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AUTOMATION OF DEPLOYMENT OF INTERPRETABLE MACHINE LEARNING MODELS TO CLOUD SOLUTIONS

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INTRODUCTION

Machine learning models for a long time have been regarded as an inherent part of many systems. While processing their predictions, barely anyone has been considering what were the actual factors that were driving returned results. Their explainability has started to be a very important and emphasized area.

The xai2shiny [1] package for R is a Shiny dashboard generator that allows users to automatically create applications based on machine learning models within a few moments. They contain models' local and global explanations that are intuitive for even the most inexperienced users. Dashboards can be run both locally, as well as deployed to the cloud with Docker [2] and DigitalOcean [3] connection.

LOCAL USAGE

The main feature covers generating Shiny [4] dashboards locally based chiefly on passed explainers (i.e. special objects created with the DALEX R package). User can analyze both local and global explanations, e.g. Break-Down Plots, Ceteris Paribus Profiles or Partial Dependence Plots. Additionally, model performance measures and text descriptions can be added.

All mentioned functionalities can be adjusted using a special cockpit on the left-hand side of the application. Moreover, user-defined observation can be prepared for local explanations analysis. The bottom of the whole panel contains "Learn more about XAI" pane that includes methods depiction and great sources of knowledge.

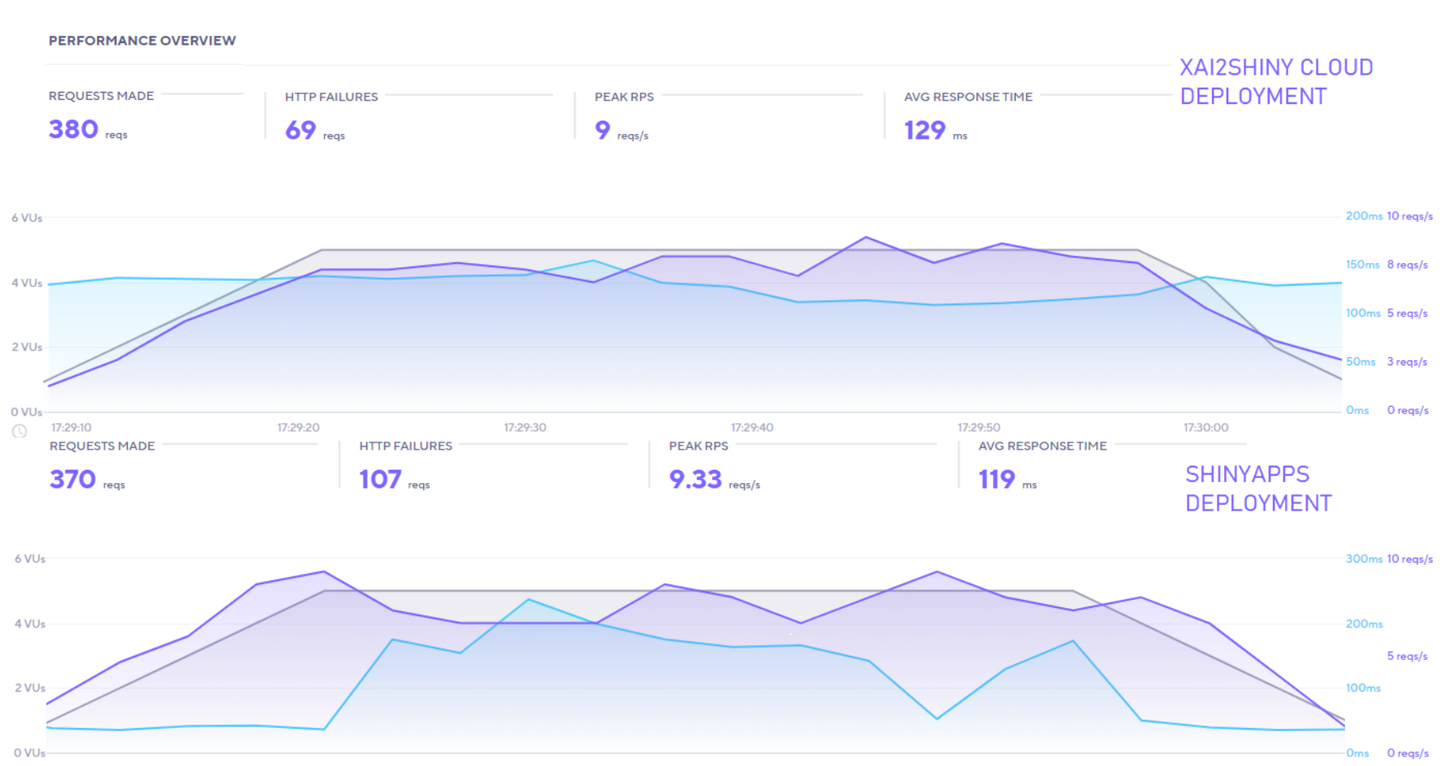
CLOUD DEPLOYMENT

Apart from using and analysing dashboards locally, they can be further pushed to the cloud. Thanks to developed functionalities it is enough to deploy them using only R code. Indeed, 2 simple functions have to be launched, and after a few minutes, everything is running on a given server instance.

RESULTS

The final solution provides over 9 times quicker deployment than the popular shinyapps.io service. It was also load-tested and proven to be more reliable and stable, which can be seen on the graph to the right.

Apart from performance benefits, it is also a more affordable solution to be used long-term. It is already proven in real-life use-cases, as there are more than 50 applications deployed using xai2shiny. The authors have a firm belief that the solution can be used to introduce eXplainable Artificial Intelligence to a wider audience. It is already proving to be the case as an undergoing study of survival of septic patients' by dr hab. Barbara Adamik et al. is using xai2shiny to present the results.



1. xai2shiny - https://github.com/ModelOriented/xai2shiny, **2. Docker** - https://docs.docker.com/, **3. DigitalOcean** - https://www.digitalocean.com/docs/, **4. Shiny** - https://shiny.rstudio.com/

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