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AI for government

Use Cases for AI in Government: Accelerating Permitting Processes

When project developers apply for permits to build renewable energy sources, complex and decentralized permitting processes can often delay projects for years. As a result, globally, governments and project developers are pushing to shorten permitting processes.

To do this, the Environmental Protection Agency (EPA) in Denmark has standardized and digitized their permitting process using a best practice methodology. As a next step, the EPA is now training AI to guide project developers, define scopes, generate drafts reports, guide case workers, and compile inputs.

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In Europe and the United States, permitting processes delays the development of renewable energy sources, typically taking a median duration of 2 to 8 years.

Environmental permitting is a regulatory process through which government authorities at various levels (local, regional, or national) give permission for individuals, businesses, or organizations to undertake projects that can potentially impact the environment. The process involves activities such as Environmental Impact Assessments, which is an evaluation of the potential environmental effects of the project. Environmental permitting is crucial to ensuring safety and environmental compliance.

Despite the urgency for the green transition, the complexity of permitting processes cause significant delays for project developers. In Europe and United States, industry analysists estimate that permitting processes can take in the range between 2 to 8 years from project start to the permit being granted. Thus, globally, both governments and project developers are pushing to shorten permitting time.

The high complexity of permitting is due to multiple factors, including the need to balance economic development with environmental protection, ensuring public safety, and complying with regulatory requirements. As development projects differ in nature, standardization can also be difficult, which can cause even further complexity. As a result of the complexity, multiple governmental authorities must often be included and collaborate across offices.

To shorten the permitting process, the Environmental Protection Agency in Denmark launched a standardization initiative, using a best practice methodology.

The Environmental Protection Agency (EPA) in Denmark is responsible for environmental protection and regulation nationally, including handling environmental permit applications, and handling Environmental Impact Assessments. Previously, each environmental permit was handled manually on an individual basis, causing a high degree of variation and complexity. In response, the Danish EPA used a formalized methodology called "Digital Bureaucracy" to streamline and standardize the permitting process.

Digital Bureaucracy is a best practice methodology for describing processes in government organizations, developed in Denmark as a public-private partnership. The standardized approach describes all steps of a process end-to-end, including screening, applying, case processing, filing, checklists, communication, and decision support. By leveraging this approach, the EPA was able to standardize the permitting process.

To handle the complexity and variation of permitting processes, the standardized process uses "variance factors", which enables the process to adapt to the specific needs of an individual permit application. As a result, the standardized process can handle all variations of environmental permit applications.

In addition, the labeling of data has been standardized. Thus, data is structured in a standardized way across all the different steps of the permitting process. The standardization and structuring of data is an important step towards enabling the use of artificial intelligence (AI).

The process was digitized within a few months by use of configurable standard software.

The EPA digitized the process by using the F2 platform, a fully integrated standard software platform for government, used by 100+ government organizations globally. The platform features a four-layer structure, consisting of a data repository, government work functionality, process layer, and user interfaces.

The data repository keeps all data in one place. The government work functionality includes all general functionality such as workflows for requests and approvals. The process layer includes templates that can be configured to specific processes such as environmental permitting. User interfaces can also be configured, with elements such as an online self-service portal for applications.

By using configurable standard software, most major IT work was eliminated, as only configuration of the process layer and user interfaces was needed. This shortened delivery time, and the EPA went live with the digital permitting process within a few months.

As the solution was configured using a fully integrated standard platform, data was ready for AI from the start.
Large AI projects are often centered around the collection, alignment, and verification of data (data engineering) across various data sets. This consumes both time and resources. However, due to the integrated architecture of the standard platform, the data is collected within one shared repository with an aligned data model.

Data is validated, as data labelling gets verified by case workers when they work on the platform. Existing cases are already labelled with metadata, so both e.g., documents, files, and process data were updated. As a result, the AI team could start working on the data right away.

As the solution is fully integrated, the AI models understand the full context.
Firstly, the AI model understands the context of assessing an environmental permit application, and where in this process the task is being carried out, e.g., in the initial screening, the evaluation, or the final decision. Secondly, the AI model knows which specific permit application is being assessed, and thereby which data is relevant to use. Thirdly, the AI model understands who the case worker is, and thereby which data the person is allowed to access.

As a result, the AI model understands the context on the same level as a human case worker, and thereby can support the specific case worker's needs and provide both more accurate and detailed feedback. Also, the AI model will only provide the information that the case worker is allowed to access.

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USE CASE 1
– Guiding project developers

When project developers apply for a permit, authorities first assess whether the relevant information is included in an application. This assessment includes various offices and people, and consequently is time-consuming. If information is lacking, the application will be returned to the project developer, who must submit the application again with the missing information.

As a result, permit applications can go back and forward between project developers and authorities many times, until the application contains all relevant information. This can cause significant delays early in the process.

To solve this problem, authorities can develop an AI-powered screening service for project developers. The screening service can be made available as a self-service front-end, where project developers can submit their application online. In turn, the project developers can receive an AI-powered and automated screening and receive guidance in multiple ways on how to create a successful application.

Firstly, the AI model can help identify similar previous applications to be used as guidance for project developers. This functionality is developed by training AI models on previous applications and the evaluations of these. As a result, the project developer can receive examples of former applications that have been approved and use these as guidance.

Secondly, project developers can receive information about which limitations or requirements similar applications received in the past. Thereby, project developers can better predict these elements early on in project planning and budgeting, as opposed to receiving this information at a much later stage.

Thirdly, the AI model can inform the project developer about missing information, such as considerations about specific legislation. Thereby, the project developer can ensure that all information is included in the application from the first submission. This can save significant time and resources for both the project developer and public authorities, as applications otherwise can go back and forth multiple times until all information is included.

USE CASE 2
– Defining scope

When a submitted permit application arrives at the centralized office of the EPA, the first step is to generate a scoping report. A scoping report identifies the scope for evaluation and a strategy for providing a permit. The content of a scoping report depends on the individual application, including factors such as the type of construction, limits and regulations of a geographical area.

When the application arrives at the centralized office, an AI model can screen the application and suggest relevant areas to include in the scope based on previously submitted applications. The AI model uses machine learning to develop it's ability to analyze past applications and the result of the scoping report. The AI model can access this information, as the fully integrated platform within the EPA provides the AI model with both the data (former applications) and context (the processes within the organization).

USE CASE 3
- Generating drafts

Once the scope for evaluation has been identified, AI can generate a draft scoping report, which can be sent to the applicant.

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The draft scoping report will explain the reason behind the chosen scope.
To ensure validity of the generated draft, a large language model (LLM) must be fine-tuned through training it on as specific data as possible. This can be done as applications and scoping reports can be divided into different components. A specific component covers topics relevant to the permit e.g., water areas, land use, or farming areas.

To train the LLM on as specific data as possible, the model is trained on each of those components separately. More specifically, the model is trained on previous answers to each of the specific components of an application. This enables the LLM to learn the arguments, language, and format that are relevant for each component.

As the model is trained on each component separately, the LLM can be fine-tuned to provide drafts with much higher validity as opposed to if the model was trained on full applications and reports.

USE CASE 4
– Guiding case workers

Whenever case workers wish to compare an application to previous applications, an AI model can help identify previous relevant applications. Then, case workers can use this functionality to compare their assessments to previous assessments. This can help ensure consistency, as well as providing precedents.

USE CASE 5
– Combining final input

For the final Environmental Impact Assessment, the centralized office must receive input from all the relevant offices across the EPA. Once the central office has received all the input, they must be combined into a final report. This also includes to ensure consistent tone of voice, no opposing or overlapping arguments, and alignment across the final report. By leveraging a generative LLM, the case worker can automate this task, thereby freeing up significant time and resources while adding quality assurance.

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