DEVELOPMENT AND TESTING OF **INDIVIDUAL LEVEL WARNING SYSTEMS** FOR FATTENING PIGS

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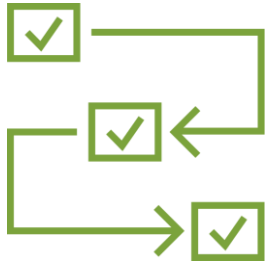# INTRO

Can we go one step further?

Data gathering   Analytics   Info to farmer

GOAL: monitor each pig in the barn and detect individual problems related to health, welfare and productivity

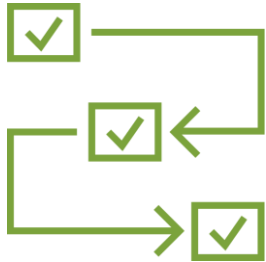=> tool to support farmers' observations

MATERIALS & METHODS

5 rounds

120 pigs/round

Previous work: PIGWISE project and PhD Maselyne, 2016

MATERIALS & METHODS

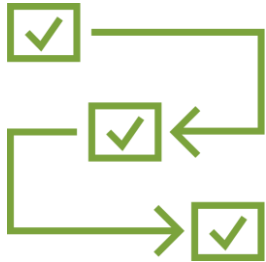**5 rounds**

120 pigs/round

5 real-time data sources

- Individual feeding stations
- RFID antennas
- Climate sensors
- Individual weighting scales
- Flowmeters

MATERIALS & METHODS

- Caretakers (daily), 10 min
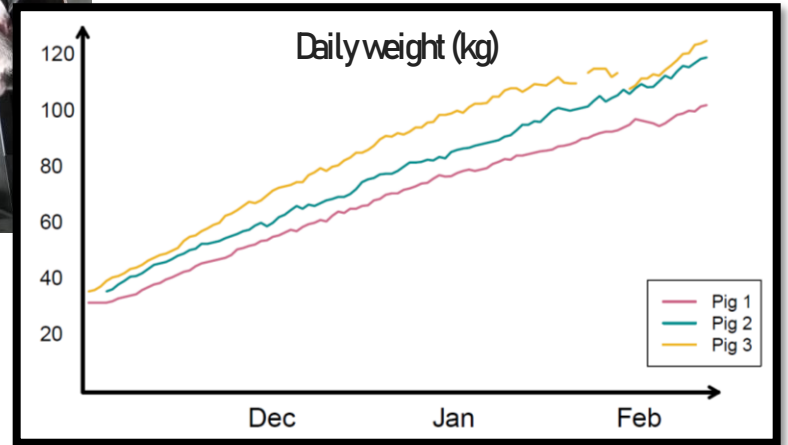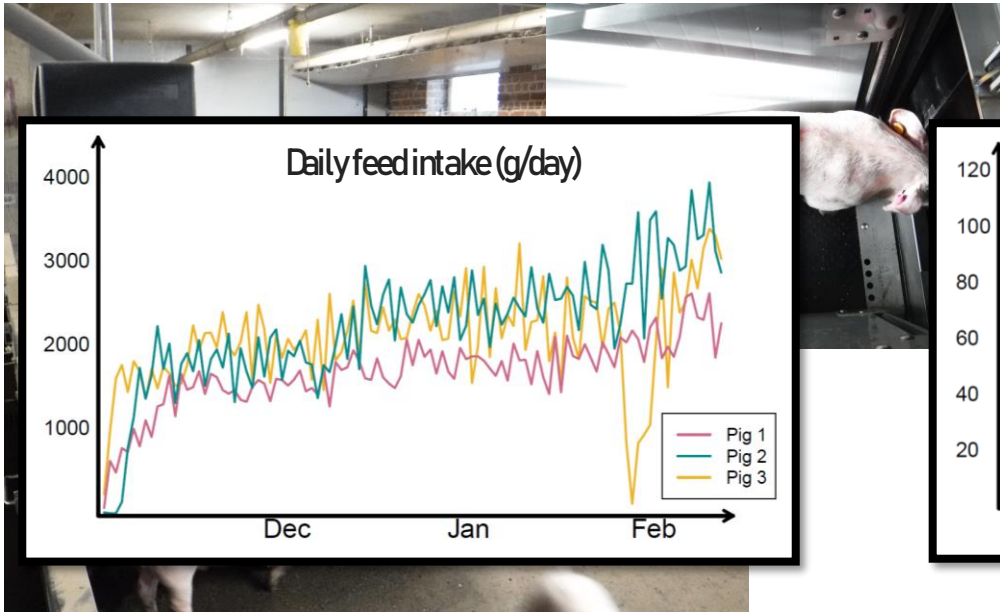- Researchers (3x/week), 1 h

5 rounds

120 pigs/round
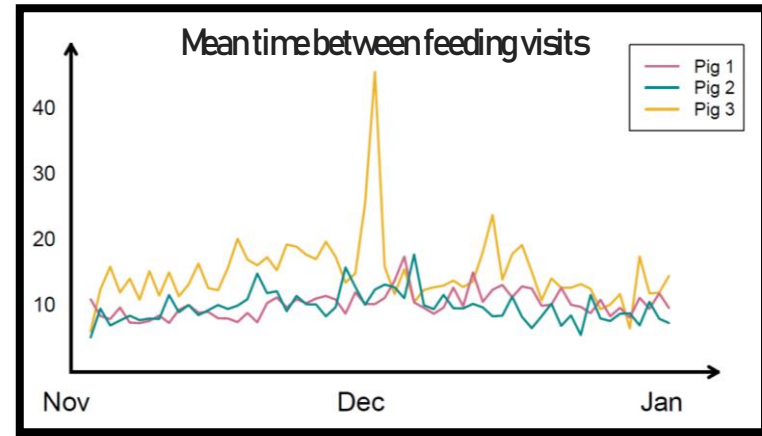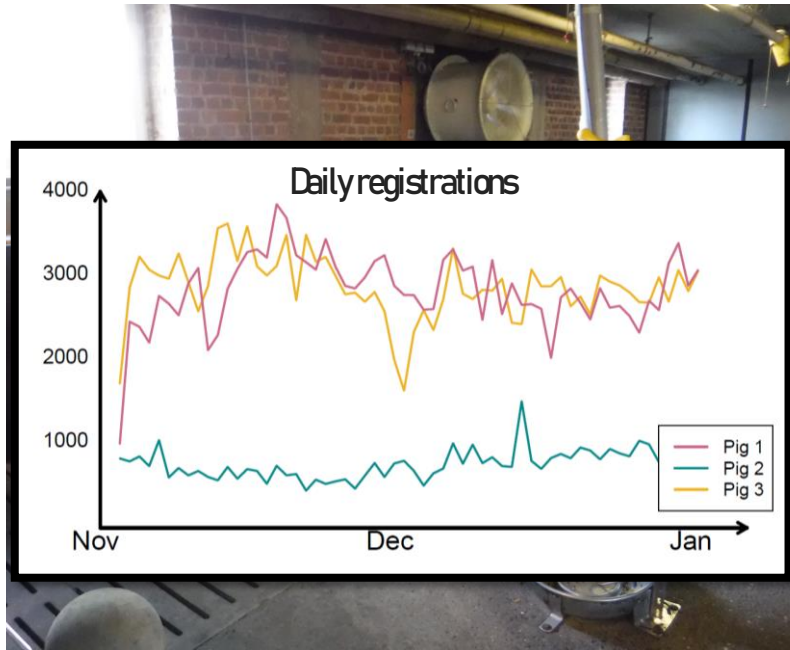
5 real-time data sources

visual observations

Mon	Tue	Wed	Thu	Fri	Sat	Sun
C + R	C	C + R	C	C + R	C	C

INDIVIDUAL FEEDING STATIONS

NEDAP feeding stations x 4 pens +
low frequency RFID tags

RFID FEEDER

Daily registrations
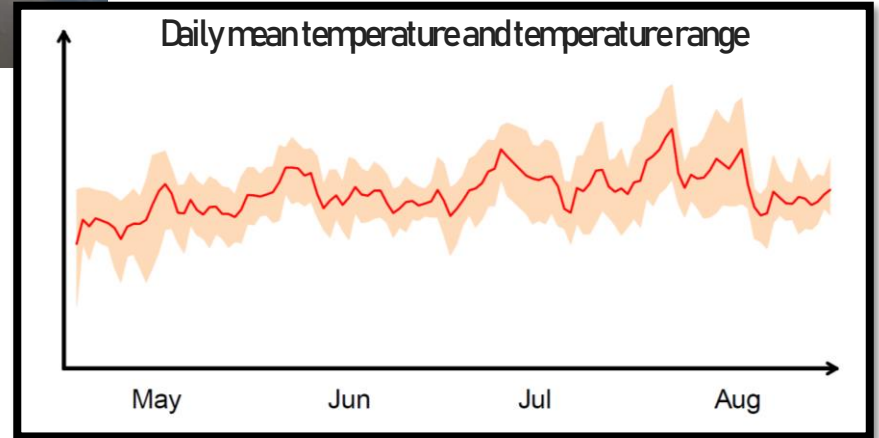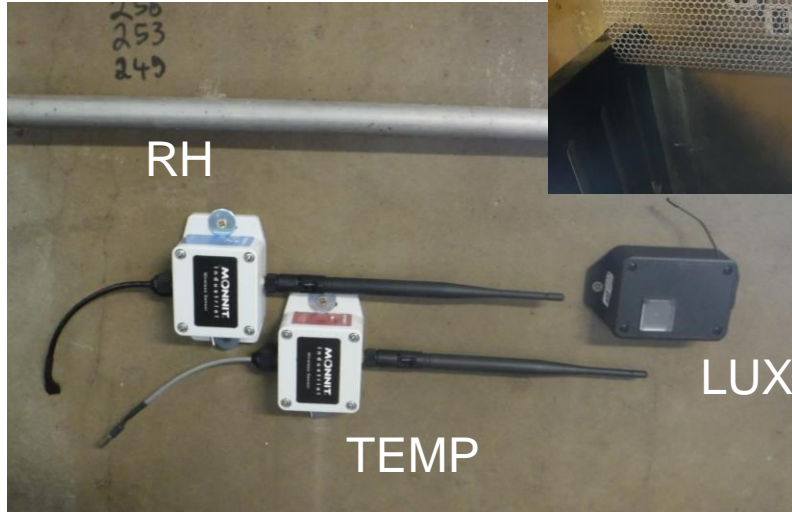

Mean time between feeding visits

Feeder with RFID antenna x 4 pens +
high frequency RFID tags

RFID DRINKER + FLOW METER
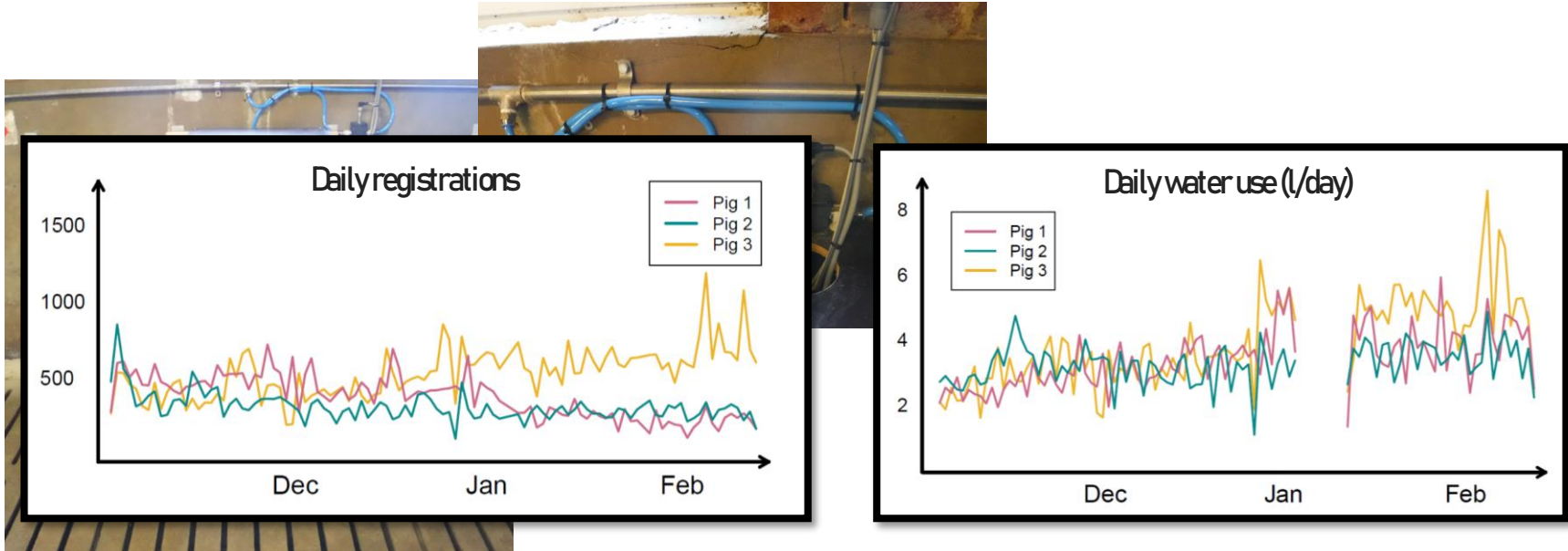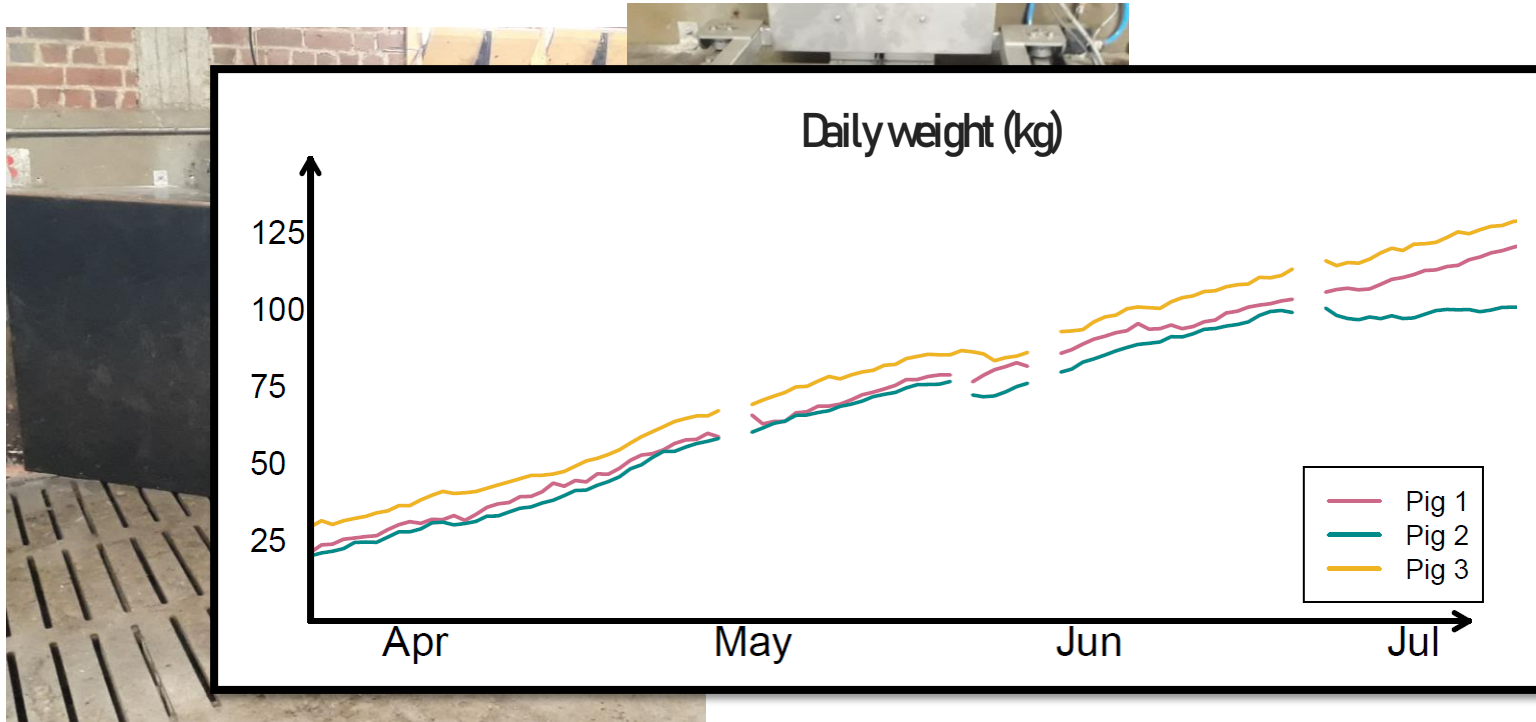

Nipple drinker with RFID antenna x 8 pens +
flowmeter +
high frequency RFID tags

CLIMATE SENSORS

RH

TEMP

LUX

CLIMATE SENSORS
x 4 locations

Daily mean temperature and temperature range

May   Jun   Jul   Aug

NEW: INDIVIDUAL WEIGHING SCALE

WARNING SYSTEM CURRENTLY TESTED

1. Algorithm based on feed intake
2. Algorithm based on time between feeding visits

Alert goes to caretakers if:
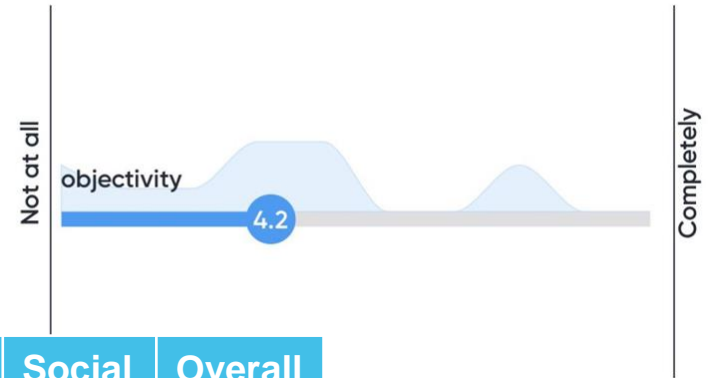
- combined warning for both algorithms

OR

- 2 warnings in 3 days for either one algorithm

VALIDATION METHOD

How easy is it to remain objective?

- Very hard job to do…
- No gold standard exists at all!
- Validation by researchers

Mobility	Respiratory	Digestive	Ear- and tail biting	Social	Overall health
Lameness	Coughing	Diarrhea	Biting	Being bullied	Skinny

- Validation by caretakers

Discussion at PLF workshop (Univ of Copenhagen, 2019) **-> check poster 45.15**

Not at all

objectivity

4.2

Completely

RESULTS CARETAKERS

- Daily alerts for a randomly chosen 50% of the pigs

- 34 alerts checked, of which

  - 6 not eating

  - 7 lame, treated

  - 4 lame, not treated   => 62 % correct alerts

  - 3 technical problems

  - 1 late alert

  - 13 no problem observed

EXAMPLE: NOT EATING

Daily feed intake (g/day)

Mean time between feeding visits (min)
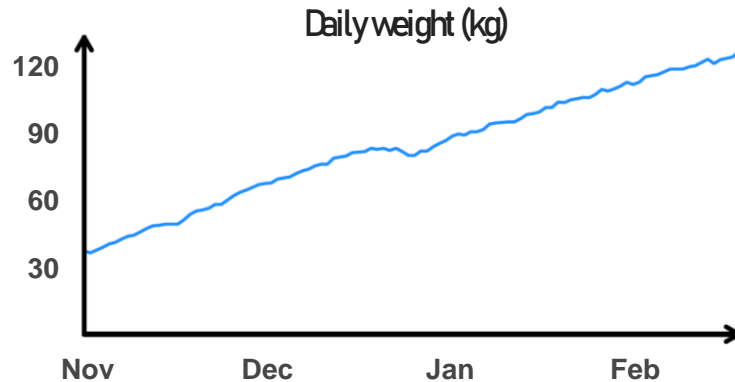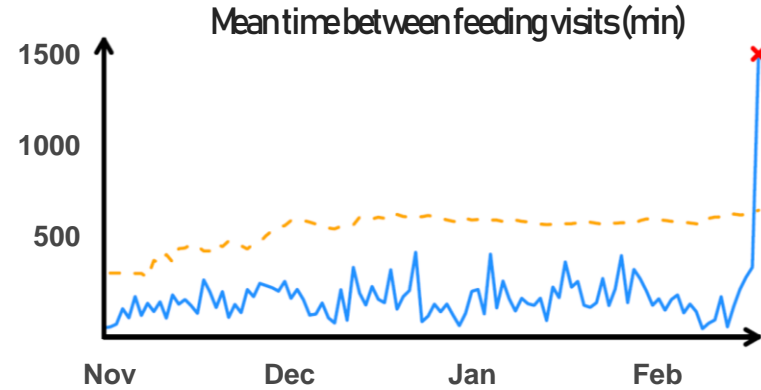
Daily weight (kg)
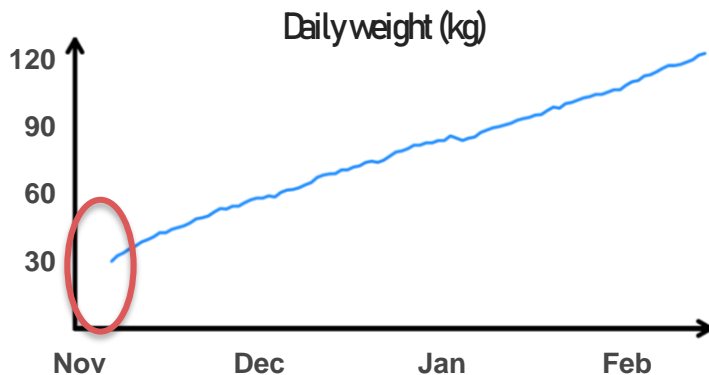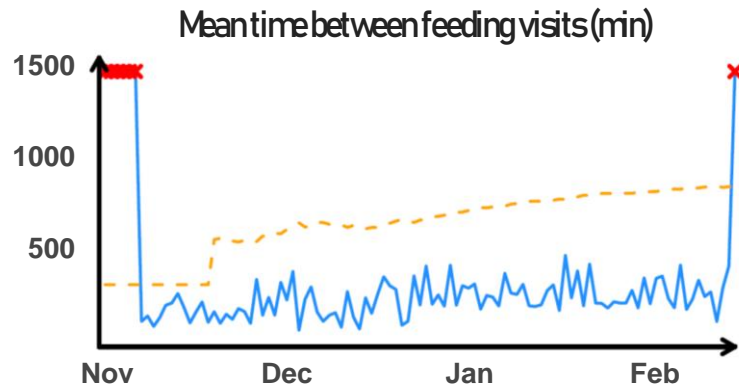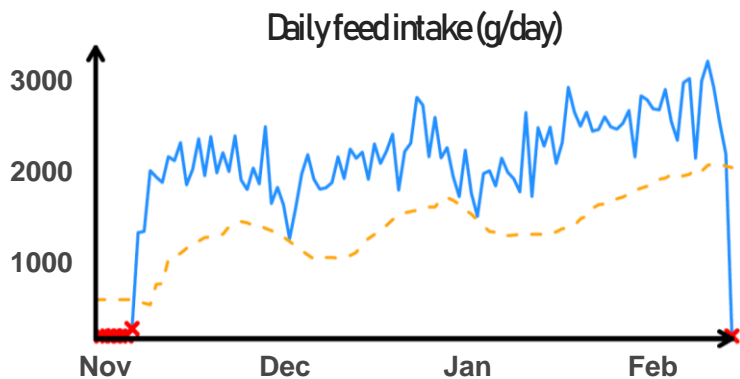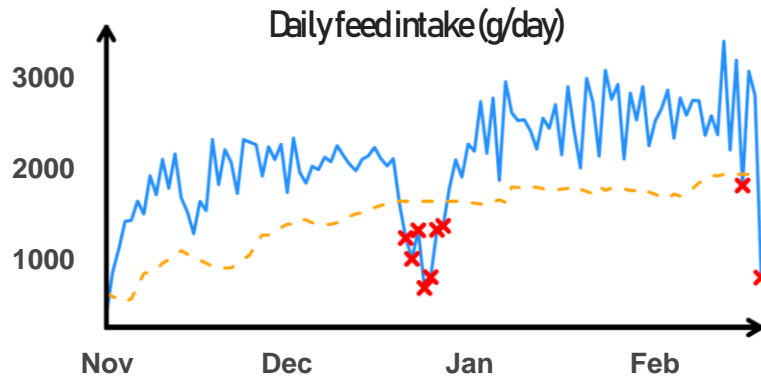
Alerts: Necessary?
- **09/11:**   No
- **10/11:**   No, but put in feeding station
- **11/11:**   No
- **12/11:**   No, but put in feeding station
- **13/11:**   Yes, put in feeding station

EXAMPLE: NO PROBLEM OBSERVED

Daily feed intake (g/day)

Mean time between feeding visits (min)

Daily weight (kg)
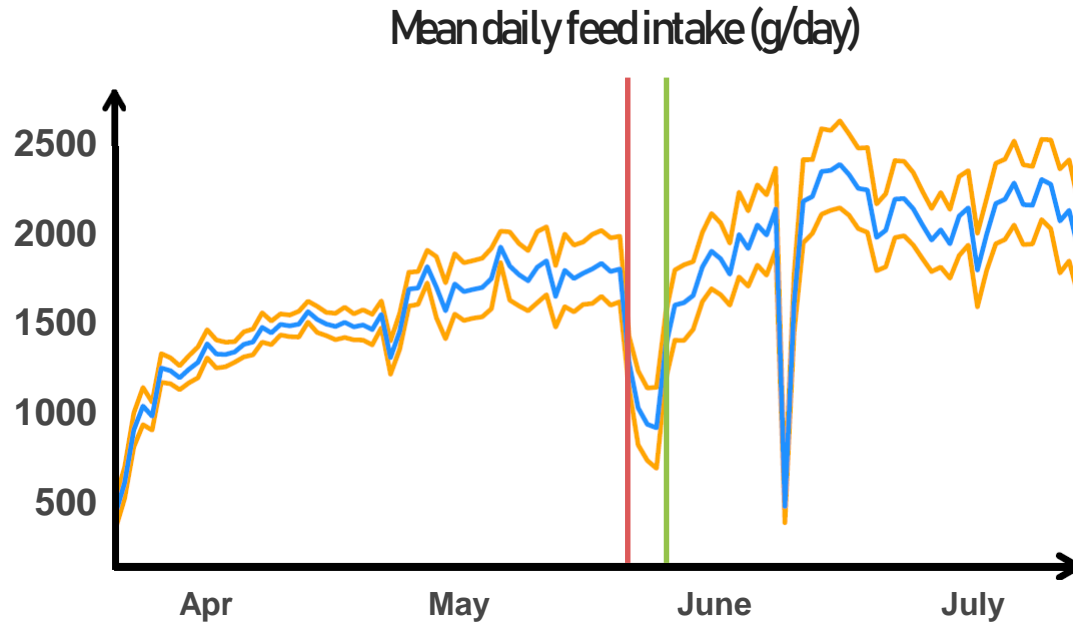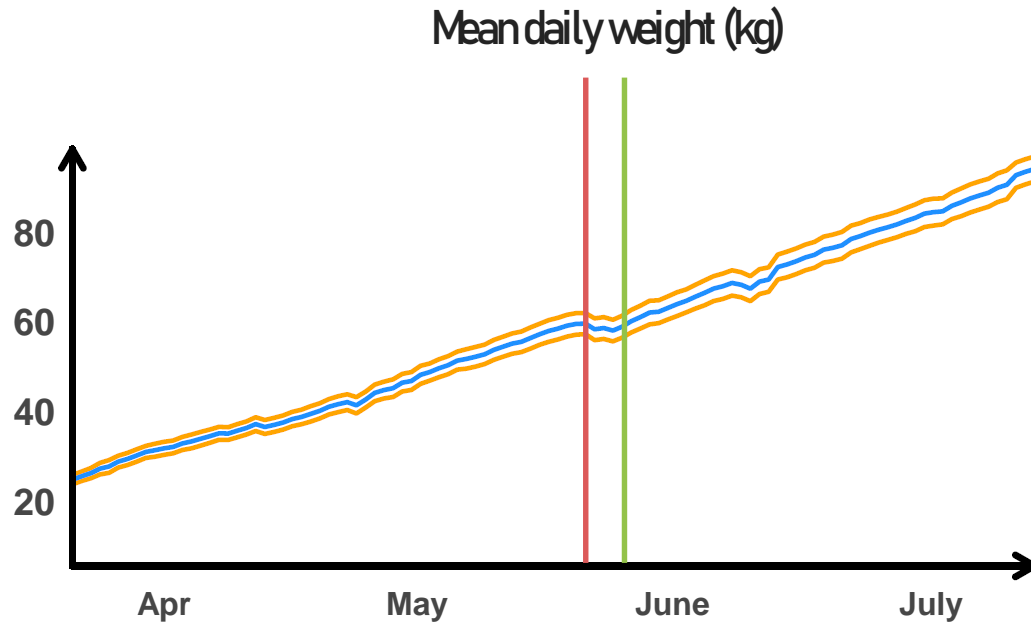
EXPERIENCE ALERT SYSTEM

- Alert check generally did not take up a lot of time

- Days with lots of alerts are a problem

  ➢ Often technical problem - need for technical alerts

  ➢ Need for group-level alerts to indicate systematic problems

- Continuous alerts for same pig were not considered a big problem

  ➢ BUT: need for restart/ignore button

- Caretakers did not really believe in the system until disease outbreak in whole department

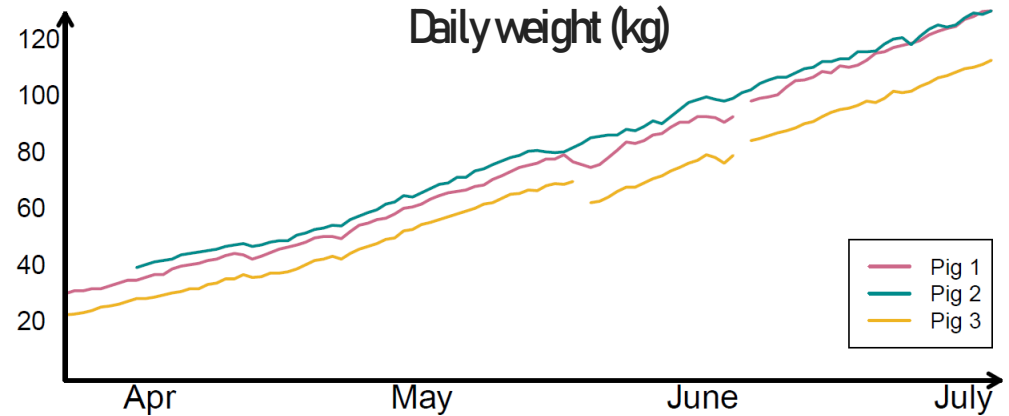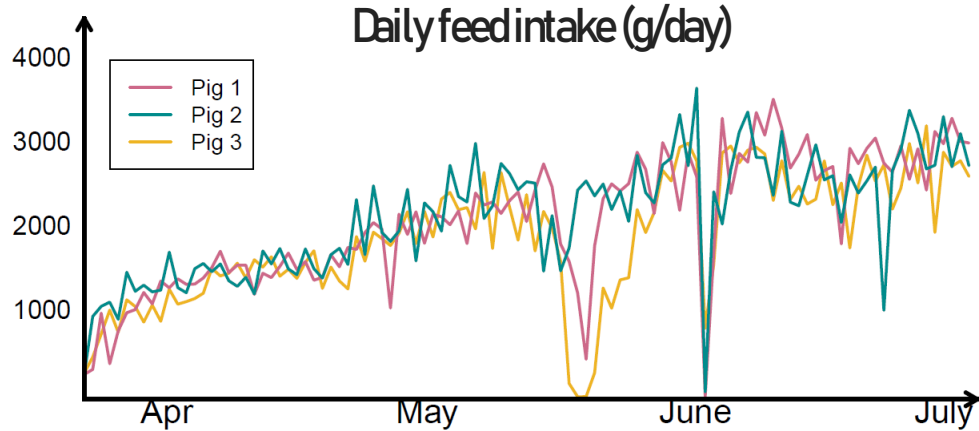 ➢ Spotted by the system 3 days before visible symptoms!!

EXAMPLE DISEASE OUTBREAK

Mean daily feed intake (g/day)

EXAMPLE DISEASE OUTBREAK

Mean daily weight (kg)

EXAMPLE: DISEASE OUTBREAK

Daily feed intake (g/day)

Daily weight (kg)

FUTURE WORK

Improve performance

Group level warnings

Technical alerts

Reset options for false alerts

Incorporate user feedback

CONTACT INFORMATION

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