



**POLITECNICO DI TORINO**

*Department of Mechanical and Aerospace*

*Master of Science in Biomedical Engineering*

Summary of the Master's thesis:

## **“ Front-End Development of a Web Application for Patient Monitoring after Coronary Angioplasty”**

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Cardiovascular diseases are among the main causes of disability and mortality in Italy, responsible for 35.8% of all deaths.

Cardiofilo project, entering the context of telemedicine, was born in 2017 in the company Abinsula Srl (the name derives from the idea of wanting to recreate a "filo" between cardiologist and patient), with the aim of preventing this type of death by providing a health model for patients suffering from atrial fibrillation, myocardial infarction and / or undergoing coronary angioplasty,

The goal is to provide an additional tool for the secondary prevention of cardiovascular diseases by providing the doctor with technological support for the diagnostic-therapeutic process, at the same time ensuring few follow-up cardiological visits (approximately one visit after 3-6 months or even annually).

Cardiofilo project will allow easier, direct and frequent communication between patient and doctor, through a mobile app (managed directly from the patient's and / or caregiver's smartphone) and a web app (managed by the cardiologist and / or nurses).

The mobile app will allow the patient to enter values such as blood pressure, weight, glucose, which can then be easily sent to the doctor.

The web app, on the other hand, will allow the doctor the possibility to check the parameters in order to keep track of any annoying alterations of the parameters sent and at the same time will allow the doctor the possibility of inserting new treatment plans, new visits, new medical history and personal and health data related to patient, in accordance with the GDPR (General Data Protection Regulation).

In this thesis work, improvements were first made to the descriptive mockups of the web application previously made, with the aim of improving the user experience of the end-user and making the application more intuitive, functional and easy to use.

Starting from the graphic models created, the next step was the Front-End development of some user interfaces of the web application. The goal is to recreate graphical interfaces with well-organized structures, not only working on the visual aspect of the web app, but also ensuring that the user experience runs smoothly, and that navigation is fluid and fast.

The development of the Front-end was achieved using a specific JavaScript library: React, a tool that allows you to build dynamic and increasingly complex user interfaces while remaining simple and intuitive to use. The use of the framework is supported by packages that can be installed via Node.js (an execution environment that allows you to execute Javascript code).

By creating components, React allows you to divide the user interface into independent parts, which can be reused by thinking about each of them in isolation.

The components receive parameters, called props (from "properties" or properties) and return a hierarchy of views to be displayed through the render method which will provide the views that the end user would see on the screen while using the application. User interfaces are assumed to be dynamic as they respond to user actions on the interface and then when data changes, React updates and redraws the components efficiently so that the views shown agree with the changes made.

Finally, after the design and development phase, thinking about a subsequent commercialization of the app and adaptation for a possible CE marking, the attention was focused on the classification of Cardiofilo application as a medical device as it provides an additional tool for the secondary prevention of cardiovascular diseases and thus providing support for therapeutic and diagnostic purposes. In particular, the app can be classified as "software as a medical device" (SaMD) and can be classified as a class IIa device.

Cardiofilo project can be concluded that it was therefore conceived as a real hymn to innovation, prevention and computerization of digital processes in the medical field and in health practice through the support of Internet Technologies tools, specialized personnel and specific communication techniques doctor-patient, facilitating the provision of health services, from diagnosis to therapy.