# KPI Review and Conclusions:

Note that the initial KPI from the project overview is bolded, and then conclusions drawn from these KPI are attached in non-bold.

* **Detection of proximity to ultrasonic sensors. Success for this criteria is indicated by TurtleBot motion corresponding to variation in ultrasonic ranging readings.** This criteria was successfully met as the TurtleBot’s motion is clearly responsive to changes in ultrasonic readings.
* **Speed control via ultrasonic sensor input. Success is defined by proportional changes in TurtleBot speed with respect to ultrasonic proximity.** This KPI was successfully achieved by having one ultrasonic sensor’s distance reading proportionally correspond to linear velocity of the TurtleBot from 0m/s to its maximum speed of 0.26m/s.
* **Directional control via ultrasonic sensor input. Success is defined by proportional changes in TurtleBot direction with respect to ultrasonic proximity.** This KPI was successfully achieved by having one ultrasonic sensor’s distance reading correspond proportionally to angular velocity of the TurtleBot in its full range of -1.82 to 1.82 rad/s.
* **The ability to enter gesture control mode. Specifically, the press of a button to switch modes and the representation of the system being in "gesture mode" being reflected on the M5 Core UI.** This criteria was successfully met, though representing the system being in “gesture mode” in the UI was not implemented – as this was seen as unnecessary cluttering of the UI and adds unnecessary communication between the devices. Instead, due to well-implemented button debouncing, any press of the user button on the nucleo board will toggle the mode – and the device will always start in normal mode, so the mode of operation can always easily be tracked.
* **Accurate detection and execution of gestures (system recognises defined hand motions) and representation of this in the UI. Success for this criteria does not involve turtlebot motion, but rather the accurately UI display of the detected gesture.** This criteria has been successfully met, with the detected gesture being displayed in the bottom left corner of the M5 Core.
* **Localisation of the TurtleBot. Success for this criteria is indicated via accurate position estimate display in a 2x2 grid interface on the M5Core2.** The TurtleBot’s position is correctly displayed on the M5 Core grid, which constitutes success for this criteria.
* **Staying within the grid. Success for this criteria is described by the turtlebot automatically detecting that it has moved outside of the grid, and then turning around so that it can stay within the grid. Expected behaviour is that gesture or ultrasonic input until the turtlebot has completed its process of re-entering the grid.** This criteria has been successfully implemented, as the TurtleBot detects that it has moved outside of the 2x2m grid and immediately turns around, bypassing all current queued actions for it to perform.