical side

of the work. In this sense, the "intelligence" contained within this work is as much the stuff of a planner as the person writing these words.

However, unlike most humans, the logic contained in such an algorithm can respond more openly to new information, new values, and new weights and conditions. It can be far more receptive to the changing attitudes and needs of a community. Better still, when it produces an error, it is often clear to others that the error has occurred. In complex models, such errors are difficult to trace and thus harder to resolve, but the errors are nonetheless conspicuous. This sparks the iterative cycle of trial and error that makes an AI stronger over time. We humans, however, tend to hide our errors for fear of embarrassment or failure. It is often painful to "update" our thinking in the same fashion as a machine-learning model because we are often hesitant to recognize such errors in the first place. Finally, an algorithm can perform its duties consistently, using the same reliable process every time, while humans may be forgetful or inconsistent on occasion.

It is these strengths of AI that led to its victories in pattern-driven games like chess. Today, chess masters have learned from these tools. We can too. With the right data and parameters, an AI can optimize a city's street network design to minimize greenhouse gas emissions. It can identify the best route design for maximum transit access in low-to-moderate income areas. It can identify the most sensitive natural areas for land preservation. It can simulate the performance of a future city's growth under a build-out analysis derived from the parameters of the zoning ordinance. With regular iterations and continual back-testing, it can predict future impacts with a diminishing margin of error.

This does not happen overnight, however. Nor does it happen by mistake. Data collection must be continually improved in every aspect. The colloquial "5Vs" apply here—data must be the best it can be in terms of volume, velocity, variety, variability, and value (see also APA's PAS Report, *Smart Cities: Integrating Technology, Community, and Nature*. The formulas that prioritize certain variables over others must be continually refined. Finally, the results of every decision and finding must be shared transparently in a way people can understand and trust.

Though AI can augment our practice immensely, these are tall orders. Planners cannot do it alone. AI researchers and developers cannot do it without us. Our contribution to the exchange can come from our work with the community, translating their evolving concerns and needs into priorities, values, and visions. This is creative work, and it requires the emotional intelligence that a computer cannot emulate. Such information will become more precious in the years ahead.

> **The iterative cycle of trial-and-error makes an AI stronger over time. We humans, however, tend to hide our errors for fear of embarrassment or failure.**

Technical data, particularly of the type that can inform a planner's algorithm, is increasingly processed through automated systems. From sensors to smartphones, these systems feed an AI the quantitative information it needs to predict a favorite video recommendation or the drive time to a destination. But the personal satisfaction we derive from these tools is something that isn't easily measured in a technical fashion. Likewise, the sociopolitical implications of these tools are something that only we can, and will, identify and manage through our own collective efforts. In other words, while AI is human built, it cannot capture the humane without the planner's continued collaboration with the technology. AI can show us the "right" answers, but only in the manner that we define. It is up to us, the authors of this intelligence, to interpret which results are "right" or "wrong."

2.4 Potential uses and implications of AI in planning

AI can process, synthesize, and interpret the data we provide. It can generate countless permutations of the weights and measures we tie to however many variables we define. Its quality (in terms of reliability and accuracy) is dependent on the data it is given and the formulas we design. Until planners define, or at least understand, the best practices in data collection, analysis, and algorithm development, we cannot fully realize the potential uses of AI in our profession. We can, however, easily recognize the implications.

When done well, AI can allow us to elevate public engagement through real-time analysis of various design scenarios. Practitioners can currently provide this experience in design charrettes. The scale and scope can vary, but the core elements involve participants contributing their ideas for an area's future. Those ideas are translated into designs that are then digitized and tested by the software that are evaluated by a model of AI. As impacts are estimated, the public can better see the trade-offs of their many ideas and designs. Through revisions and adjustments, they can learn the interplay between streets, buildings, natural areas, and the policies that govern them. The

Three examples of AI entering planning practice

The New Jersey Board of Public Utilities needs to identify all commercial buildings in the state with floor areas larger than 25,000 square feet for its new energy benchmarking program. It worked with planning researchers to use machine learning algorithms to extract building footprints and heights from aerial photography and lidar data because property tax records have incomplete floor area data.

The Town of Jackson Hole, Wyoming, uses GIS and AI to derive traffic analysis from CCTVs. The system can detect vehicles by type as well as pedestrian and bicycle traffic. The AI has been trained to detect and locate accidents, sudden stops, and other anomalies. This helps planners understand traffic patterns and enables public safety to deal with incidents quickly. The data is fed into a real-time dashboard that planners can reference to see current traffic/pedestrian/bicycle counts and see patterns over time.

The City of Tuscaloosa, Alabama, uses cameras mounted on municipal garbage trucks to detect blighted properties along their routes. The AI-trained tools help planners mitigate blight before it becomes severe and warrants a fine.

visual representations and rapid feedback the technology provides can lead to a deeper understanding of how to plan their collective future. The experience is highly engaging and informative for any who take part in the process. Over time, such high-quality, data-driven exchanges can be part of every planning decision.

It is important to note that the exchange is primarily between the community and the models that represent the practice, just as a chatbot is a communication between a customer and a language model. This does not lead to planners being replaced in the process. Instead, it allows planners to focus on refinements to the models—so that they produce better analysis and feedback. Likewise, the direct exchange between the community and the models allows the community to learn, clarify, and refine its priorities and interests—so that they produce better value judgments.

This already occurs in the most advanced planning efforts. The work has allowed laypersons to deeply understand the once-unknown connections between street designs and

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fatality rates, wildfires and urban sprawl, housing costs and zoning policy, and much more. Such knowledge once only belonged to the most engaged in the profession. Today, it is far more commonly available and much more accessible to learn. We have made great strides in this arena. (See also APA's *PAS Memo*, "Artificial Intelligence and Planning Practice.")

Even so, informed practitioners know that the technical accuracy of current AI models is less than ideal. Likewise, they know the intelligence of our current AI is bounded by limited data. A lack of data leads to a lack of effective training. Powerful machine learning techniques, such as unsupervised reinforcement methods, are largely out of reach in current practice for lack of robust training sets to fuel them. We also lack the literacy needed to translate our qualitative ideals into numbers and objects that can be automated in software code. These things can, and will, be solved by the technical experts. What they need from planners is a recipe for success.

Planning's best AI will take time to create and only the first step is clear: the best AI logic for planning must begin as an imitation of the best human logic for planning. Do we have a clear sense of what that logic is? Do we know, empirically and philosophically, the problems and solutions that we consider ideal? Do we know how to cultivate such knowledge in a way that can empower these models? If we do not develop this logic for planning, there is a distinct possibility that other professions (AI developers) will when developing AI-based tools for planning.

Answers will come from somewhere because, to succeed, AI demands it. The public does too. There is no better way to uncover these answers than through trial and error and better data that can come from focused efforts in this field. This is the finest aspect of the synergy between AI and planning. Striving to make AI an effective tool will help planners gain clarity on the best practices and approaches that will invariably make our profession more effective too.

Jackson Hole, Wyoming, uses GIS and AI to derive traffic analysis from CCTVs. The AI has been trained to detect and locate accidents, sudden stops, and other anomalies. PHOTO BY IAN DAGNALL/ ALAMY.

3. Challenges and Opportunities

Bringing AI to planning will uncover pain points, along with associated opportunities. It will require the same tasks associated with any innovation: developing a shared vocabulary, learning new skills, understanding what new tools do well, regularly recalibrating expectations, and identifying appropriate performance metrics, analytical frames, and evaluation techniques. Planners will need to bridge the contrasting cultures of planning and the tech sector, and planning academics will find new research opportunities in this field.

Knowing what we are discussing is the first noteworthy challenge. AI terminology is used inconsistently across contexts and many planners are unfamiliar with its basics. Fostering a common understanding will help advance both the conversation and AI's assimilation into planning practice. It is useful to understand that AI builds on statistical methods for prediction and classification that have long been used by planners, such as regression modeling, cluster analysis, and principal components analysis. The extension that makes AI distinctive is that the predictions and classifications are used to support automated, rule-based decision-making.

It will be important to create AI applications that are user-friendly, comprehensible, reliable, and fit for purpose. The number of practicing planners is small relative to analytical professions such as accounting, engineering, and software development. This means that planners often wait for polished products such as spreadsheets and visualization tools to become mature in the larger economy before adopting them within the profession. While it may be unwise to pursue AI for the sake of AI—the "shiny object" syndrome—early adopters provide a service to the profession by identifying innovations that help.

Appreciating and managing the limitations of AI is another important challenge for planners. This is especially true when the AI tool is adapted from its initial market for a planning application, such as the use of a sales forecasting tool to assess Main Street viability. It becomes important to

know whether the AI was trained on representative data, whether the tuning of the algorithm reflects the context of application and features of greatest interest, and what biases might be present in the final algorithm. It takes practice to become adept at interpreting the accuracy and meaning of results, and to recognize when the tool is not fit for purpose. Procurement practices may need revision to give weight to outcome quality and bias alongside acquisition cost. Managers will want to identify where and when the introduction of AI will make work processes more efficient, improve their quality, and allow planners to focus on human-centered activities and needs. In this context of automation, it is a good thing when AI outputs are unsurprising, and an experienced planner might say, "I could have told you that!"

AI raises challenges similar to those encountered when adopting other well-known tools. Sometimes we choose convenient rather than appropriate metrics. Often the metrics we deploy in public decision-making can be constructed by what is easiest and least expensive to access. An example is the early discussions on how to approach performance-based planning in transportation. Often the data that might illustrate the impacts of decisions on underserved communities is expensive to create and therefore isn't collected. Sometimes we don't consciously choose an analytical frame to guide decision-making or ask who it benefits. Before any analysis or data is consulted there is always a question. What that question is has ripple effects upon the presentation of data, the construction of narratives, and ultimately the outcomes of planning decisions. Sometimes we don't build evaluation into our usage of new methods. To know whether processes and outcomes improve, planners may want to perform or commission algorithmic audits and require data declaration sheets.

Other significant challenges planners will face are questions of equity and ethics in the application of AI and transparency in the data and algorithms used in AI. Both of which are discussed in Section 4 below.

3.1 Tech sector and planning

Planners tend to use methodological tools developed by others. Spreadsheets, statistical packages, and GIS originated elsewhere and became essential to the planner's toolkit. Today's tech sector writes most of the software that planners eventually use.

The tech sector seeks to innovate in ways that allow humans to do entirely new things or to do old things more efficiently. As mathematician Alfred North Whitehead (1911) wrote long ago: "Civilization advances by extending the number of important operations which we can perform

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without thinking about them." Some planning practice is indeed inefficient, with highly trained people performing repetitive, rote tasks that require more diligence than imagination. These aspects of the job are welcome targets for automation.

However, automation via AI carries risks, because when we allow the AI to perform operations without us thinking about them, we may misapply methods or create unintended consequences. Thus, there is value in periodically assessing the performance of our attempts at automation. Approaches such as measurement modeling—"the process of developing a statistical model that links what we would like to model to data about the world" (Jacobs and Mulligan 2022)—can help assess AI-based operations. Planners will serve their communities better by becoming critical, discerning users of tech and ensuring that the efficiencies pursued are those valued by the community and broader society.

Practitioners need to be informed about how AI works—it shouldn't be a black box. They need to understand how the output is created and be able to relate what goes in to what comes out. Planners should seek to get ahead of the game and be proactive, not reactive, about AI and its impacts. As AI consumers and users, they should encourage a research focus on explainable AI (which helps users understand and interpret predictions made by their models) to improve the odds that their AI applications will be viewed as legitimate by the public. Successful deployment depends on determining what AI means for planning knowledge and what all planners need to know versus what specialists should know.

Bridging gaps between tech and planning brings familiar challenges and opportunities to the profession. The classic tension emerges between for-profit activities and the public good. Private actors will use AI tools to advance their objectives, and planners need adequate responses. When planners borrow tools developed by and for the much-larger private sector, the fit may not be perfect, and requirements for openness and accountability may not be met. Both tech-sector programmers and academics have more freedom than public-sector

planners to innovate and test ideas. Local government planning practitioners in particular are not given opportunities to "fail," suggesting that the tech sector, where many ascribe to Maxwell's (2000) dictum to "fail early, fail often," should shoulder more responsibility to experiment (see also APA's PAS Report, *Smart Cities: Integrating Technology, Community, and Nature*).

As the planning profession saw with GIS, widespread adoption accelerated when web-based versions of these tools became available. Costs dropped, expertise requirements shrank, and even small planning departments were able to use GIS. A similar dynamic is taking place with AI applications.

There is a need for comparative evaluation of AI tools to assess their relative strengths and weaknesses. This is a role for academics and researchers, often working with practitioners. The engineering and computer science communities often do these in the form of hackathons, challenges, and competitions; economists do this around sectoral topics, such as modeling the energy economy. Planners have done this previously, when assessing the state of the art of planning support systems (e.g., Brail 2008). Such efforts need funding from neutral sources, rather than from self-interested vendors.

3.2 Planning academia and practice

Planning academics have roles to play in evaluating AI tools in terms of fitness for planning applications and in training students and mid-career practitioners in the critical use of the latest techniques. In addition, AI raises new questions for the planning research agenda.

This is an opportune time for planners to consider the application of AI-related methods, given vast increases in data collection, increased processing speeds, and increased popularity and accessibility of AI techniques. The potential of AI for planning, like that of other business and government sectors, was recognized in the late 1950s and early 1960s, but further advancement in adoption was limited by the lack of data about urban places and processes. This

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is rapidly changing, given the implementation of data collection sensors that track movement patterns, land-use changes, real estate transactions, energy usage, and other information (see Thakuriah, Tilahun, and Zellner 2017).

Though research on AI-related topics by urban planning academics has been increasing over the past several years, the evidence suggests that the results are slow to make it into the hands of professional planners (Batty 2018; Sanchez et al. 2022). Some academics propose that planners shorten the time frames at which they plan to better overlap with advances in cybernetics and urban operations research (Batty 2021). Others contend that planners should use the ubiquity of data and advances in computing to enhance redistributive justice in information resources and procedural justice in decision-making among marginalized communities (Goodspeed 2015; Boeing et al. 2021).

Along with the uptick in data availability, computing capabilities, and urban AI research, urban planning is poised to experience significant changes in technology applications for plan making. The academic literature suggests there is an extensive range of prospective AI applications for planning in domains as diverse as land use, zoning and permitting, environmental planning, and transportation. Many of these examples represent "wicked" problems within planning operations that do not have agreed-upon rules, logic, or finite sets of possible outcomes. AI is easily applied to "tame" problems, such as medical diagnosis from X-rays addressed with voluminous supervised data classification, compared to a "wicked" problem like diagnosing urban blight with no straightforward criteria (Safransky 2020). Other prospective applications are used infrequently and may not represent significant improvements or cost savings compared to other more routine and regularly used methodologies. Therefore, as urban planners and planning organizations consider appropriate applications to improve their processes, it is wise to consider which aspects of planning practice will benefit from the current stage of AI and are not likely to cause unintended consequences.

Significant advances still need to be made for AI to apply to the "wicked" problems of urban planning, and academic research can help. This includes important elements, such as who is involved in defining the problem, evaluation of AI tools, representativeness of data, and the time horizon involved. This can mean emphasizing the needs of planners first and the attributes of technology second, an approach that differs from the current practice of developing technology through research processes with little consideration of current practice.

With the challenges ahead of us related to an ethical use of AI, topics such as ethical handling of data and transparency will have to be included in the discussion around ethical planning practices. PHOTO BY 400TMAX/ ISTOCK UNRELEASED.

4. Equity and Inclusion and the Need for Ethical AI

To make sure the use of AI in planning results in equitable and sustainable outcomes, we must first reevaluate current planning processes, understand their shortcomings, and use lessons learned to inform the development of new or adjusted processes and practices. As laid out throughout this white paper, it is important to understand the human factors of planning and determine what can be done by a machine and what should not be done by a machine.

The planning profession has been working to correct mistakes from the past and to improve planning practices to create equitable communities in the future. Equitable planning practices need to be the foundation of AI-based planning tools.

Planners can start by identifying the challenges they face in the context of equity, diversity, and inclusion, and the remaining shortcomings that need to be resolved when working with AI. In addition, planners must understand the shortcomings of AI in the context of equity, diversity, and inclusion, which are similar to the ones planners are trying to resolve within their own profession.

4.1 Planning goals and the purpose of AI

The "AI in Planning" Foresight Community started by asking the question: What is the purpose of planning? In general, planners agree that we strive to plan for the common good. Planners try to resolve current problems, build consensus, and balance tradeoffs between different stakeholders and different interests. According to the AICP Code of Ethics and Professional Conduct, "the planning process must continuously pursue and faithfully serve the public interest."

But what does "planning for the common good" or "to serve the public interest" mean when trying to formulate an algorithm? Does it mean to plan for the greatest good for the greatest number? If so, it would exclude minorities and marginalized groups by default. Does it mean

that the "community perspective" is more important than an individual perspective? If so, how does the concept of equity fit in? Or would a better algorithm assume that by addressing the needs of the most vulnerable in the community everyone would be served? While planners have aimed at planning for the common good, some planning practices have resulted in harm to certain communities, both unintentionally and intentionally.

The primary purpose of the development of AI systems is similar: to resolve certain problems, especially those humans have not been able to resolve by themselves. AI itself is not harmful or meant to be harmful. Its purpose depends on its user and their intentions. A machine doesn't make its own decisions, doesn't have an opinion, and doesn't have experience. The programmer of an AI—the human being who developed the algorithm that the machine is using and who decided which data to feed into the machine—is responsible for the decisions it makes and the outcomes those decisions create. However, the difference is that planners who are planning for the common good can refer to ethical guidelines, while AI (and its programmers) does not have any ethical framework within which it can operate—at least, not yet.

4.2 Values and ethical decisions

The AICP Code of Ethics and Professional Conduct is a guide to help the planning profession make ethical decisions, while protecting the planner "when faced with controversial or difficult choices." With the challenges ahead related to the ethical use of AI, topics such as ethical handling of data (big data, open data, data protection, data privacy), transparency, and potentially a broader discussion around societal values will have to be included in the discussion around ethical planning practices.

As of now, there is no universal regulation for AI or a general ethics code for AI development or use. While multiple entities ranging from global organizations such as the Organization for Economic Co-operation and Development (OECD) and national governments to private-sector tech companies have been developing initial concepts of ethical AI, none of them are legally binding or enforceable at a larger scale.

Questions such as "What is a moral decision?" or "What is an ethical algorithm?" go beyond the responsibility of an AI developer or a planner. For example, if an algorithm of an autonomous vehicle must decide between running over a person or running into a tree, the decision might be easier than if the algorithm has to decide between running over

But what does "planning for the common good" or "to serve the public interest" mean when trying to formulate an algorithm?

a 70-year-old woman or a 10-year-old boy. Depending on cultural values and beliefs, the answer may vary. The development of AI forces us to understand and define our human values and reasoning better.

When looking to translate a planning task to an algorithm, or otherwise aid the task with an AI-based tool, planners should align conversations around ethics in AI with existing planning ethics. Similarly, the AICP Code of Ethics will require updates and adjustments to reflect a future where AI applications will be common—whether or not planners are part of the conversation.

4.3 Inclusion

One of the biggest challenges when trying to plan for the common good is to make sure all voices are heard and everyone is included. However, issues such as the "loudest voice" dominance problem (how do we uncover subordinate narratives and encourage marginalized voices to speak up and be heard?), budget restrictions in community engagement (what channels, tools, methods, and locations can be used for outreach, input, and engagement?), and the path of least resistance (whoever is easiest to engage will be engaged, whatever data is easiest to collect will be collected) are underscoring the need for inclusion. What are the best ways to include all community members? What does civic inclusion, in which all residents can find some method to interact that meets their expectations, look like?

Like in planning, when using AI (for example, to make decisions based on big datasets), people who are not represented in the data may be left out. Incomplete datasets and data that do not represent the community can result in inequalities. In addition, the risk of algorithmic bias may exacerbate these inequalities. The algorithm reflects the biases of its creator, and incomplete datasets may reflect inequalities in society. When raw political power overrides participatory gestures, AI will not mitigate the problem but may instead reinforce it.

4.4 Transparency

Another challenge planners face is the declining trust in the public sector due to lack of transparency. While planners have been working on correcting mistakes from the past, planning is still an expert-driven profession, and planners' jargon can create language barriers, a lack of understanding, and the perception of top-down decision-making. How can planning be more equitably accessible and offer opportunities to cocreate?

Certain technologies can facilitate more inclusive access and opportunities for everyone to participate. But when unknown data feeds into a black box, where an unknown algorithm creates the output, this lack of transparency can exacerbate distrust to a point where neither the community nor the planner trusts the technology. In planning, the challenge of transparency relates to making the planning process itself more accessible to others—which planners can do. But in the case of AI, the user of the AI-based tool often doesn't understand what's inside the black box themselves. When using AI in planning, the challenge is twofold. First, planners (as the users of AI) need to understand where the data comes from, who is included in the data, what's in the black box, and what's not in the black box. Second, planners need to be able to communicate that knowledge to their community members, the receivers of the output.

AI literacy—or an understanding of basic AI concepts—will be key for planners to be able to use AI in equitable ways and to communicate its purpose appropriately to the community. Transparency in the process of adopting AI into planning offers opportunities to increase overall transparency in the traditional planning process. By prioritizing transparency in planning processes, planners can build trust with the community. This planning competency is increasingly becoming important, especially as planners deal with the ramifications of distrust resulting from past mistakes. In the end, every individual should be a critical user of AI systems and be conscious of their rights and responsibilities and how they can exercise them in an AI-driven world.

4.5 Weight of history

In trying to eliminate inequalities and resolve related challenges, we are using the same processes, approaches, and methodologies that we used to create them. This may include asking the wrong questions, use of biased assumptions or goals, lack of monitoring and post-implementation evaluations, and the lack of planning education on issues related to equity, diversity, and inclusion. Like planners, AI is trained on past events, using data from the past

Hindsight is necessary to learn from past mistakes and appropriately rethink planning processes; this can inform the development of algorithms and tools that can assist in planning tasks.

(that reflects societal disparities) to inform decisions for the present and future. Algorithms simply reflect existing mindsets, biases, and values of their creators; they do not question them. Data reflects historical practices and ways of thinking, which may have been inequitable, misguided, and discriminatory.

Hindsight is necessary to learn from past mistakes and appropriately rethink planning processes; this can inform the development of algorithms and tools that can assist in planning tasks. Analysis and evaluation of past planning decisions and their consequences is crucial. Planners and AI developers need to understand the weight of history in our mindsets and datasets and how it may negatively impact our work, resulting in a snowball effect toward more inequalities in the future. Asking different questions; using new ways of thinking, new methodologies and processes, and different datasets; and unlearning flawed, inequitable approaches will be key to resolve the issues of today, in planning and AI development.

4.6 Diversity

The planning profession currently does not reflect the diversity of the communities we serve. This lack of diversity results in a lack of diverse perspectives. Similarly, in the tech world the values and biases of only a few are reflected in the algorithms and the data used. To equitably serve a diverse community and understand different needs and values, the ones who serve need to reflect that diversity as well. Input from diverse perspectives alone does not solve inequalities. However, it can assist in shifting conversations about values and bias.

In addition, as mentioned throughout this white paper, the data and algorithms used in AI need to reflect the diversity of the community. However, not everyone is connected to a device through which data can be collected. It will remain the planner's role to make sure the data they use captures the diversity of the community to create inclusive and equitable outcomes (for more, see also APA's PAS Report, *Smart Cities: Integrating Technology, Community, and Nature*).

4.7 Who is responsible?

As mentioned, planning practices have created harm, in some cases intentionally, in some cases unintentionally. Inequalities were intentionally created by planners through redlining, exclusionary zoning, and other processes. However, when trying to improve planning processes, we need to answer the question: what is in the planner's control and what isn't? What was the role of elected or appointed council members, developers, politicians, and other actors, and what was the planner's role? What part of the process resulted intentionally in exclusion, and what was done unintentionally and might therefore need some deeper assessment? Who is responsible?

The question "Who is responsible for the outcomes AI creates?" came up recently for the first time during the Computer Vision and Pattern Recognition Conference, where AI researchers presented their latest findings in AI development. Many researchers prefer their academic freedom and see their main task as developing these tools, not considering potential use cases and consequences of misuse (Kaye 2022).

An ethical framework that considers the use of AI in planning and training planners to become informed consumers will help to mitigate some of the risks and challenges faced in planning and in the development and use of AI. While the above points outline the shortcomings of both planning and AI, the solutions to current issues might be found in trying to resolve them together for both.

Because there is room for improvement in the planning profession, AI could be a mechanism to address the problems that the profession is facing; but if not used carefully, AI could also easily exacerbate those problems. At this point, using AI-based tools in planning could go either way.

"Because there is room for improvement in the planning profession, AI could be a mechanism to address the problems that the profession is facing; but if not used carefully, AI could also easily exacerbate those problems."

Planners can make informed decisions and understand the impact of AI on their work through building awareness, gaining appropriate knowledge, and upskilling themselves.
PHOTO BY PEOPLEIMAGES/ ISTOCK/GETTY IMAGES PLUS.

5. The Roles of Planners and How To Prepare for AI

Planners can play two roles when it comes to using AI-based tools and supporting the ethical use of AI for equitable outcomes: (1) planners can contribute to the development of AI-based tools in the role of subject matter experts who aim to resolve community challenges and achieve community goals, and (2) planners need to be informed consumers who understand the tools being used and their shortcomings.

Planners can act as advisors to programmers and AI developers to ensure the purpose of these tools reflect equity, diversity, and inclusion goals that should be central to planning practice. Connections and relationships between planners (the user) and the tech companies (the developer) will need to be built, maintained, and evolved—though not every tech company may be willing to listen to their users. A dialogue with the developers of AI-based planning tools is needed throughout the research and development process. It is not uncommon for developers to work with end users to refine a product.

As this relationship between the tech world and the planning profession matures, planners can expect their role to evolve. As with the adoption of geographic information systems (GIS) products into the profession over the past few decades, specialists will become more common, and these planners will have specific skills for contributing to the development of AI-based planning products.

In addition, it is important for planners to understand the tools they use, including what the tools are capable of doing and what they can't do, their limitations and shortcomings, and the risks of potential unintended consequences. The ethical use of tools requires planners to ensure no one is harmed or left behind. Planning ethics and the objective of planning for the common good, not potential efficiency gains, should guide and drive decisions on when and how to use AI in planning.

Both roles require that planners upskill and educate themselves about AI, its opportunities and challenges, and its potential applications.

5.1 Planners as contributors to the development of AI-based tools

What should the planner's involvement be in the development of AI-based planning tools or products, and what does it mean to be at the table? Planners can take the following actions to meaningfully contribute to the conversation around the development of AI-based tools for planning.

DEFINING THE PROBLEMS TO BE SOLVED AND ASKING THE RIGHT QUESTIONS. AI shouldn't be used just for AI's sake. Planners need to be proactive in defining needs statements that reflect planning challenges that need to be solved. This has always been a key step in the community planning process. Since AI tools are largely based on a defined problem or need, planners need to be thoughtful about how they define the problem AI is supposed to solve, especially to AI developers who work outside of the planning world. The profession will also need to factor in the effect of different approaches, such as asset-based community development or design thinking, on how practitioners will be defining problems.

TRANSLATING AND UPDATING PROCESSES. As previously noted, the processes and approaches for accomplishing planning tasks need to be reevaluated—especially in light of ongoing equity, diversity, and inclusion discussions. Planners need to be able to clearly outline the planning task, process considerations, and how this process may look different when done by an AI.

PREPARING FOR UNINTENDED CONSEQUENCES. Planners can mitigate unintended consequences of AI by identifying groups who have been made vulnerable by marginalization, anticipating unwanted effects, and creating protections early on. Planners should prepare to actively watch for the unintended consequences of AI, data, and algorithmic bias by establishing monitoring and evaluation mechanisms. It is especially important to work with

> **It is important for planners to understand the tools they use, including what the tools are capable of doing and what they can't do, their limitations and shortcomings, and the risks of potential unintended consequences.**

community members and provide them avenues for feedback about their experiences and the actual (or perceived) results of using these AI-based tools. Over time, this can aid evolving standards for AI that reflect real-world experience.

ELEVATING THE VOICE OF PLANNING. Planners need to be able to succinctly justify their presence at the table. Planners are the subject matter experts on various social, spatial, and urban topics that AI developers try to provide solutions for. The integration of this subject matter expertise while trying to avoid bias will be key when developing AI-based planning tools that are supposed to improve planning.

CREATING PLANNING-SPECIFIC TRAINING DATASETS. Planners can initiate programs to create planning-specific training datasets for AI systems. These can provide demonstrations of the value of AI to a community (and to a planning organization) and can promote AI literacy, education, and awareness in the community. Planners can then take note of what works and what doesn't and scale up (or down) as necessary.

BECOMING DATA FACILITATORS. The creation of planning-specific training datasets is also an opportunity for planners to try their hand at becoming facilitators of civic data. Planners can express the value of real-time data shared across agencies. Planners can advocate for improved data quality and definitions of applicability; ensure context-aware data collection and use; and use qualitative approaches to fill in the gaps of quantitative data collection that may be preferred by other professions.

DEFINING ORGANIZATIONAL CHAMPIONS. Planning organizations might also identify specific people within the organization to be champions of the topic of AI. This might be someone at the management or decision-making level who is an expert on technology applications, who can keep up with latest updates and find opportunities to leverage this technology in their practice. Staff at other levels can contribute to the discussion, but the champion should have the power to make official changes in the organization.

UNDERSTANDING WHO ELSE IS (AND ISN'T) INVOLVED. Planners are not the only professionals attempting to join the conversation in the AI and tech world. The planning profession can get a foot in the door by partnering with those who are also seeking a seat at the table, specifically those that have mutual interests

> **This is a new venture, so experimentation is needed, and actions may become more concrete as this relationship evolves and matures.**

and goals. In the end, there is an opportunity here to build the bridge between planning, policy, and technology experts.

BRAINSTORMING FUTURE-ORIENTED APPLICATIONS. Given the long-term focus of most planning efforts, planners are in a good position to brainstorm areas for future-oriented applications of AI. This is a major contribution that the profession can make in the AI space. Most existing tools are geared towards real-time monitoring, but there is an opportunity to use AI for long-term projections and decision-making. The planners' perspective can aid AI developers in becoming more creative when it comes to the data used to train AI, as the future will look differently than the past or the present.

These are just a few of the actions planners can take to enter the AI world, for the benefit of both sides. But it is important to remember this is a new venture, so experimentation is needed, and actions may become more concrete as this relationship evolves and matures. The actions listed above are by no means the final word on how planners can become participants in the development of AI-based tools. However, taking the first step with these actions will be necessary to initiate a productive dialogue between planners and tech developers.

5.2 Planners as informed consumers

How can planners become informed consumers of AI-based tools and applications, and which factors should planners be aware of when using these tools and applications? Planners are attempting to enter an existing world filled with decades of discussions and resulting tool development. The role of planners using AI should be as responsible actors in the marketplace for these tools. Planners can take the following actions to be informed consumers of AI-based tools.

RECOGNIZING DATA (AND OTHER) LIMITATIONS. Before using an AI-based tool, planners need to be aware of the original intent and purpose of it. Behind every tool or product is a defined data collection method, a model, or an algorithm. Planners should always ask questions about these

foundational pieces, and the required inputs, of an AI-based tool. They should be productively (but not prohibitively) critical of data and models to determine if they are appropriate for planning use. Finding flaws and faults in an AI-based tool does not mean eliminating its use entirely; rather, it means recognizing that a tool's outputs are not definitive or perfect but can still have value in the planning process. For example, if the data behind an AI is incomplete, planners can still use this tool as one input to the planning process. The tool still offers added efficiency and provides relevant information. However, further work would need to be done separately to fill in the gaps. In short, planners need to know the key aspects of how the technology works to identify shortcomings and adjust accordingly.

UNDERSTANDING THAT NOT EVERY TOOL IS APPLICABLE TO EVERY TASK. Planners should develop a clear understanding of different kinds of data, such as monitored and modeled data. An AI-based tool may be appropriate for certain data resolutions but not others. Using an AI-based tool requires a planner to match the resolution of data and models with appropriate temporal (short term, medium term, or long term) and spatial (local, regional, etc.) scales of decision-making.

PARTICIPATING IN PROFESSIONAL DEVELOPMENT. Planners should know the basic questions to ask when choosing to use an AI-based tool. Some of the core philosophical questions are touched on in this white paper and may include the following: Will this tool help me do my job—will it increase efficiencies in my work? Will this tool advance equitable outcomes in the community I serve—will it increase the effectiveness of my work? Is this tool good for planning—will it solve an actual problem, or am I using the tool just for the sake of using a new technology? Planners will have to upskill in AI literacy.

LEARNING FROM OTHER FIELDS. Other fields have lessons to offer on the adoption of AI into their work. From seemingly distant applications in medical professions to uses in more closely aligned professions such as civil

> **AI imposes clear upskilling, education, and training needs on the profession. Planners don't need to become AI specialists; however, they should understand how AI impacts their work today and in the future.**

engineering and landscape architecture, planners can look at the range of applications of AI-based tools and how they have impacted these professions.

CHALLENGING PRECONCEIVED NOTIONS. One crucial action that planners can take is always challenging the preconceived notions of the profession. For example, the idea of planners as "problem solvers" requires reflection on preconceptions that AI tool developers may have on the problems that need solving. These may not align with the goal of the planning profession, or they may be based on outdated notions of the origin of problems. Additionally, AI is changing traditional planning assumptions, whether or not planners are involved in the use of AI. Planners may be aware of some of these shifts—such as how AI is affecting employment or migration trends—but they need to ensure they change their projection tools to reflect changing assumptions.

As subject matter experts who understand human values as they relate to the built environment and social change at various community levels, planners need to maintain a firm grasp on their valuable perspective. One way to be informed consumers is to use this knowledge as a consistent basis to spot misalignment between actions and results from AI operations. When working with existing tools, planners can flag these misalignments and request adjustments where necessary (and if tech developers are open to changing tools for the better—if not, planners can move on to another tool and developer).

RAISING AWARENESS ABOUT CURRENT APPLICATIONS. Finally, planners can express their role as informed consumers by speaking out on current applications that are effective to their work. This can encourage the creation of similar products and lead to a more robust and accessible marketplace for all communities.

Planners are entering an industry that already has been underway for some time, so using existing products is not only inevitable, but encouraged. By learning what has been done outside of planners' contributions, planners can see where they can bring value and benefits for both sides. Planners cannot assume that they can jump straight into having AI-based tools designed for planning without first becoming informed consumers of what's already out there.

5.3 Upskilling and continuous learning

Learning something new is the next big challenge for the planning profession. AI imposes clear upskilling, education, and training needs on the profession. Planners don't need to become AI specialists; however, they should understand how AI impacts their work

today and in the future. Upskilling is the process of learning new skills that help individuals adapt to changing needs; it is about continuous learning that enables them to perform their work in a more meaningful way.

There are direct implications for academic programs, where planning students first encounter many theories, methods, and topics that they will use in their professional practice. The core curriculum required of all students should introduce them to the major debates associated with AI in planning. The core methods course should locate AI as an extension of more familiar methods. Elective courses should go into more depth to equip some students to work on advanced applications and tool development.

Automation of simpler planning activities with AI also carries significant implications for those just starting in the profession. In the common apprenticeship model, the junior planner learns accepted professional practice by performing simpler tasks under supervision. If AI can perform that work, the junior planner will need another way to learn the norms of the profession. Reliance on AI will dramatically increase the range of tasks for which novice planners will need to substitute critical thinking for learning by doing.

Upskilling helps planners fill their skills gaps and advance their careers. Local planning agencies and private firms must invest in diversifying and upskilling planners to boost innovation and be relevant to the changing world. The world around us is becoming more digital, and digital transformation starts with skills transformation.

To be prepared for AI use in planning, planners will need to upskill their human skills (soft skills) as well as their technical skills (hard skills). As mentioned throughout this white paper, the use of AI in planning will refocus the planning profession toward the human factor of planning. AI can take care of repetitive tasks (e.g., traffic counts) and rational decision-making (e.g., automated permitting process). AI will be able to conduct quantitative analyses, provide information, and create recommendations. Humans

> **Communication skills, emotional intelligence, agility, empathy, and critical thinking will be key for planners to work successfully with AI, while putting their community members' needs first.**

will have to rely on their experience to provide wisdom and judgment, communicate the policies and plans, interpret the recommendations, and implement them with humanity and compassion.

Collaboration with the right AI tools can make planning more efficient and more people-centric. Communication skills, emotional intelligence, agility, empathy, and critical thinking will be key for planners to work successfully with AI, while putting their community members' needs first. In addition, skills, such as data analytics, coding, and data management, as well as knowledge about data protection and privacy, data visualization, machine learning, and other related issues, is becoming ever more important for planners. This is already reflected in many planning jobs now available in the public and private sectors.

Similarly, collaboration across sectors, such as the tech sector (see section 3.1); across jurisdictions (e.g., for collecting consistent data); and across different agencies (e.g., developing new digital tools) is needed to address complex community issues and avoid working in silos. Planners will need communication, interpersonal, and relationship-building skills, among others, to initiate and sustain collaborations with different agencies and organizations.

Upskilling requires continuous learning and effort, and the sheer number of skills to learn and apply may be overwhelming. To make it more manageable, planners should create personalized learning paths to gain required skills and meet career goals. Planning organizations and employers can support these efforts with equitable hiring practices and career-building opportunities related to expertise in AI and AI governance for all positions.

Planning organizations can establish career paths related to AI to bring individuals from nontraditional backgrounds into the field. In general, the planning profession should integrate the topic of inclusivity within training and development for staff. This may occur through the establishment of partnerships with academic institutions, civil society, and public-sector organizations to embed equitable and inclusive processes into in-house AI capabilities. Upskilling is a way for planners to redefine themselves in the realm of policy, planning, and design.

6. The Future of Planning with AI

This white paper intends to raise awareness among planners about the opportunities as well as the shortcomings of AI, and to help planners prepare for a future where AI will play a significant role in our communities and nearly any profession. It aims at helping planners navigate the changes on the horizon by bringing the topic into a planning context and by sharing a basic understanding of the concept of AI and its potential impacts on the planning profession.

Additionally, planners can use this white paper to determine first steps on how to use AI in their work and what role they want to play. For some, this might be a completely new concept, and learning more about it may be the first step. Others might already be familiar with AI's capabilities and ready to engage with the tech sector directly, as suggested above.

Whether you are an AI novice or an AI expert, it is important for you to be involved in the discussions around AI and its potential applications in planning. AI is not sci-fi anymore, and AI-based tools for planning are a reality. If we as planners don't use them, others will in our place. Let's learn how we can collaborate with AI, use this technology to improve our processes, and continue to create great communities for all in equitable and technologically advanced ways.

"Let's learn how we can collaborate with AI, use this technology to improve our processes, and continue to create great communities for all in equitable and technologically advanced ways."

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