



# Diabetes prediction of a patient

## Group 06

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# Problem description

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The aim of the project is the exploration, training and serving of a machine learning model for **Time Series Data forecasting** by leveraging Kubeflow's main components

The problem to be solved is a **time-series regression problem** represented by the glucose levels in future instants of times

$$\hat{G}(t + h\Delta(t)) = f\left(G(t), G(t - \Delta(t)), \dots, G(t - k\Delta(t)), I(t), I(t - \Delta(t)), \dots, I(t - k\Delta(t)), C(t), C(t - \Delta(t)), \dots, C(t - k\Delta(t))\right)$$

The main goals are:

- Design a Kubeflow **Pipeline**
- Design and deploy a **Web App**

# Software

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Kubeflow



Arrikto



Visual Studio Code



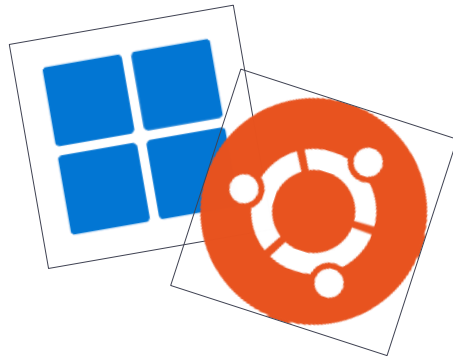
Streamlit



Docker



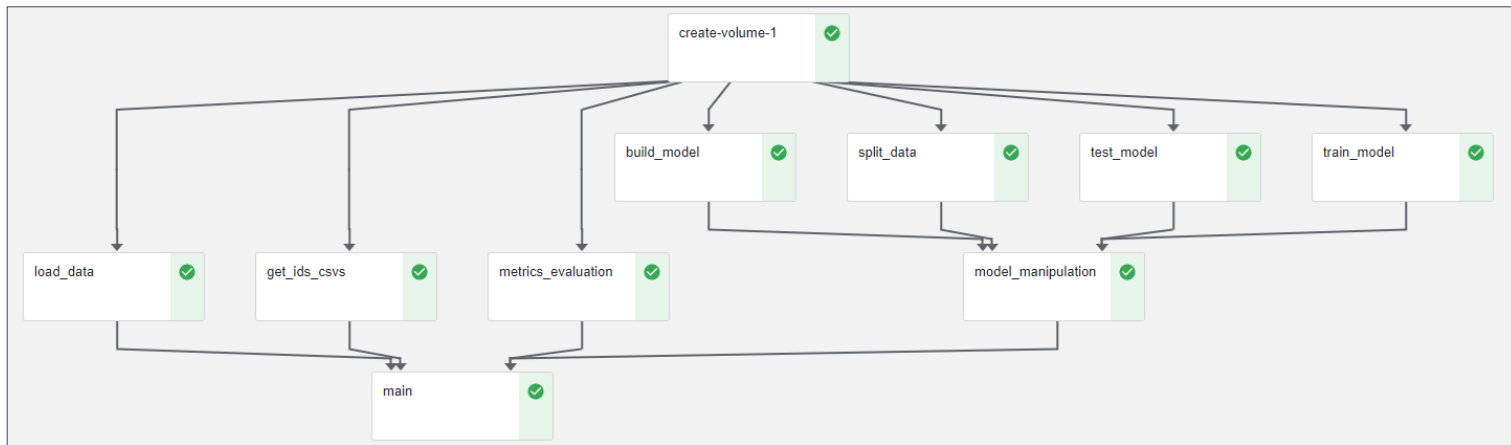
Kubernetes



# Pipeline

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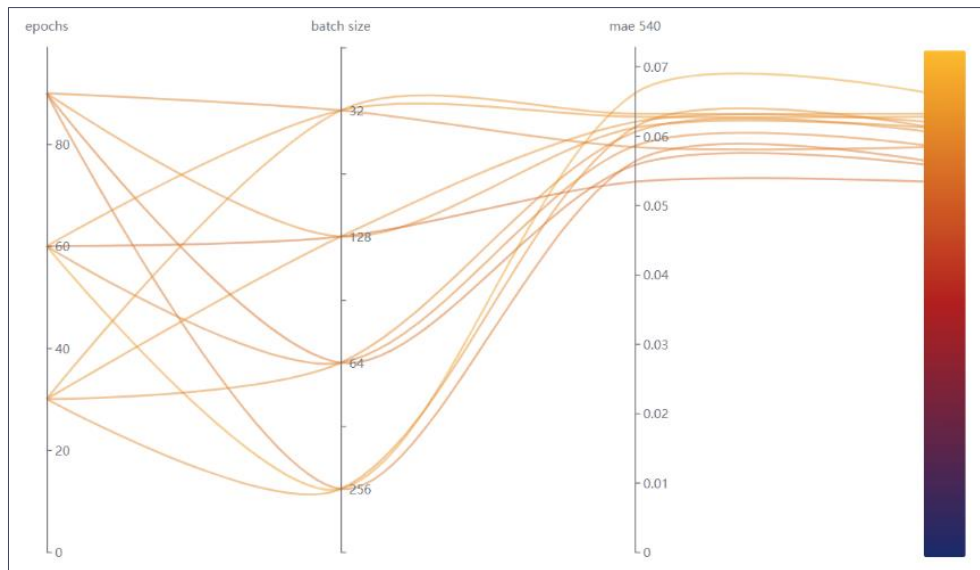
Functional components that make up the Machine Learning workflow



# Pipeline

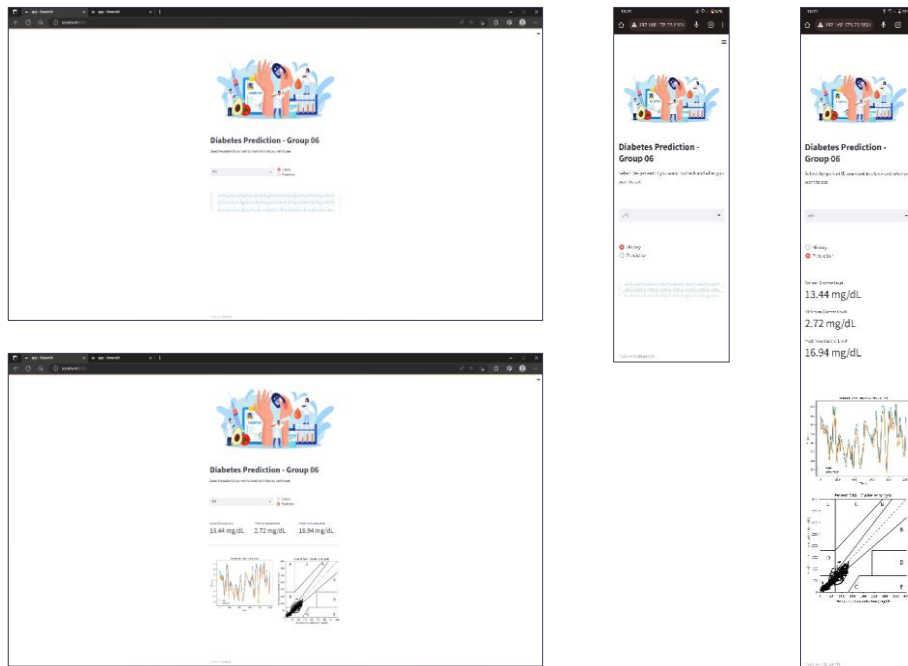
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Automated Hyperparameters Tuning thanks to **Katib**



# Web App


Creation and Testing of the Web App thanks to **Streamlit**



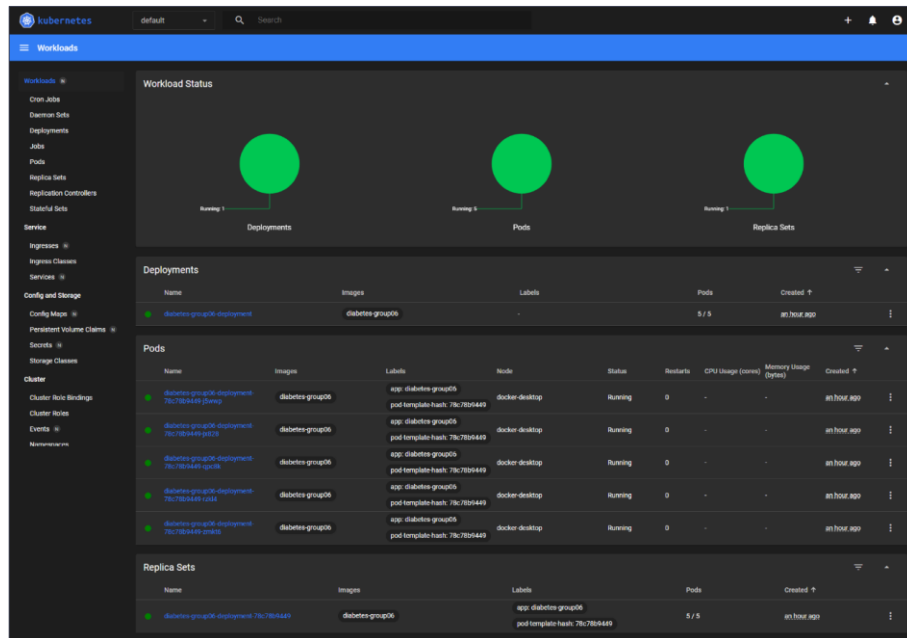
# Web App

Containerization thanks to **Docker**

<input type="checkbox"/>	Name	Tag	Status	Created	Size	Actions
<input type="checkbox"/>	diabetes-group06 5f28ba231c12	latest	Unused	3 minutes ago	4.05 GB	<a href="#">▶</a> <a href="#">⋮</a> <a href="#">🗑️</a>

<input type="checkbox"/>	Name	Image	Status	Port(s)	Last started	Actions
<input type="checkbox"/>	 diabetes-group06 7d571d2a7ee5	diabetes-group06	Running	8501:8501	4 minutes ago	<a href="#">⏏</a> <a href="#">⋮</a> <a href="#">🗑️</a>

Deployment thanks to **Kubernetes**



The screenshot shows the Kubernetes dashboard interface. The top navigation bar includes the Kubernetes logo, a dropdown menu set to 'default', a search bar, and icons for help, notifications, and user profile. The left sidebar contains a 'Workloads' section with links to Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, Replica Sets, and Replication Controllers. Below this are sections for 'Service', 'Ingresses', 'Config and Storage', 'Secrets', and 'Cluster'. The main content area is titled 'Workload Status' and features three large green circular progress indicators for 'Deployments', 'Pods', and 'Replica Sets', each with a 'Running 1' label. Below these are three tables: 'Deployments', 'Pods', and 'Replica Sets'. The 'Deployments' table has columns for Name, Images, Labels, Pods, and Created. The 'Pods' table has columns for Name, Images, Labels, Node, Status, Restarts, CPU Usage, Memory Usage, and Created. The 'Replica Sets' table has columns for Name, Images, Labels, Pods, and Created. All tables show a single entry for 'diabetes-group06'.

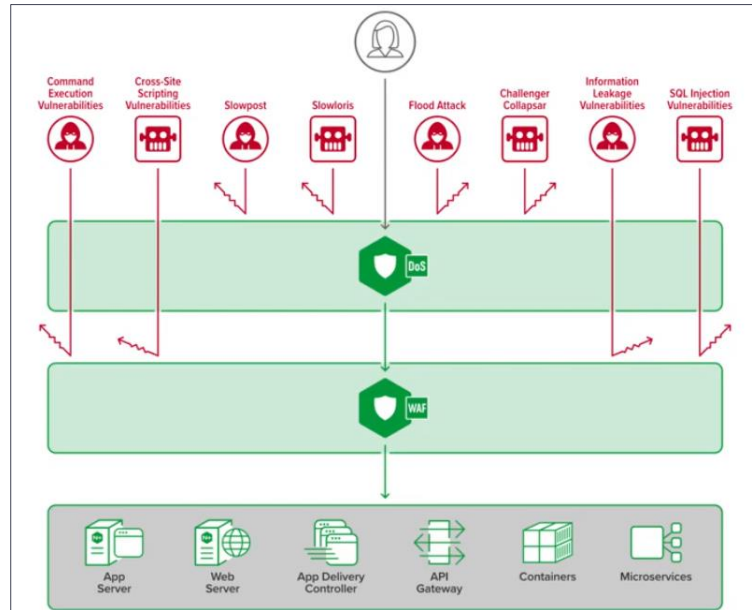
Name	Images	Labels	Pods	Created
diabetes-group06-deployment	diabetes-group06		5 / 5	in hour ago

Name	Images	Labels	Node	Status	Restarts	CPU Usage	Memory Usage	Created
diabetes-group06-deployment-7bc78d449-2wvq	diabetes-group06	app: diabetes-group06 pod-template-hash: 7bc78d449	docker-desktop	Running	0	-	-	in hour ago
diabetes-group06-deployment-7bc78d449-p028	diabetes-group06	app: diabetes-group06 pod-template-hash: 7bc78d449	docker-desktop	Running	0	-	-	in hour ago
diabetes-group06-deployment-7bc78d449-qc08	diabetes-group06	app: diabetes-group06 pod-template-hash: 7bc78d449	docker-desktop	Running	0	-	-	in hour ago
diabetes-group06-deployment-7bc78d449-2d44	diabetes-group06	app: diabetes-group06 pod-template-hash: 7bc78d449	docker-desktop	Running	0	-	-	in hour ago
diabetes-group06-deployment-7bc78d449-2d46	diabetes-group06	app: diabetes-group06 pod-template-hash: 7bc78d449	docker-desktop	Running	0	-	-	in hour ago

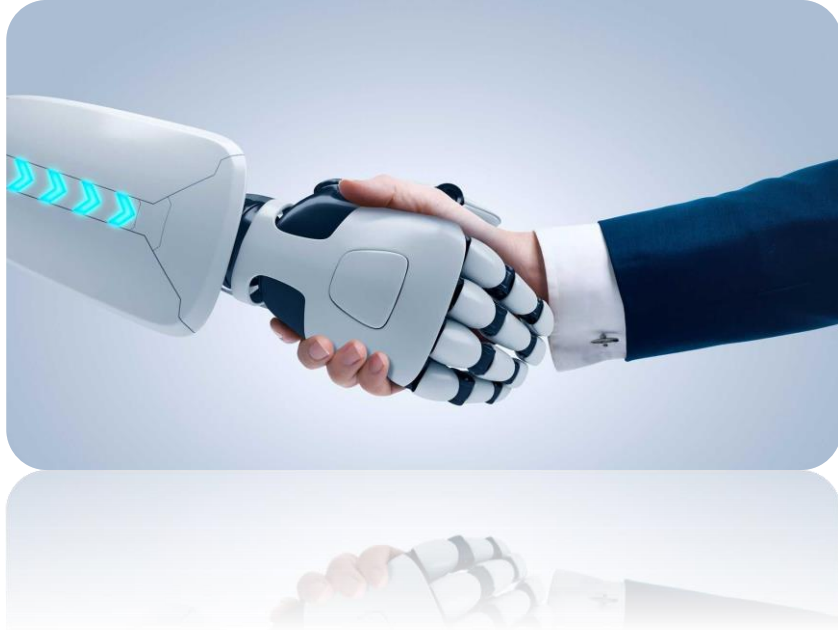
Name	Images	Labels	Pods	Created
diabetes-group06-deployment-7bc78d449	diabetes-group06	app: diabetes-group06 pod-template-hash: 7bc78d449	5 / 5	in hour ago

# Security

NGINX to protect Kubernetes Apps (WAF and DoS)







# Thanks for the attention

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