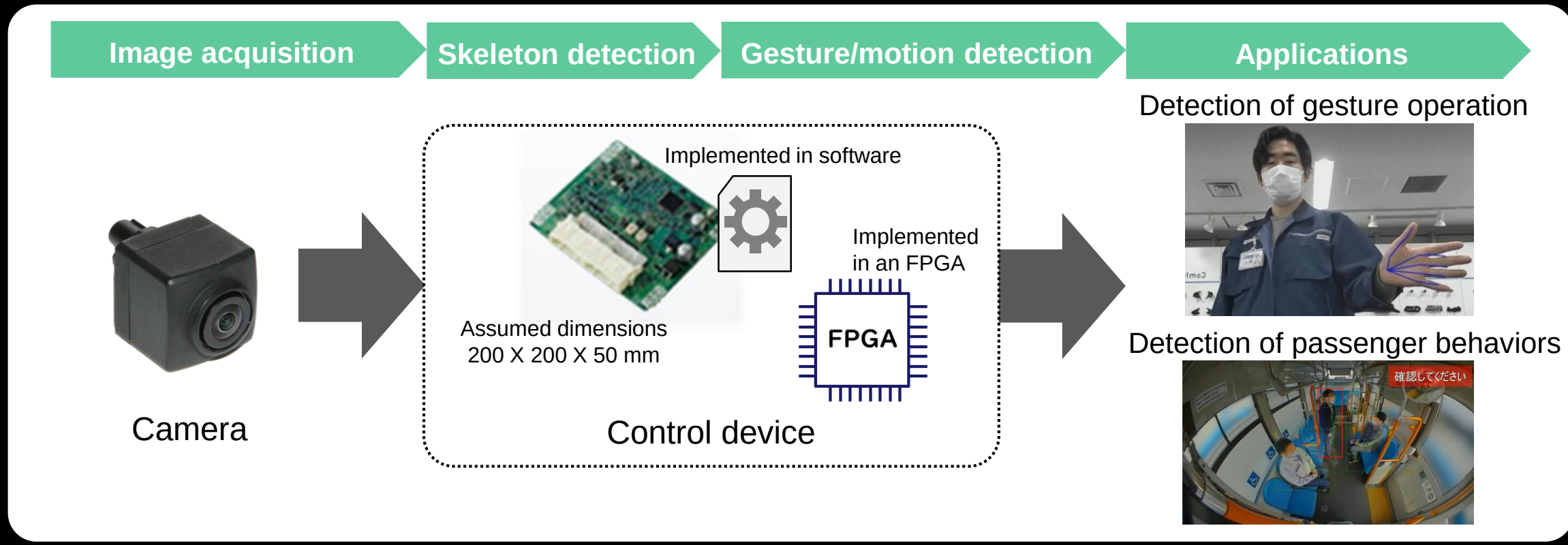
Human Presence Sensor (Camera)

人を捉えるセンサ（カメラ）

Purpose Skeleton detection technology versatile in human presence sensing by camera image recognition is implemented in an FPGA to achieve high-speed processing and optimal cost.

Outline

- AI estimates the position of human joint points from an RGB camera and recognizes gestures from the time series motions.
- Applicable to various fields including gesture operation and passenger behavior detection.
- Workable on a suitable edge device such as an FPGA.



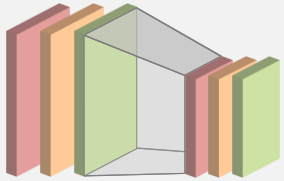
An example of service provided: Camera + control device (FPGA, etc.)
(Tokai Rika can provide a control device alone or a software program alone.)

Technology

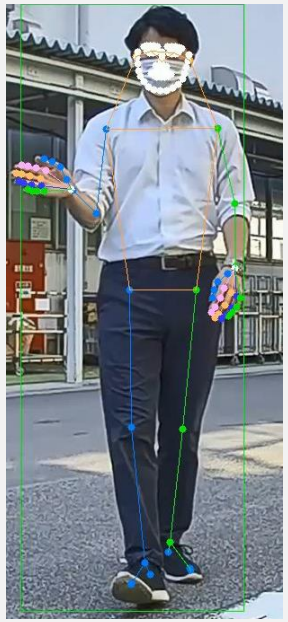
- Deep learning is used for detecting human presence and their skeletons (estimating the position of joint points).
- A rule-based system and machine learning recognize human gestures from the motions of the joint points.

Skeleton detection processing

The coordinates of joint points are estimated



- Deep learning
- Optimal hardware such as an FPGA achieves high speed processing



Gesture and motion detection processing

Motions are estimated from the time series information of joint points

A suitable feature amount is designed from the coordinates of finger joint points

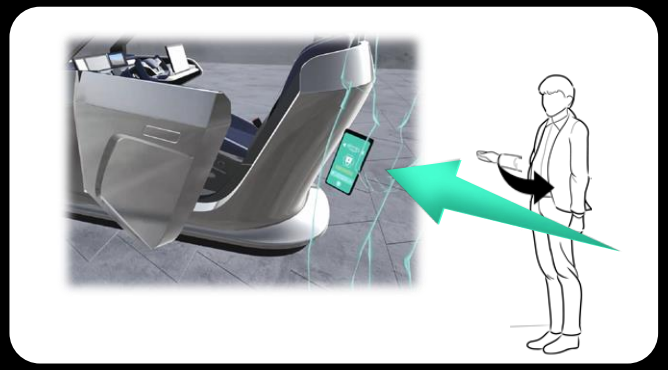
Rule-based machine learning algorithm

Gesture judgment results

Hand signal

Future use

Applications of Skeletal Detection Technology Applications of Skeletal Detection Technology



Door entry gestures using CMS camera

Detection of passengers' behaviors in a bus

Other applications
- Driver Attitude Detection
- Factory worker analysis
- Elevator operation
- House entrance doors
- Curtains, Blinds
- Human presence sensing shutters
- Opening and closing windows on high places etc.

Other Image Recognition Technologies

※ Cockpit mock-up model mounted as a demonstration