



IoT project

IoT: Bernardo Sata, Gonçalo Fontes Neves

Data Manage: Alberto Gonzalez, Seungah Lee

AI: Brian Franklin, Mohamed Eltablawy, Adrien Mencik

GUI: Gabriella Catalan, Aizar Berlanga

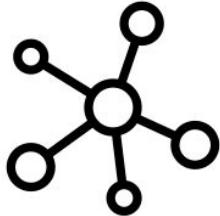
Introduction

Project name : Factory of the future

Project goals : Deploy a system to monitor and control a finite set of factories remotely.

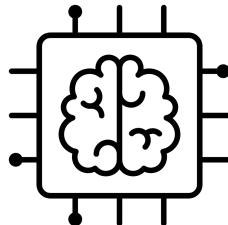
Description: This project will consider two different factories. Factory ‘Le Monde’ and ‘Chocolatine’. Both factories will be monitored thanks to a redundant system of three environmental sensors. After merging the data of the sensors using a clustering algorithm, it is sent to a server which is in charge of storing the information and send it back to a remote display and to a prediction block. The server also sends data back to the factories regarding the state of two actuators: a fan and a LED.

Introduction



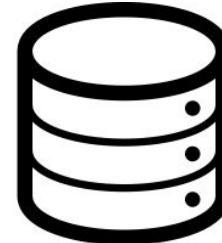
IoT

Bernardo Sata
Gonçalo Fontes Neves



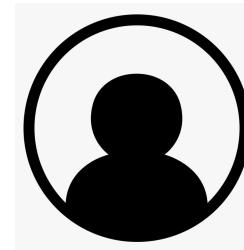
AI

Brian Franklin
Mohamed Eltablawy
Adrien Mencik



Data Management

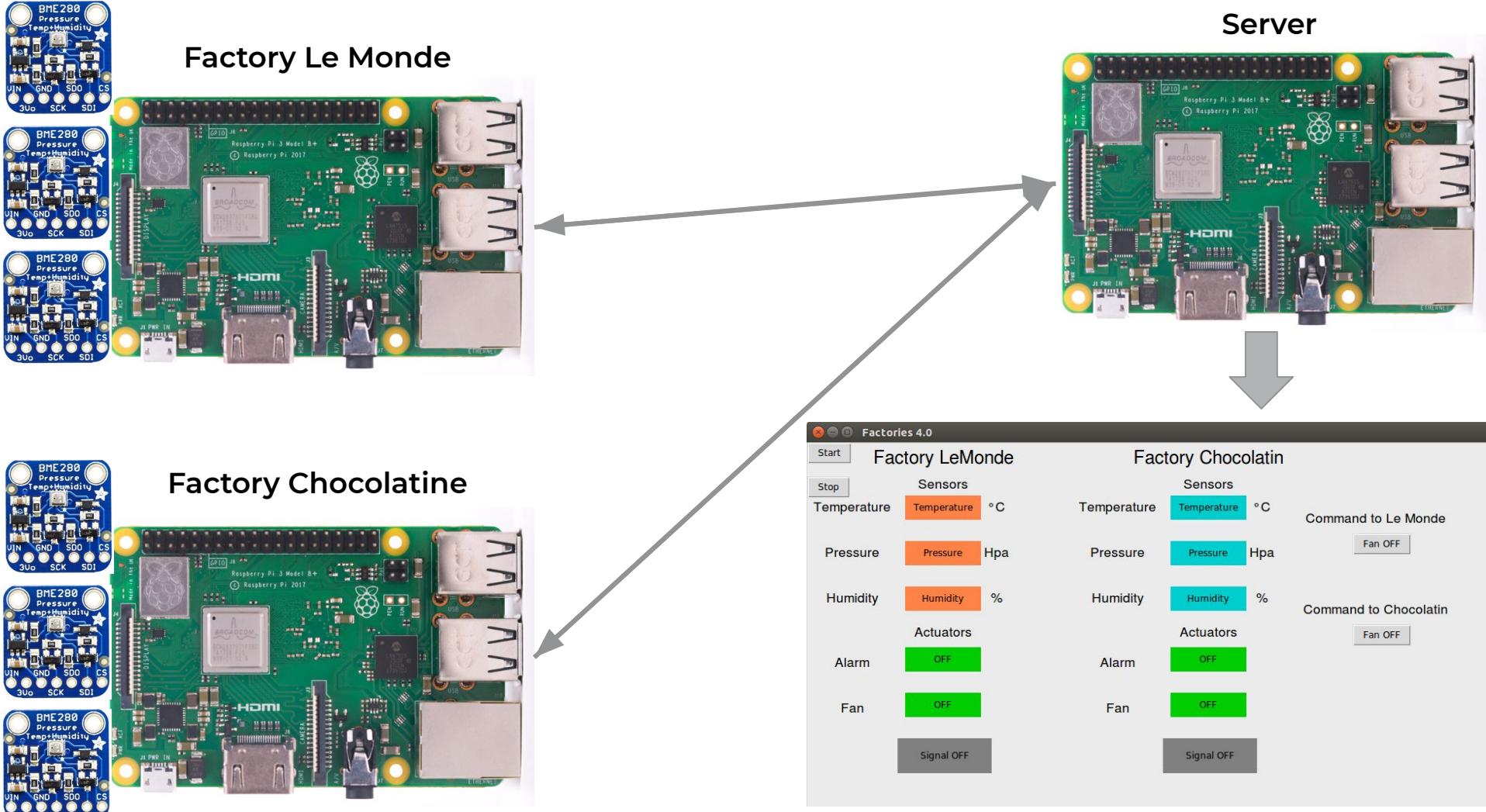
Alberto Gonzalez
Seungah Lee



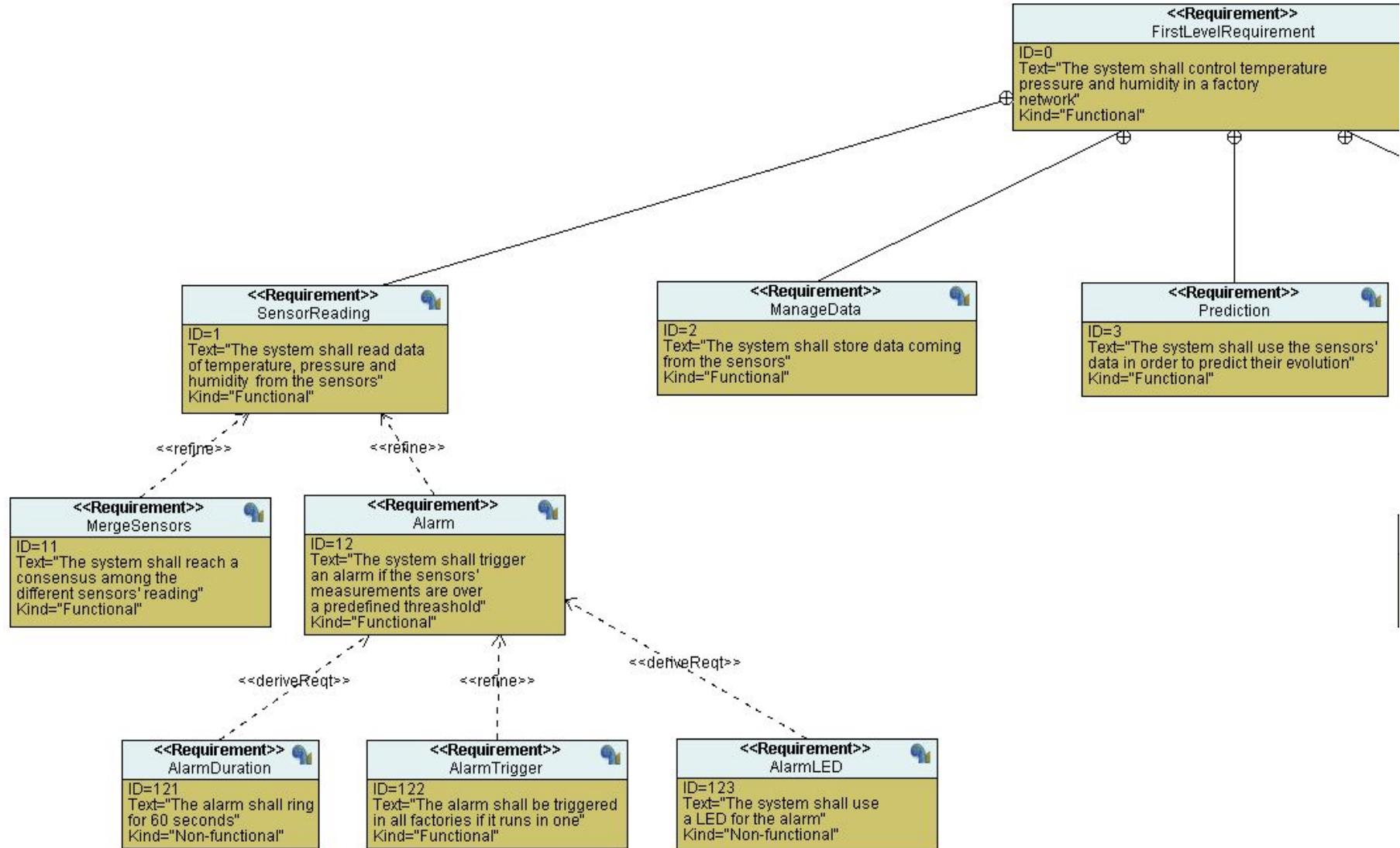
GUI

Gabriella Catalan
Aizar Berlanga

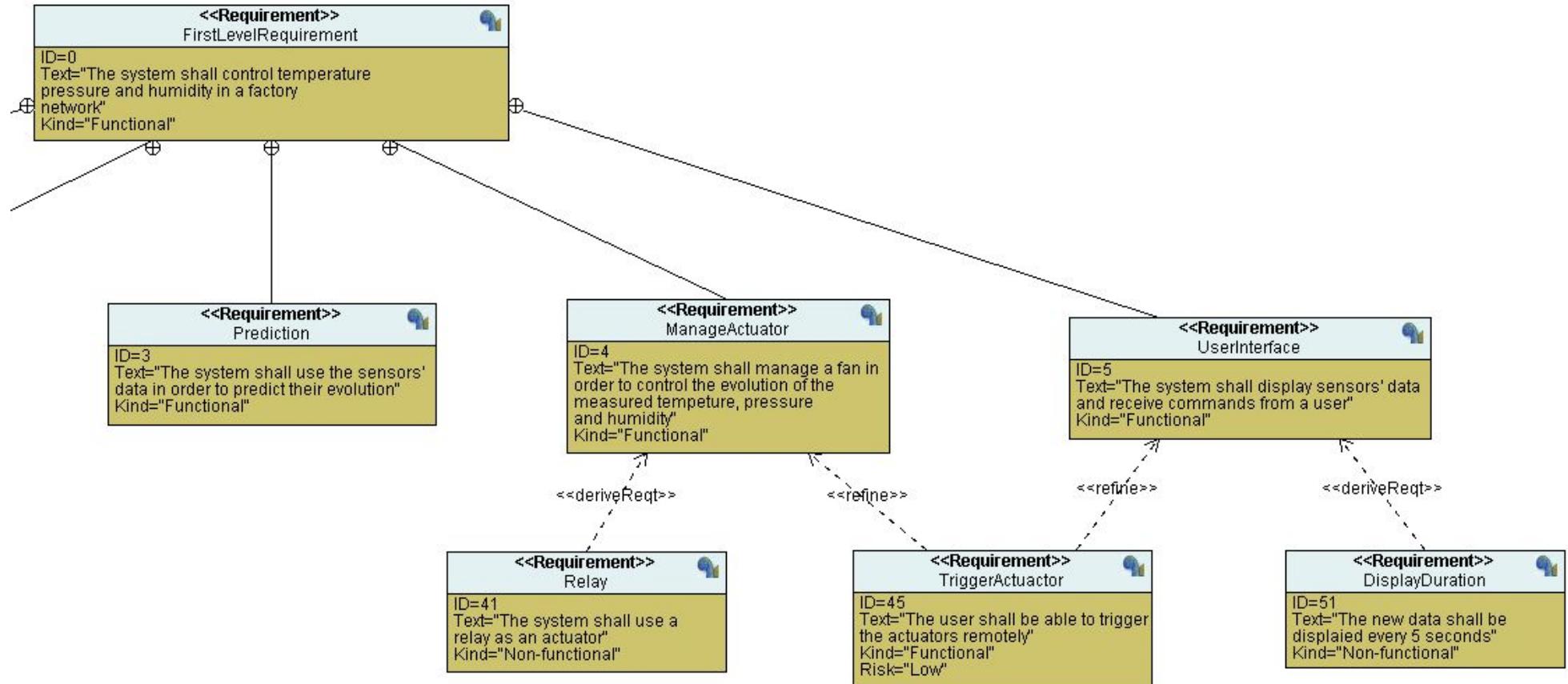
System Configuration



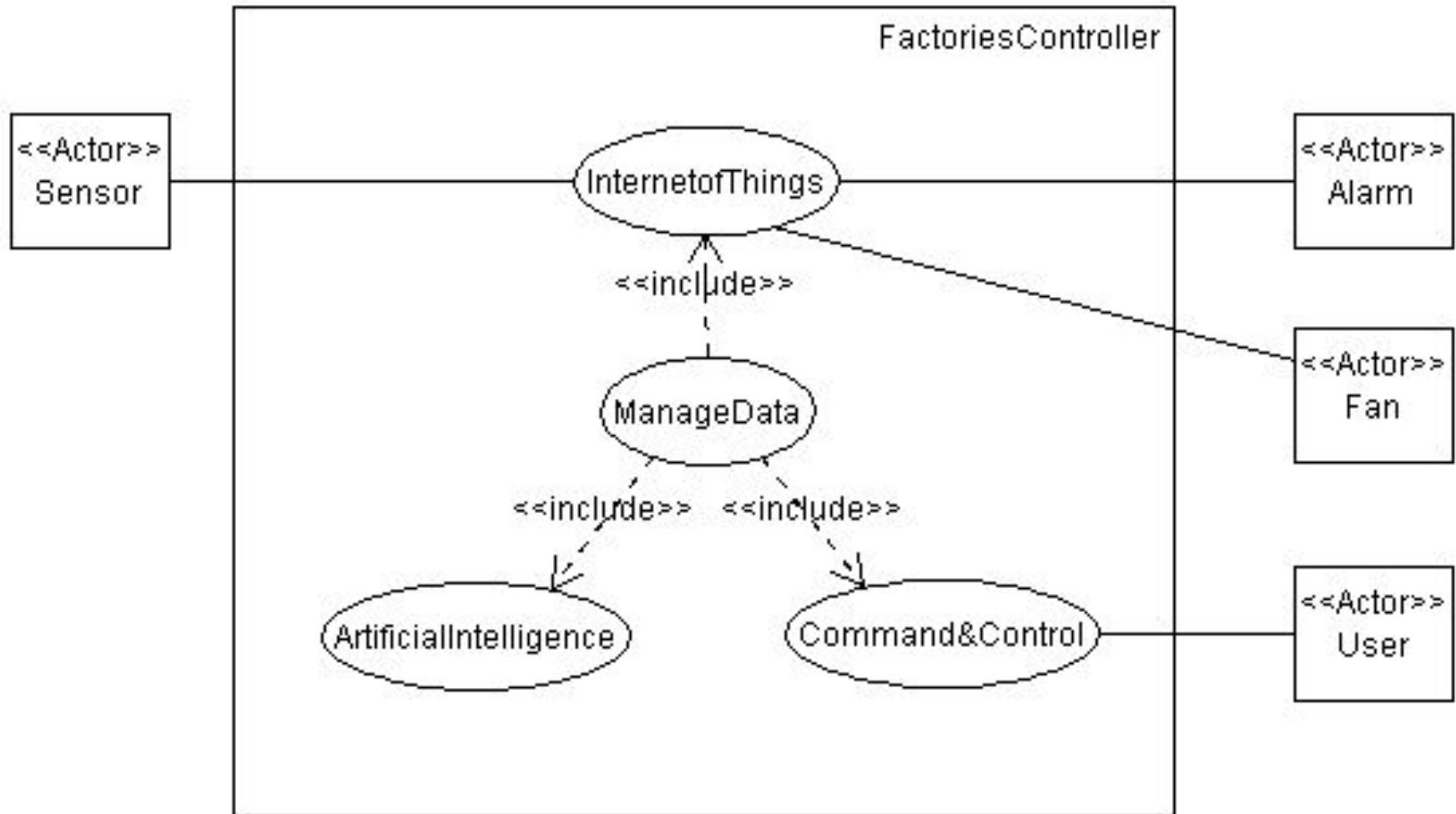
Conceptual Analysis: Requirement Diagram



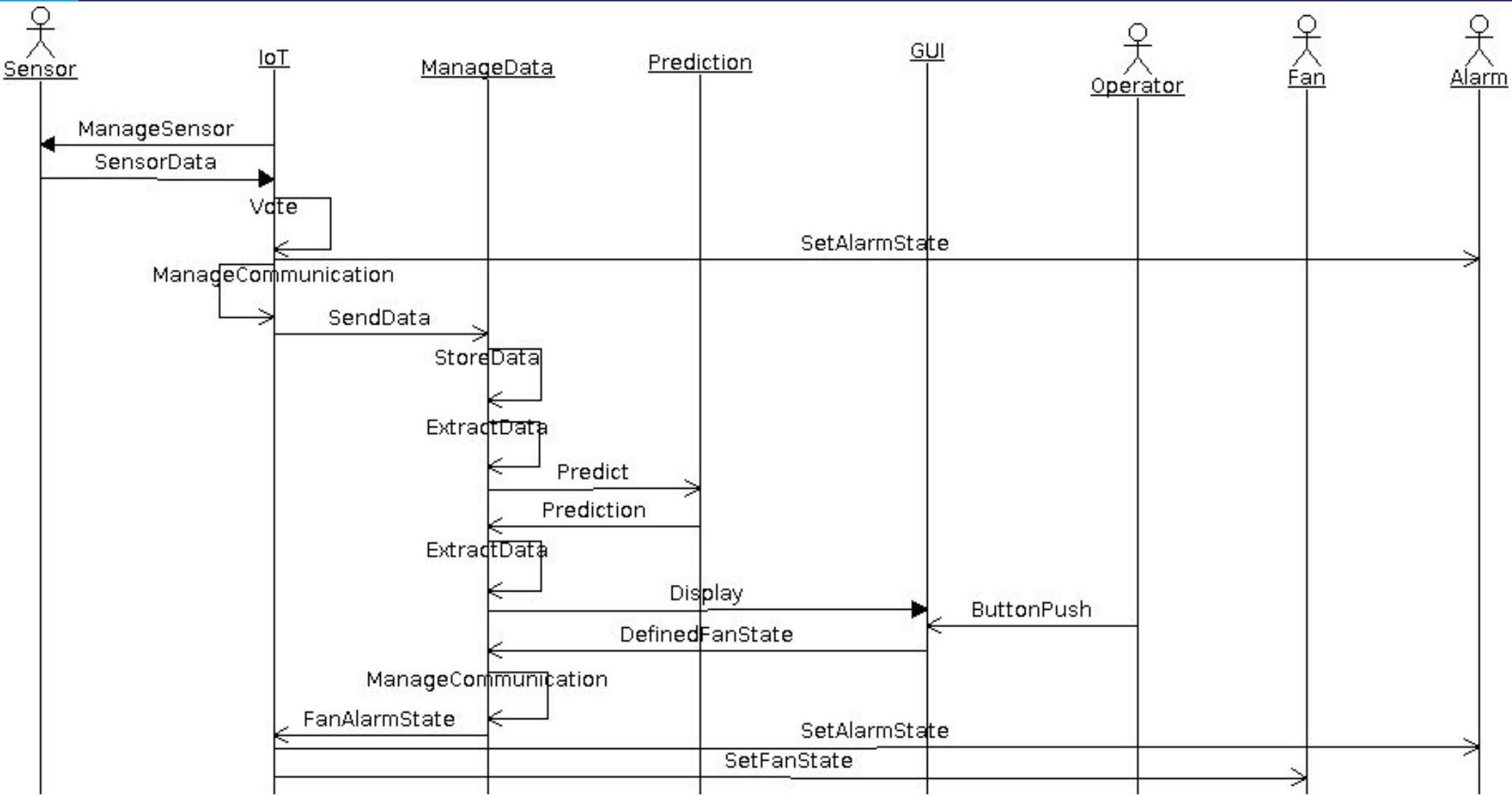
Conceptual Analysis: Requirement Diagram



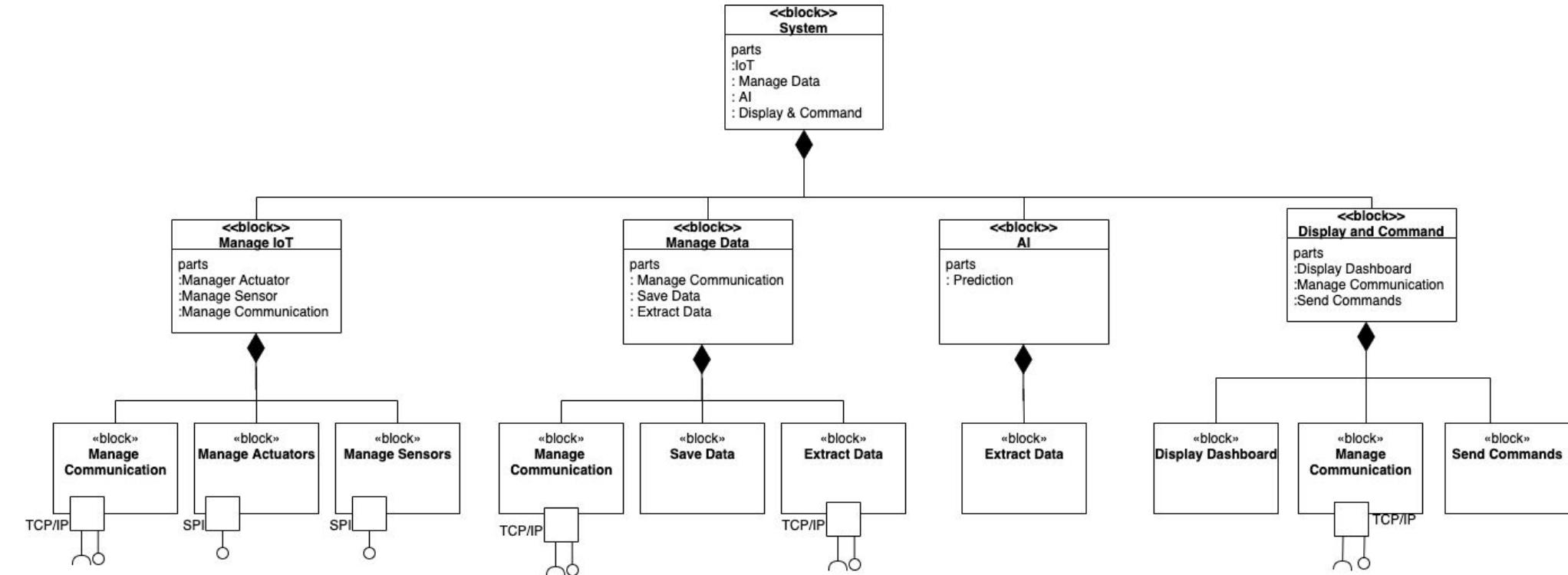
Functional Analysis: Use Case Diagram



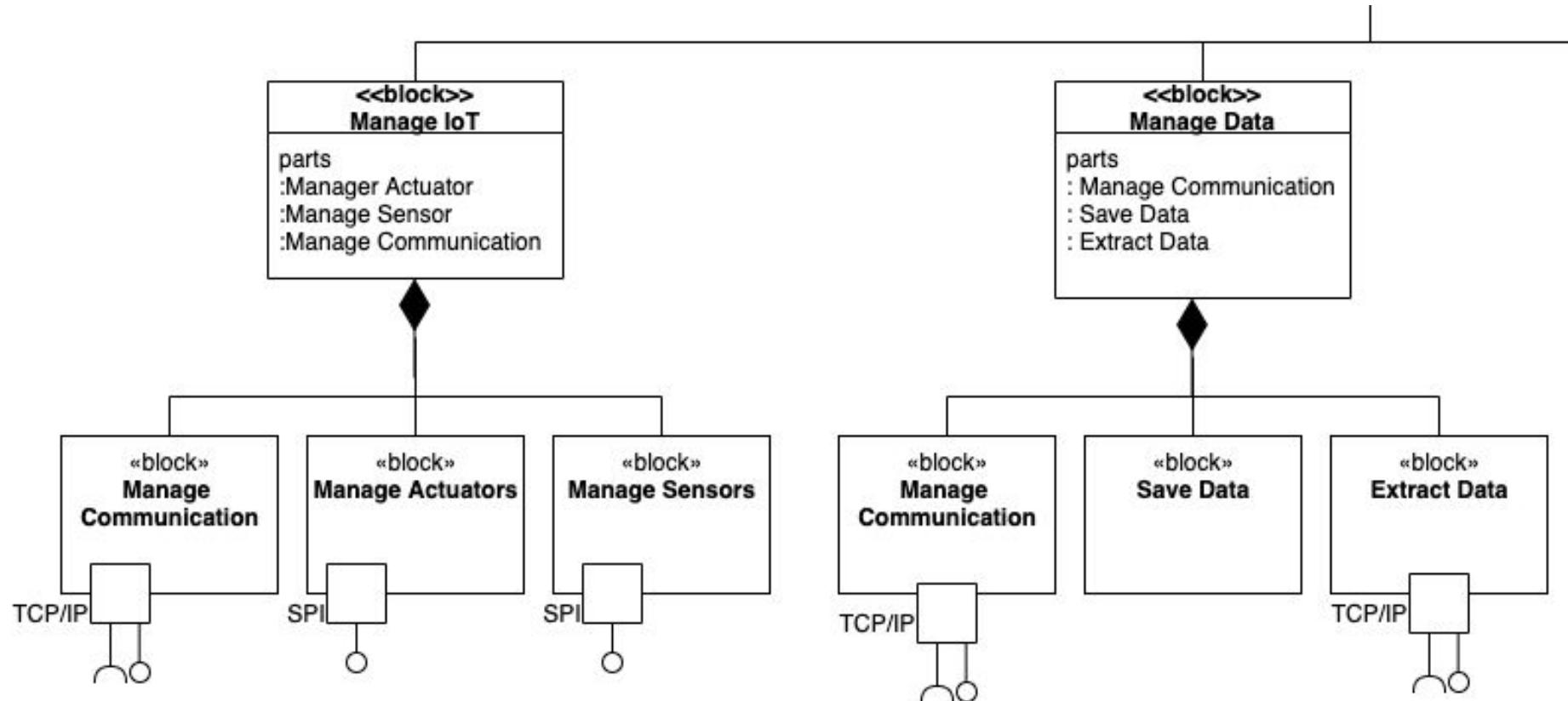
Functional Analysis: Sequence Diagram



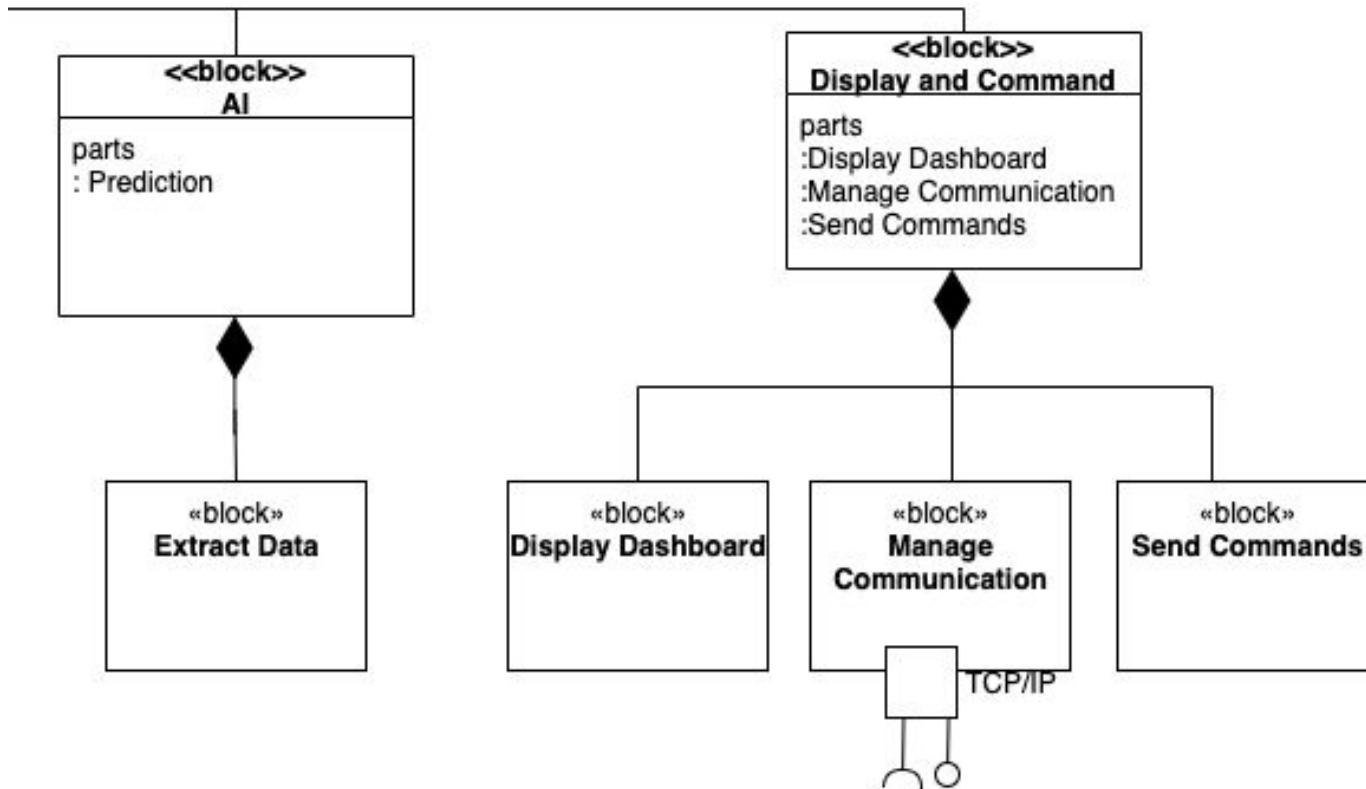
Functional Analysis: Block Diagram



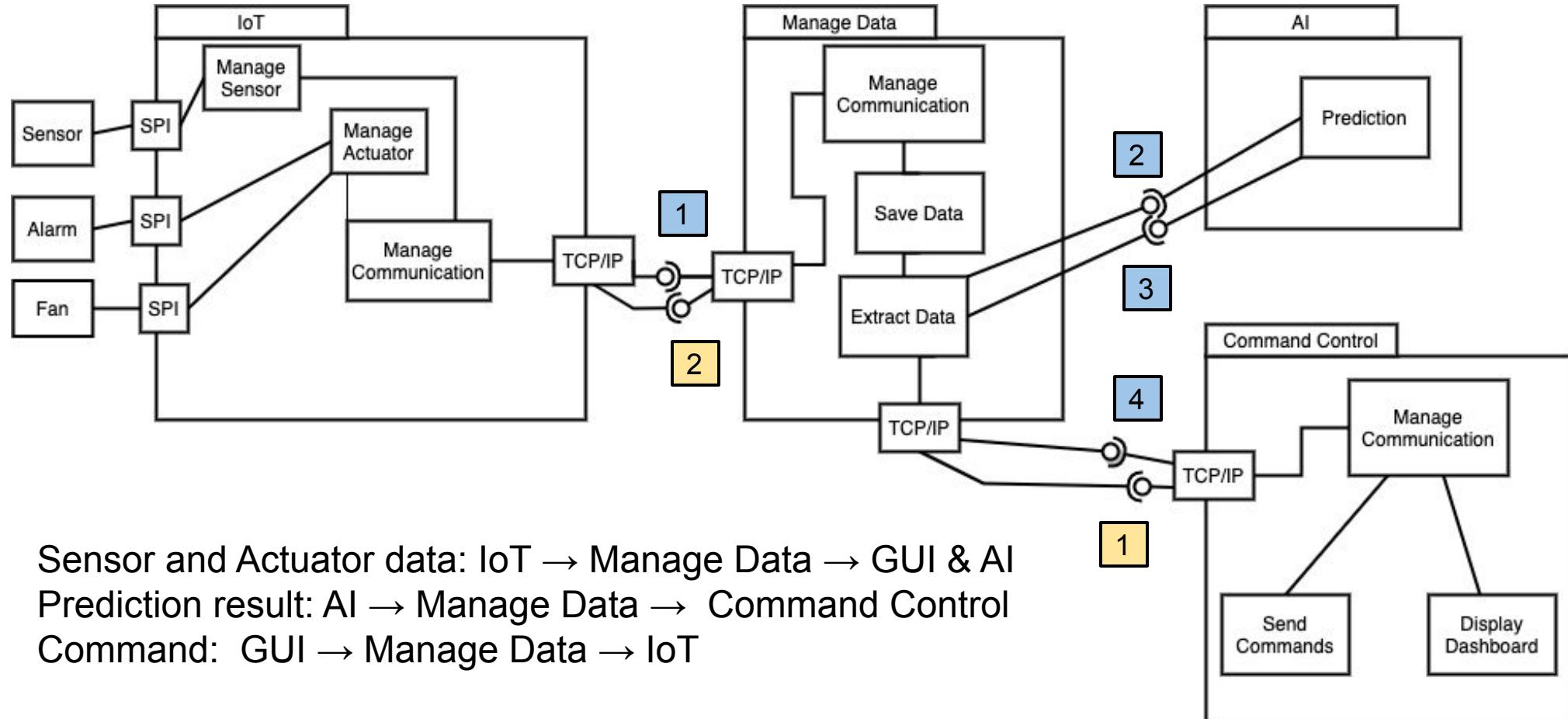
Functional Analysis: Block Diagram



Functional Analysis: Block Diagram



Functional Analysis: Internal Block Diagram



Sensor and Actuator data: IoT → Manage Data → GUI & AI

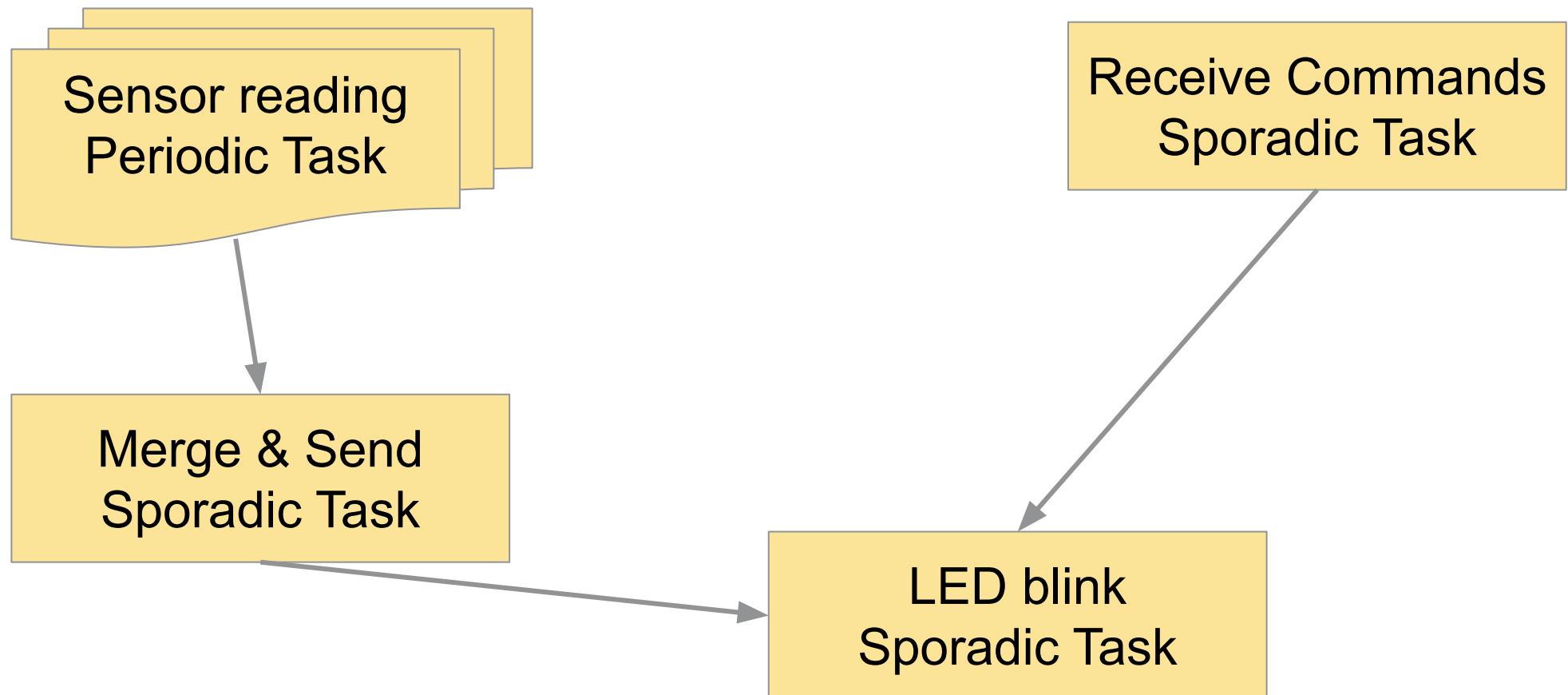
Prediction result: AI → Manage Data → Command Control

Command: GUI → Manage Data → IoT

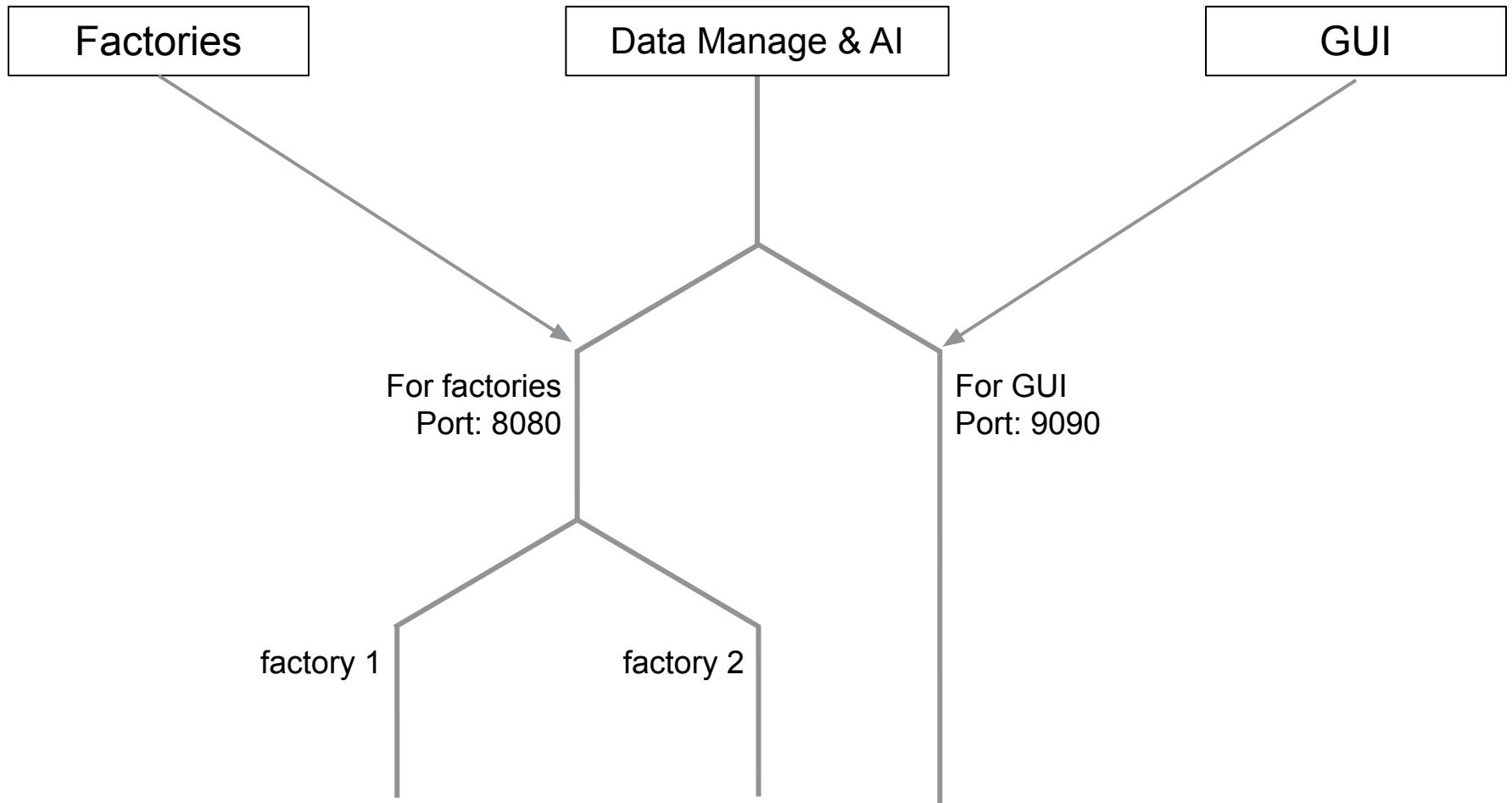
Blue box : sensor, actuator, prediction

Yellow box: commands

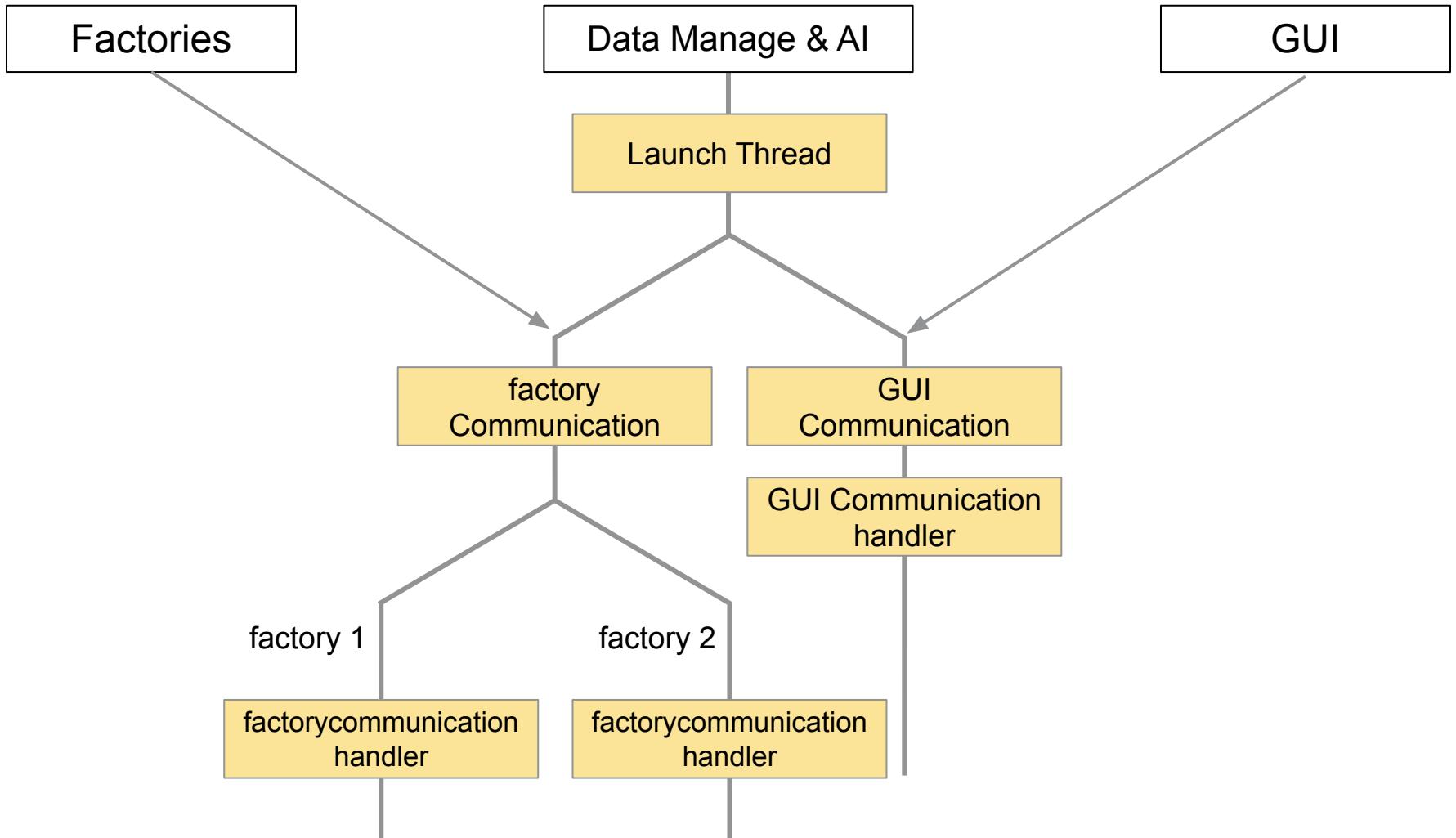
IoT Factories



Data Manage

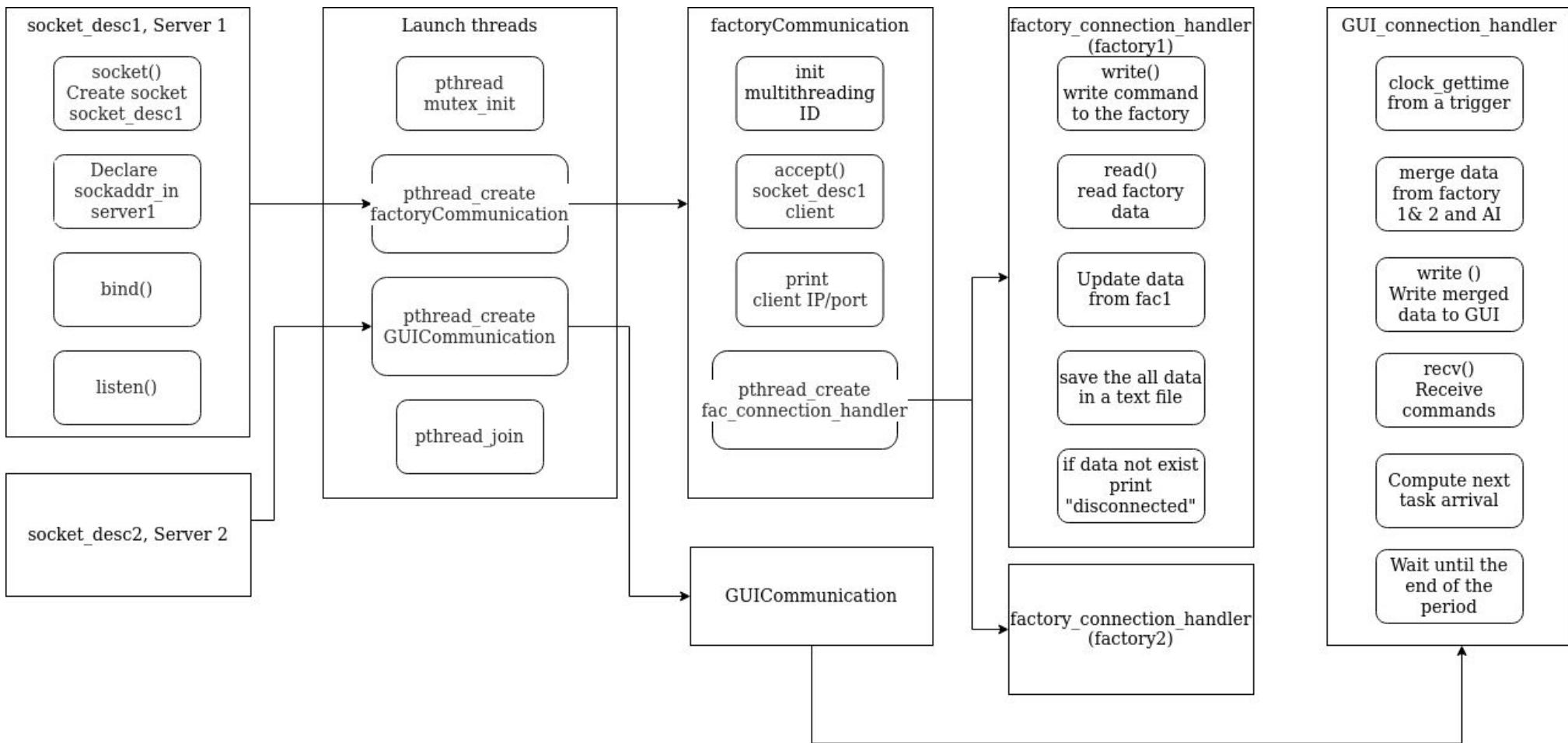


Data Manage



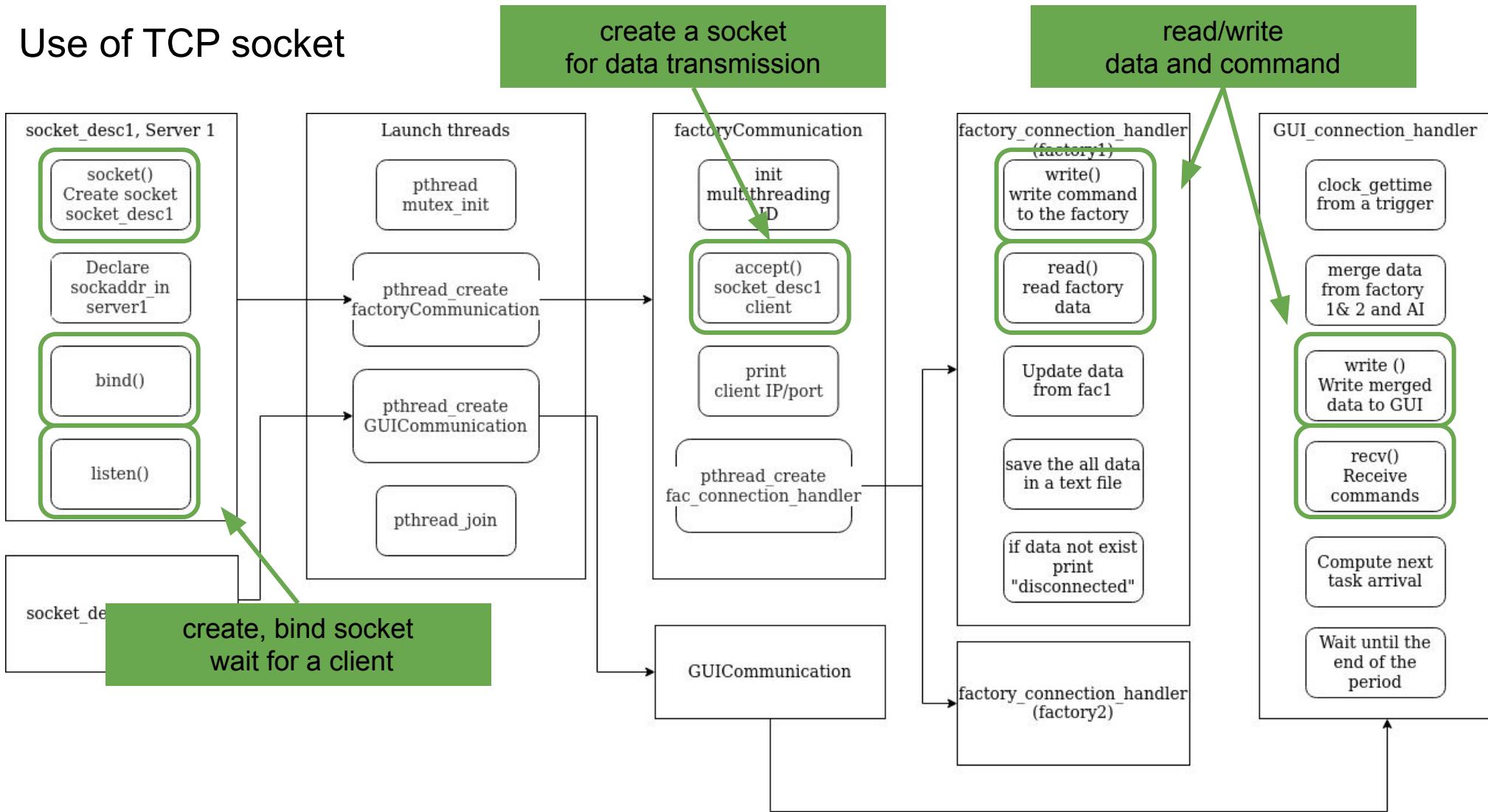
Data Manage

Flow chart



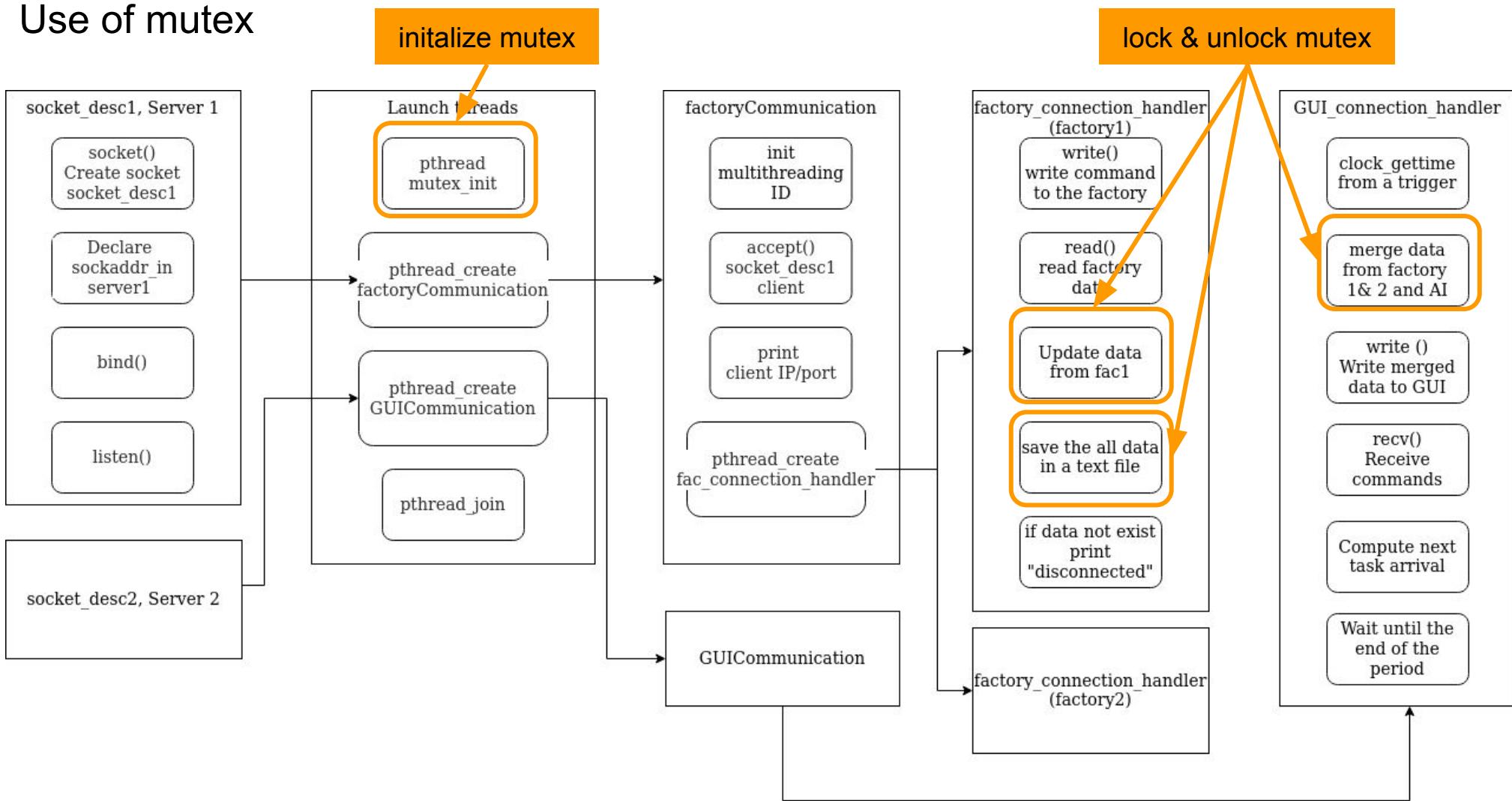
Data Manage

Use of TCP socket

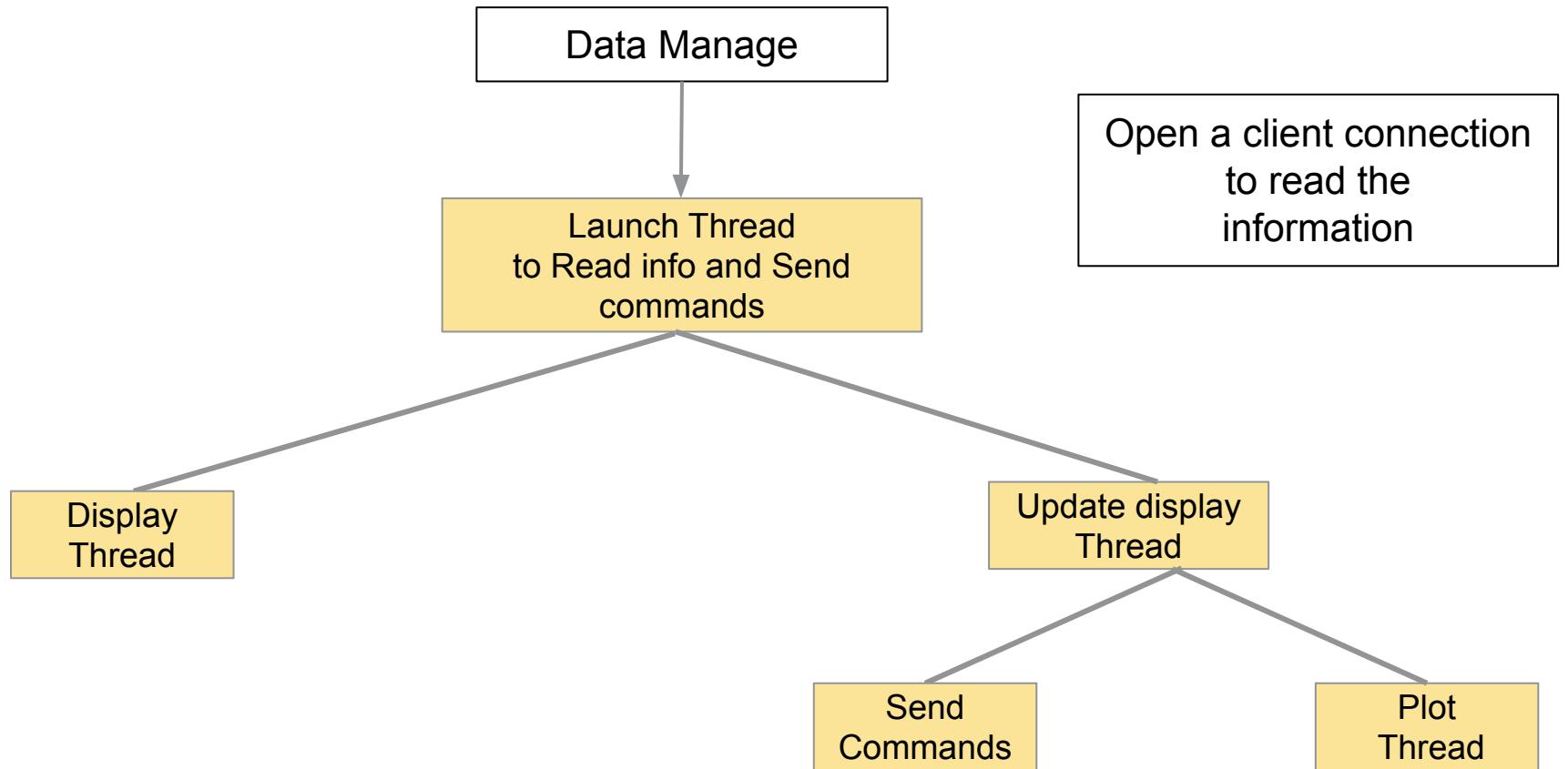


Data Manage

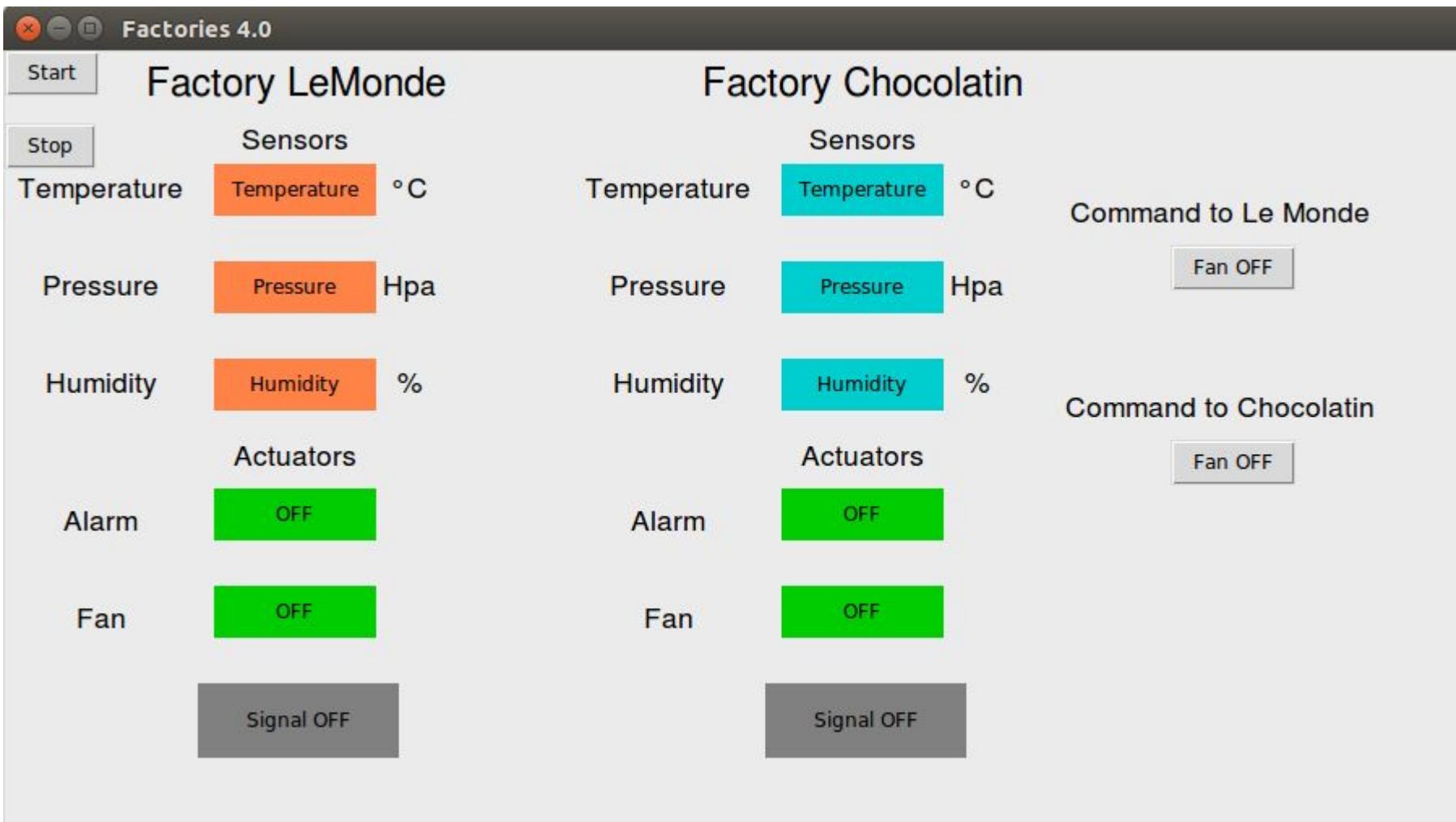
Use of mutex



Graphical Interface



GUI



- AI's purpose: To predict values based on received data:
 - Time, pressure/humidity/temperature.
 - Data received as a structure.
 - Prediction made using a linear regression model. This model is computed using the GSL library.
 - Data received every 5 seconds.
 - Prediction done at every reception of data.

AI : The code

Link with the data processing:

-the function Pred() is called after reception of data.
The data comes as a structure.

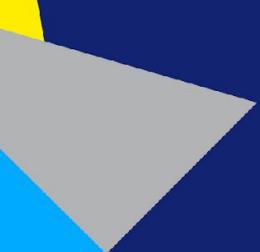
-The structure is divided in values of time pressure,
humidity and temperature. These values are swiped
in the existing array and used in the function
argument.

-Pred() takes into argument arrays of the time and
the received value of data to be predicted.

AI : The function Pred

The function Pred():

- uses the gsl function `gsl_fit_linear` to calculate the linear regression.
- returns the values of temperature, pressure or humidity predicted as double, later sent to GUI.



THANK YOU