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smartAPI: Towards a More Intelligent Network of Web APIs

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Data science increasingly employs cloud-based Web application programming interfaces (APIs) stored in different repositories. However, discovering and connecting suitable APIs by sifting through these repositories for a given application, is difficult due to the lack of rich metadata needed to precisely describe the service and lack of explicit knowledge about the structure and datatypes of Web API inputs and outputs. To address this challenge, we conducted a survey to identify the metadata elements that are crucial to the description of Web APIs and subsequently developed a smartAPI metadata specification that includes 54 API metadata elements divided into five categories: (i) API Metadata, (ii) Service Provider Metadata, (iii) API Operation Metadata, (iv) Operation Parameter Metadata, (v) Operation Response Metadata. Then, we extended the widely used Swagger editor for annotating APIs, to develop a smartAPI editor that captures the APIs' domain-related and structural characteristics using the FAIR (Findable, Accessible, Interoperable, Reusable) principles. The smartAPI editor enables API developers to reuse existing metadata elements and values by automatically suggesting terms used by other APIs. In addition to making APIs more accessible and interoperable, we integrated the editor with a smartAPI profiler to annotate the API parameters and responses with semantic identifiers. Finally, the annotated APIs are published into a searchable API registry. The registry makes it easier to find, reuse and see how the different APIs are connected together so that complex workflows can be more easily made. Links to the specification, tool and registry are available at: http://smart-api.info/.

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ACM   Michel Dumontier et al. 2017. smartAPI: Towards a More Intelligent Network of Web APIs. In *Proceedings of the 25th conference on Intelligent Systems for Molecular Biology and the 16th European Conference on Computational Biology*.

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APA   Dumontier, M., Dastgheib, S., Whetzel, T., Assisi, P., Avillach, P., Jagodnik, K., … Wu, C. (2017). smartAPI: Towards a More Intelligent Network of Web APIs. In *Proceedings of the 25th conference on Intelligent Systems for Molecular Biology and the 16th European Conference on Computational Biology*.

MLA   Dumontier, Michel et al. "SmartAPI: Towards a More Intelligent Network of Web APIs." *Proceedings of the 25th Conference on Intelligent Systems for Molecular Biology and the 16th European Conference on Computational Biology*. 2017. Print.

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