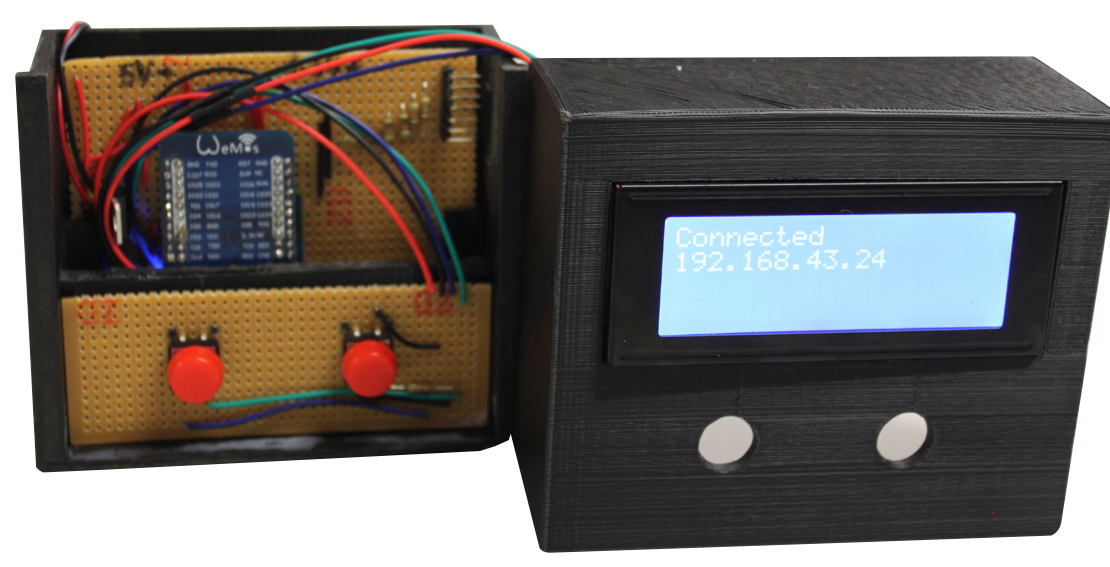
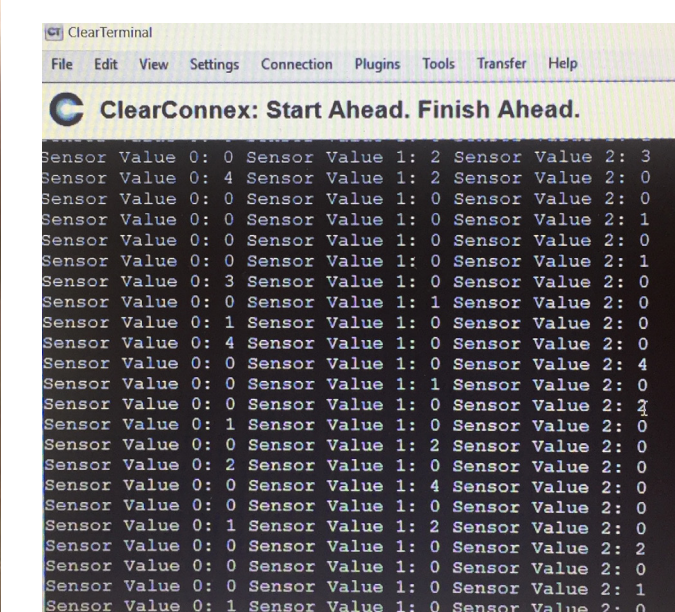




# Using pressure sensor technology to improve bovine trans-rectal palpation training: Development of the “pressure sensor glove”

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Pregnancy diagnosis (PD) by trans-rectal palpation (TRP) in cows is an important competency for veterinarians,<sup>1</sup> due to its economic importance and wide use in practice.<sup>2</sup> However, training requires extensive exposure in TRP of live cows to ensure competency.<sup>3, 4</sup> It is a complex skill to learn and one possible reason for students’ initial lower palpation accuracy is their uncertainty about how much pressure/ force to use during TRPs. To investigate this, a “pressure sensor glove” was developed. The glove makes use of Force Sensitive Resistors (FSR) which can register weights from as little as 18 grams to gather necessary data.<sup>5, 6</sup> These sensors can be calibrated according to users’ requirements. For this project, the FSRs (diameter 13mm, 0.1mm thickness) were calibrated to read up to 4kg of force and attached to five silicone rings that can be placed on individual fingertips. An ESP32 microcontroller measures data from the sensors, which is then transmitted via integrated wireless technology to a laptop where it is stored as an excel file for easy rendering and cleanup. Data collected with the FSRs during TRPs done by experienced production animal veterinarians will be used to program the sensors with set boundaries indicating to students how much pressure they should ideally apply during TRPs. A light signal and a “buzzer” will be used as a feedback mechanism indicating to students when using too little or too much pressure. It is anticipated that the programed FSRs will be a useful aid in students’ initial TRP learning experience.



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