Object Recognition of Medical Device Classes

Project Management and Software Development
for Medical Applications

General Info

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Project Abstract

Hospitals collaborate with multiple medical device manufacturers. From the operating room to radiology, different vendors provide tools and equipment for healthcare providers to conduct their work. The scope of this project is to build an AI object recognition system that detects medical devices in images and classifies them into the correct class. This tool could facilitate medical device malfunction reporting since users could connect their report to the correct device class by simply taking a picture of the device.

Background and Motivation

Because of the Medical Device Regulation, all medical devices must now have a Unique Device Identifier (UDI) that contains the Unique Identifier and other information about the device. Part of the UDI is also a machine-readable code, e.g., QR code. Although users could theoretically scan the UDI to get the necessary information, those codes are often on the back of the device or hardly accessible. This is where Object Recognition and Detection can play a crucial role in helping the user take a picture of the device and access its information without the difficulty of scanning the UDI.

The student should develop an Object Recognition Program that allows the user to submit a photo of a medical device, and the system would respond with the type of class it has detected. Class I includes devices with the lowest risk, and Class III includes those with greater risk[1]. For example, the program developed by the student would take a picture of an ultrasound device and associate it with class IIa.

Technical Prerequisites

Programming skills are preferred since the student is supposed to build a program that allows the user to input an image and receive feedback on what device the system detected in the picture. Deep Learning, Machine Learning, or Computer Vision understanding is desired. UX/UI skills are also valuable. The student should also show the limitations of such a system and how these limits could be pushed further!

German language is preferred but not required. The student should stay in contact with Klinikum Rechts der Isar to collect device pictures for preliminary model training. Thus, communication with nurses (in German) might be needed.

References

https://ieeexplore.ieee.org/abstract/document/8627998

https://health.ec.europa.eu/system/files/2021-10/mdcg_2021-24_en_0.pdf

Student's Tasks Description

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[1] https://www.fda.gov/medical-devices/overview-device-regulation/classify-your-medical-device#:~:text=Class%20I%20includes%20devices%20with,I%2C%20II%2C%20and%20III.