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# ServiceNow text-to-code LLM Model Card

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## Intended Use

The ServiceNow text-to-code Model ("the Model") is designed to support ServiceNow developers with code-generation assistance for the ServiceNow Platform.

It can generate or complete code according to the intent expressed in a developer's prompt. Developers manually initiate a code-generation request with a prompt, then review and edit the AI-generated code as needed for their use case before accepting and using the generated code. It is important to have a human reviewing the AI-generated code (i.e., human-in-the-loop) to ensure the code is appropriate and functions correctly for the intended use case.

The Model is based on a model in the [StarCoder](#) large language model family, and has been further fine-tuned on ServiceNow Platform-specific data.

The license for the StarCoder family of models includes explicit usage restrictions that preclude, among other things, the generation or distribution of malware, the generation or dissemination of personally identifiable information (PII) to harm others, any use that violates applicable laws, any use that results in automated decision making that adversely affects individuals' rights, and any use that is intended to discriminate on the basis of legally protected characteristics.

See Attachment A of the [Open RAIL-M v1](#) license for the license for the StarCoder family of models and a list of usage restrictions.

## Model details

Developed by: ServiceNow  
Research and Engineering  
Released: Sep. 2023, v1.0

## Evaluation data

[HumanEval](#) examples include a prompt written in English, a code snippet, and a unit test.

Note that the programming language is Python. Internally evaluated using Glide JavaScript code.

## Metrics

The Model was optimized for Pass@1— the likelihood that a problem is solved in a single attempt by the Model.

This metric measures functional correctness, i.e., if the unit tests pass.

## Model Architecture

The Model is a finetuned version of a model in the StarCoder model family.

## Training data

The Model is based on a model in the StarCoder model family, which was trained on data from publicly available sources. Some personally identifiable information (PII) and malicious code were removed. Programming languages include Java, JavaScript and Python. See the [StarCoder paper](#) for additional details.

Fine-tuning was done with ServiceNow Platform-specific data.

## Additional information

There is currently not a watermark indicating that a code snippet includes AI-generated code.

## User Benefits

The Model is trained and fine-tuned to provide code completion suggestions, relevant code snippets, functions, and variable names, and is intended to reduce the time spent on manual typing and potential syntax errors.

## Risks

The Model may generate code that is inefficient, contains bugs or contains malware. For more information, refer to section 10 of the [StarCoder paper](#). The Model may not create code consistent with the best practices for an organization or developer and should be reviewed and tested by developers before acceptance and usage.

## Factors and limitations

The Model needs enough context in a prompt to create an acceptable response.

The Model can only generate code for a limited number of programming languages. It currently supports a variety of languages including Java, C++, JavaScript and Python, but it is important to note that the Model may not be able to generate code for all programming languages.

The Model may struggle to handle complex or uncommon scenarios, such as non-standard code patterns, niche programming paradigms, or specialized use cases. In such situations, the generated code may be less reliable or fail to meet the desired requirements.

The Model may struggle with complex or ambiguous code structures. The Model relies on its ability to understand the context and semantics of the code being written.

## Ethical considerations

Some PII and malicious code was removed in training data for the StarCoder family of models, but some may still exist. Additional PII and malware detection in pre- and post-processing can help mitigate this issue. Code LLMs can produce harmful code based on how it is prompted, and the Model is not free from such limitations similar to the behavior of other industry LLMs. Developers should not use the Model to generate malware or in any other way prohibited by the usage restrictions for the StarCoder family of models.

To perform a membership check, along with attribution to original code and licenses, tools such as [HF Code Autocomplete](#) can be leveraged. ServiceNow does not endorse or assume any responsibility for the accuracy, completeness, legality, or appropriateness of the results generated by such tools.

Please report instances of hallucinations, malicious code, or PII in output so that we can evaluate for remediation.

