ida
lab.

Recruiting Process:
Data Engineering for Data/AI Consulting in Life Science & Health

Case Study Documents:
Alarm Management Case Study

Coding Case Study

Scenario

MensSana is a German chain of hospitals. They operate around 110 hospitals, 90 of those have an intensive care unit (ICU). They have engaged the services of idalab to improve the alarm management on their ICUs.

The situation on a ICU currently looks the following:

- Not every alarm is relevant; the manufacturers of the ICU machines are of course interested to hedge against being sued – therefore the machines produce alarms very easily, e.g.: even if a sensor is just temporarily moved
- The large amount of alarms leads to a dangerous side effect. Sometimes, false or alarms of low priority happen simultaneously to those which are critical, raising the probability that an important one might be missed

MensSana and idalab have cooperated to develop an AI model, “ICUzen”, which should reduce the number of false alarms in the ICU by predicting the likelihood of an alarm being false. Our data scientists say that the performance of ICUzen in previous experiments looks promising.

For the next step in this project, we need your help. We must evaluate how ICUzen performs on live patient data. You will **build and present a self designed data pipeline** for this test. The **results will be presented in a meeting with the client**.

The live test will be conducted while the ICU is operating as usual. During the test phase, we **do not want to interfere** with the current alarm system. ICUzen will be tested in the background **without any impact** on the deployed system. That means we will access the ICUs API, extract the data and process the data on a local machine (your machine).

The goal of the test phase is to **collect real-time data and process it in our model**.

You have been assigned to the following tasks.

Task 1 – Data pipeline

Design and implement a Python program that performs the following steps:

1. Connect to the API of the hospital
2. Save the raw data coming from the API
3. Feed the vital signs data coming from the hospital API into ICUzen
4. Save the results of the prediction from ICUzen

There are some requirements for your pipeline, it should :

- adhere minimal software design standards
- run stable
- be client ready e.g.: if a client's engineer want to see the code
- have interfaces so that it could connect to a larger piece of software

Try if everything works by **running your system** for a few seconds.

Resources

- The API to download the vital signs
- ICUzen.py (detailed in the Python script)
- Readme.md

Task 2 – Client presentation

In the client meeting you will **present slides.** You are supposed to prepare this **presentation with at least three content slides.** If you need more slides to convey your story, use as many as you like.

- **Slide 1: Present the project.** Not everybody in the meeting will be familiar with the situation, problem and project. This slide should pick up those people.
- **Slide 2: Place your work in the project context.** Explain how your work fits in the bigger picture. This slide should help the audience to transition to the technical slide 3.
- **Slide 3: Present your pipeline architecture**. Make it clear so non-technical people can understand the idea while adding enough details so that a technical audience is not bored.

Required documents

Please upload:

- Your slides
- Your code
- The data collected in your test
- Readme including an instruction on how to start your program

via the link provided in the email you received together with this briefing document.

Further Information

Client meeting

You will present your data pipeline at a meeting with MensSana. Here is a list of MensSana staff who will ask questions during the presentation:

- *Jenny Wang* is a Team Lead in IT-Operations and has been with MensSana for a couple of years. She is responsible for running the systems in production. In the last year, a growing portion of her job has been to mitigate risks in the IT-infrastructure. She tends to be critical when introducing new systems to the hospital's infrastructure.
- *Serdar Demir* is Head of Business Intelligence at MensSana. He has been with MensSana for a couple of months and wants to develop MensSana into a data driven company. He is not a very technical person and has the bigger picture in mind. He is known to ask naive questions when it comes to technology.

How to succeed in this case study

We want you to succeed in this case study. That’s why we want to give you some help upfront on how you can impress us:

Data pipeline:

- Don’t be scared of the openly formulated specifications. We want to encourage you to find your own solutions. You're of course free to use any packages.
- Your code should be readable and properly documented. Assume somebody else would have to use it after you.
- Carefully consider any design decisions, you might have to explain them in the presentation
- It is important for us to see which ideas you have, which approaches you take, which aspects you consider and why you do so.

- Surely, you will not be able to implement all ideas for this case study that you have in mind. Write them down or remember them, we will probably ask how your system could be improved and what are its weak points.

In the meeting:

- The meeting will be held in English
- Slides should have a clean design
- Pay attention to spelling and grammar
- Remember that not everyone has a technical background

Be aware that this scenario is not 100% realistic, though it is inspired by our work. If you join idalab, you will also work independently, but you have guidance from more experienced colleagues. Note that the data and the model provided are also strongly abstracted from reality.