MACHINE TRANSLATION FROM POLISH (CONFERENCE WAS IN POLISH) 😊

Microsoft Azure capabilities in the context of deploying machine learning models on edge devices

Pawel Fic

Silesian University of Technology, Department of Automation Electronics and Computer Science,

Department of Automation and Robotics

Supervisor: Prof. Adam Czornik, D.Sc.

Abstract: The theme of the poster will be the Microsoft Azure IoTEdge service. Three use cases will be considered, distinguishing between device access to the Internet. Full-time access, irregular access and no access. The low-level basics of the service and the high-level use case will be discussed.

Within the case of Internet access without availability and bandwidth constraints, the possibility of using cloud-embedded models will be analyzed. The discussion is presented using the Azure Machine Learning service as an example. It was also analyzed in terms of the cost of its implementation. The method of connecting to the Internet for intermittent use was contrasted with the capabilities of Azure IoTEdge. A use case assuming limited data transfer and no Internet access at all was also analyzed.

At its core, both Azure IoTEdge and Azure Machine Learning use Docker containers. Their creation, updating and storage are discussed. Techniques for transferring containers to edge devices and deploying them in the cloud are analyzed. Advantages and disadvantages of their use are pointed out.

A use case for Azure IoTEdge in a deployment on a food manufacturing plant will be presented. The project implementation required data acquisition from multiple sources. Therefore, it will serve as an example of use for hypothesis development by models that need input data from multiple sources. It is therefore necessary to integrate multiple sources of data, the feasibility of implementing them using Azure IoTEdge will be discussed. The implementation case under consideration will be anonymized.

The capabilities of the service in streaming data processing will be shown. These capabilities are contrasted with cloud tools and services for similar purposes. The reasonableness of using the service in terms of the cost of commercial use was analyzed.

An analysis of large-scale deployment of the IoTEdge service was conducted. On a number of edge devices of the same, but also other types. Approximate hardware and system requirements needed to use it were given. A use case was presented in which, due to excessive resource consumption and design complexity, the service failed. Debugging methods to produce stable software are presented.

Literature:

H. Shehab and S. T. Faraj Al-Janabi, 2020, Microsoft Azure IoT-based Edge Computing for Smart Homes, International Conference on Decision Aid Sciences and Application (DASA), pp. 315-319.

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Klein, S., 2017, Azure Stream Analytics. In: IoT Solutions in Microsoft's Azure IoT Suite. Apress, Berkeley, CA.

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