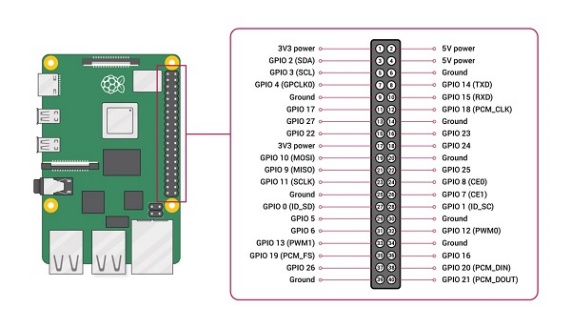
1. Effective bi-directional people flow counting for real time surveillance system
   1. Link: <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=5722907>
   2. Citation: Yam, K.Y., Siu, W.C., Law, N.F. and Chan, C.K., 2011, January. Effective bi-directional people flow counting for real time surveillance system. In *2011 IEEE International Conference on Consumer Electronics (ICCE)* (pp. 863-864). IEEE.
   3. Number of Citations: 33
   4. Notes
      1. Essentially draw a line, and if people cross that line, they are counted. Not a terrible strategy honestly
      2. Varies between 88-96% in the 6 trials they ran (3 areas, 2 trials each, one people walking one direction through the line, the other when people were walking the other way)
2. Passive Infrared (PIR) Sensors
   1. Occupancy-Driven Energy Management for Smart Building Automation
      1. Link: <https://dl.acm.org/doi/pdf/10.1145/1878431.1878433>
      2. Citation: Agarwal, Y., Balaji, B., Gupta, R., Lyles, J., Wei, M. and Weng, T., 2010, November. Occupancy-driven energy management for smart building automation. In *Proceedings of the 2nd ACM workshop on embedded sensing systems for energy-efficiency in building* (pp. 1-6).
      3. Number of Citations: 721
      4. Notes
         1. Source 9: buildings consume 70% of electricity in the US
         2. Passive Infrared: needs motion to count people, can’t detect stationary objects
         3. Cameras and Vision Systems: hard to deploy, cost/privacy issues
         4. Source 19: CO2 is very slow to detect incoming people
         5. Source 8 (Delaney): measuring wasted energy in lighting when no people present in room
         6. Made device that figures door open = occupied. If the door is closed, figure out if someone was headed in or out, if in, the room is occupied and vice versa. Other measures to stop problems like one person leaves, still another in the room issues
         7. System can reduce energy consumption by 10-15% if implemented
   2. Occupancy detection through an extensive environmental sensor network in an open-plan office building
      1. Link: <https://www.researchgate.net/publication/268185829_Occupancy_detection_through_an_extensive_environmental_sensor_network_in_an_open-plan_office_building>
      2. Citation: Lam, K.P., Höynck, M., Dong, B., Andrews, B., Chiou, Y.S., Zhang, R., Benitez, D. and Choi, J., 2009. Occupancy detection through an extensive environmental sensor network in an open-plan office building. *IBPSA Building Simulation*, *145*, pp.1452-1459.
      3. Number of Citations: 219
      4. Notes
         1. PIR dependent on motion
         2. Video capture privacy concerns and large amounts of data usage
3. **Radio Frequency Identification** (RFID)
   1. RFID-Based Occupancy Detection Solution for Optimizing HVAC Energy Consumption
      1. Link: <http://www.iaarc.org/publications/fulltext/S17-4.pdf>
      2. Citation: Li, S., Li, N., Becerik-Gerber, B. and Calis, G., 2011. Rfid-based occupancy detection solution for optimizing hvac energy consumption. *Proceedings of the 28th ISARC, Seoul*, pp.587-592.
      3. Number of Citations: 16
      4. Notes
         1. Source 1: 48% of U.S. energy consumption is from buildings
         2. Sources 2, 3: Improving HVAC systems can save up to 50% of consumption
         3. Source 5: occupancy detection system with RFID, but it was coarse-grained and only detected people that passed doors or sat at tables
         4. Only 67% success rate for detection. Interference of waves from the RFID tags was cited as the cause of error. However, the tags that missed weren’t right on the edge of zones, they just missed altogether
            1. Occupants in the center of a zone were accurately located, however, the boundary occupants were incorrectly located more often
            2. Stationary occupants were also better detected than mobile occupants
   2. Measuring and Monitoring Occupancy with a RFID based System for Demand-Driven HVAC Operations
      1. DO NOT USE
      2. <http://www.iaarc.org/publications/fulltext/S17-4.pdf>
      3. Li, N., Carlis, G., and Gerber, B. (2012). Measuring and Monitoring Occupancy with a RFID based System for Demand-Driven HVAC Operations. *Automation in Construction*, Vol. 24, pp. 89-99.
      4. Literally Same as above
   3. A Conflict Resolution Architecture for the Comfort of Occupants in Intelligent Office
      1. Link: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4629761>
      2. Citation: Lee, H., Choi, J.S. and Elmasri, R., 2008, July. A conflict resolution architecture for the comfort of occupants in intelligent office. In *2008 IET 4th International Conference on Intelligent Environments* (pp. 1-8). IET.
      3. Number of Citations: 25
      4. Notes
         1. One student can feel too cold in a room, while another might be too hot
         2. Split into public zone and personalized zone
         3. Issue I’m seeing is that the entire system is just in 1 room. So essentially they are trying to conserve energy by changing the temp in little boxes that are probably no bigger than 10x10 feet in a single area
         4. Requires a lot of information about people, privacy is a concern
4. Ultrasonic
   1. Occupancy Estimation using Ultrasonic Chirps
      1. Link: <https://dl.acm.org/doi/pdf/10.1145/2735960.2735969>
      2. Citation: Shih, O. and Rowe, A., 2015, April. Occupancy estimation using ultrasonic chirps. In *Proceedings of the ACM/IEEE Sixth International Conference on Cyber-Physical Systems* (pp. 149-158).
      3. Number of Citations: 72
      4. Notes
         1. PIR and Ultrasonic are low cost, but typically detect binary occupancy (if someone is in the room or not) and not actually how many people are in an area
         2. Needs to be trained on a per room basis, very time consuming. To speed up and improve performance of their algorithm, they assume the max capacity of a room is given and data collected has instances where the room is at least half full
         3. Sources 16-18: People counting algorithms typically use cameras
            1. Not from sources, but they say people-counting techniques are either more expensive in cost or complexity, have privacy issues, or have large, labelled databases
         4. They say their chirping can spread throughout a room and easily detect the number of people
         5. Signal difference between two empty rooms is minimal; however, there is a significant difference between the chirps of a half-full and completely full room
         6. Clustering data and removing outliers helps the accuracy of the model in situations where there are few people. In larger rooms with more people, clustering is inconclusive due to excessive, scattered data points
         7. Small groups of people in a room cause significant error, hard to scale down. Suggested having training points of at least 10% of the room’s max capacity
         8. Seems like their data shows that the algorithm might only improve cost and complexity, not actually performance
   2. AURES: A Wide-Band Ultrasonic Occupancy Sensing Platform
      1. Link: <https://users.ece.cmu.edu/~agr/resources/publications/aures-buildsys16.pdf>
      2. Citation: Shih, O., Lazik, P. and Rowe, A., 2016, November. Aures: A wide-band ultrasonic occupancy sensing platform. In *Proceedings of the 3rd ACM international conference on systems for energy-efficient built environments* (pp. 157-166).
      3. Number of Citations: 23
      4. Notes
         1. Heating, cooling, ventilation of buildings accounts for 17% of all energy used in the United States
         2. Lower cost solutions (PIR, ultrasonic) are error-prone and only do binary occupancy values. More expensive sensors (smart cameras) need specific installation/calibration, require power, have privacy risks, and hindered by obstructions
         3. Trying to eliminate false negatives and false positives as best as possible
         4. Speaker volume also plays a role in the results, as data collected in low volumes is harder to be separated into occupancy levels
         5. Accuracy decreases as room size increases
         6. Classifier(s) accuracy on their own were between 65-75%. Put together, however, they average to 80%
         7. Absolute error of no more that 3 people across room sizes (error in percentage is max of 10%)
         8. Several blind spots were detected
         9. Has extremely long lifespan, doesn’t run out of battery for years
5. CO2 or CO2 + Camera
   1. An Information Technology Enabled Sustainability Testbed (ITEST) for Occupancy Detection through an Environmental Sensing Network
      1. Link: <https://journals.sagepub.com/doi/pdf/10.1177/01436244211060903>
      2. Citation: Dong, B., Andrews, B., Lam, K.P., Höynck, M., Zhang, R., Chiou, Y.S. and Benitez, D., 2010. An information technology enabled sustainability test-bed (ITEST) for occupancy detection through an environmental sensing network. *Energy and Buildings*, *42*(7), pp.1038-1046.
      3. Number of Citations: 345
      4. Notes
         1. 40% of global energy consumption is from buildings
         2. Main issues with early CO2 models are the time delay to recognize the presence of a person, as well as the outside parameters that confuse the system
         3. Their model assumes outdoor CO2 concentration is constant at 420 ppm
         4. Note to myself: VERY off, not good collection type at all, not worth really pursuing this method at all. Literally always off by a good margin
            1. Also has a very wide range for possibilities. Some time stamps have a confidence interval of 20 people, when the max number of people at any time was 35
         5. They say accuracy is between 70 and 90% for different types of test, but I don’t believe them
6. Audio Processing w/ Background Sound Cancellation
   1. Occupancy-Driven Energy-Efficient Buildings using Audio Processing with Background Sound Cancellation
      1. Link: <https://www.mdpi.com/2075-5309/8/6/78/htm>
      2. Citation: Huang, Q., 2018. Occupancy-driven energy-efficient buildings using audio processing with background sound cancellation. *Buildings*, *8*(6), p.78.
      3. Number of Citations: 21
      4. Notes
         1. Source 1: HVAC equipment accounts for up to 50% of energy usage in buildings
         2. Sources 28-33: Previous audio studies don’t consider environmental noise on estimation performance, only suitable for quiet outdoor places
         3. Difficult to estimate when multiple people are talking, other sounds are occurring at the same time as speech, etc.
         4. You also must be making noise for the sensor to detect; working in silence keeps a person from being detected by the algorithm
         5. Cleaning background noise can be done for quieter interruptions (can get close to 100% accuracy); however, loud background noise severely decreases the accuracy of the model (only gets to 75% or so)
            1. Background sound cancellation almost always improves the accuracy, but sometimes doesn’t by much
         6. Truly doesn’t really decrease electricity usage by a ton (at least in their study)
7. Image Camera
   1. Energy Efficient Building Environment Control Strategies using Real-time Occupancy Measurements
      1. Link: <http://www.andes.ucmerced.edu/papers/Erickson09a.pdf>
      2. Citation: Erickson, V.L., Lin, Y., Kamthe, A., Brahme, R., Surana, A., Cerpa, A.E., Sohn, M.D. and Narayanan, S., 2009, November. Energy efficient building environment control strategies using real-time occupancy measurements. In *Proceedings of the first ACM workshop on embedded sensing systems for energy-efficiency in buildings* (pp. 19-24).
      3. Number of Citations: 354
      4. Notes
         1. Great point: conditioning of the room must begin prior to when the room is actually utilized
         2. Lots of assumptions that need to be made for this one
         3. Off by a little over 20% consistently, but that isn’t too bad
            1. I think a lot of it had to do with overlapping boundaries and (I think) their model is somewhat just averaging numbers of people over span of time to find a pattern
         4. Doesn’t really help limit HVAC spending (only 3%)
8. Wi-Fi Probe Request
   1. Occupancy Counting with Burst and Intermittent Signals in Smart Buildings
      1. Link: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8049459>
      2. Citation: Ciftler, B.S., Dikmese, S., Güvenç, İ., Akkaya, K. and Kadri, A., 2017. Occupancy counting with burst and intermittent signals in smart buildings. *IEEE Internet of Things Journal*, *5*(2), pp.724-735.
      3. Number of Citations: 42
      4. Notes
         1. Source 1: Buildings account for 40% of primary energy consumption and 72% of electricity consumption in the U.S.
         2. Source 9: Video processing and camera systems or occupancy sensors can be installed, but they are most often costly to deploy
         3. Since Wi-Fi is already available in most buildings, Wi-Fi probe requests can be a useful tool to count the occupancy of a room
            1. By capturing the Received Signal Strength (RSS), a sniffer can deduce where someone might be in relation to the reference node
         4. Their method achieves up to 90% accuracy in zone-level tracking
         5. They really just focus on tracking, not so much what to do with that info once it’s been received
9. CO2 + Temperature + Humidity + Light + Motion + Sound
   1. A Multi-Sensor based Occupancy Estimation Model for Supporting Demand Driven HVAC Operations
      1. Link: <https://dl.acm.org/doi/pdf/10.5555/2339453.2339455>
      2. Citation: Yang, Z., Li, N., Becerik-Gerber, B. and Orosz, M., 2012, March. A multi-sensor based occupancy estimation model for supporting demand driven HVAC operations. In *Proceedings of the 2012 Symposium on Simulation for Architecture and Urban Design* (Vol. 2, pp. 1-2). San Diego, CA, USA: Society for Computer Simulation International.
      3. Number of Citations: 112
      4. Notes
         1. Other CO2 sensors (Leephakpreeda 2001, Nielsen/Drivsholm 2010, Sun 2011) take time to build up and other factors influence CO2 concentration as well
         2. Video systems (Benezeth 2011, Erickson 2009, Wang 2010) require line of sight and need large digital storage space
         3. IMPORTANT: Maybe follow this paper’s style/structure to explain the neural network/algorithm I’ve built
         4. I like how they did testing/validation with datasets
         5. Many possible sources of error: might’ve been a better study if they only calibrated all the sensors to one lab, not 2, where there were varying conditions between them
10. Light + Temperature + CO2 + Humidity
    1. Accurate Occupancy Detection of an Office Room from Light, Temperature, Humidity and CO2 Measurements using Statistical Learning Models
       1. Link: <https://www.researchgate.net/publication/285627413_Accurate_occupancy_detection_of_an_office_room_from_light_temperature_humidity_and_CO2_measurements_using_statistical_learning_models>
       2. File on computer: <file:///C:/Users/rpwoo/Downloads/Occupancydetection.pdf>
       3. Citation: Candanedo, L.M. and Feldheim, V., 2016. Accurate occupancy detection of an office room from light, temperature, humidity and CO2 measurements using statistical learning models. *Energy and Buildings*, *112*, pp.28-39.
       4. Number of Citations: 477
       5. Notes
          1. Sources 1-5: Being able to count occupancy in buildings has been estimated to save over 30% on energy
          2. When people enter the room, all sensors increase, especially the light (because it gets turned on). When people leave, the opposite occurs
             1. Every time another person enters, the slop of the increase in the sensors’ graphs increases
          3. With all parameters included, accuracy can be very high. However, the most important parameter is light. Obviously when the lights are on, the room is most times occupied. The reverse is true when the lights are off. If we are trying to save money on HVAC systems, the accuracy should not be highly dependent on light, in my opinion.
             1. Light accuracy on occupancy is 97-99%, CO2 between 75-87%, temperature between 67-87%, and CO2 + temperature between 79-85%
             2. Any of the parameters (temp, CO2, humidity, humidity ratio) combined with light reached accuracy > 97%
             3. Adding in the time parameter also boosted accuracy (temp+time was between 86-96% accuracy, while temp only was 65-86% accuracy)
11. Active Infrared
    1. Rapid Internet of Things (IoT) prototype for accurate people counting towards energy efficient buildings
       1. Link: <https://www.researchgate.net/publication/337034021_Rapid_Internet_of_Things_IoT_prototype_for_accurate_people_counting_towards_energy_efficient_buildings>
       2. Citation: Huang, Q., Rodriguez, K., Whetstone, N. and Habel, S., 2019. Rapid Internet of Things (IoT) prototype for accurate people counting towards energy efficient buildings. *J. Inf. Technol. Constr.*, *24*, pp.1-13.
       3. Number of Citations: 21
       4. Notes
          1. Entry/exit of zone accuracy is 97% over a 3 month period
          2. Over a one-year period in a school auditorium, they were able to save 12% of the overall energy cost
          3. Non-intrusive, does not need a Wi-Fi connection, built using a Raspberry Pi 3
          4. Look at Ekwevugbe (2013), Raykov (2016), and Leech (2017), also Ortega (2015) papers to see what they did with neural networks
          5. One downside to the system. Cannot handle multiple people entering the system simultaneously because the “laser” (???) is still triggered only once
12. Energy Waste in Buildings
    1. Link: <https://news.mit.edu/2013/reducing-wasted-energy-in-commercial-buildings>
    2. Citation: Stauffer, N. (2013) *Reducing wasted energy in commercial buildings*. Available at: https://news.mit.edu/2013/reducing-wasted-energy-in-commercial-buildings (Accessed: 9 August 2022).
13. RP4 GPIO Pinout Layout Image
    1. Link: <https://www.tutorialspoint.com/raspberry_pi/raspberry_pi_gpio_connector.htm>
    2. 
    3. Caption: Fig. 1 The GPIO Pin Layout of a Raspberry Pi 4 Module
14. Breakout Board Pinout Layout
    1. Website Link: <https://botland.store/thermovision-cameras/16256-thermal-imaging-camera-flir-lepton-dev-kit-v2-sparkfun-kit-15948-5904422378080.html>
    2. Image Link: <https://botland.store/img/art/inne/16256_10.jpg>
    3. Image: Table

       Description automatically generated
    4. Caption: Fig. 2 Pinout Locations of the FLIR Lepton® Breakout Board v2.0
15. Breakout Board Pin Connections
    1. Link: none because it comes from us
    2. Image: A picture containing text, circuit, electronics

       Description automatically generated
16. Final Connections and Example Output
    1. Link: none because it comes from us
    2. Image: A picture containing text, electronics

       Description automatically generated
17. How do Thermal Cameras Work?
    1. Link: <https://www.flir.com/discover/rd-science/how-do-thermal-cameras-work/>
    2. Citation: *How Do Thermal Cameras Work?* (2020) Available at: https://www.flir.com/discover/rd-science/how-do-thermal-cameras-work/ (Accessed: 10 August 2022)
18. Electromagnetic Spectrum
    1. Website Link: <https://solatubehome.com/the-truth-about-infrared-light/>
    2. Image: A picture containing chart

       Description automatically generated
19. Our Coded Algorithm (200 epochs)
    1. Text

       Description automatically generated
20. Wien’s Law (wavelength to temp) Calculator
    1. Link: <https://www.omnicalculator.com/physics/wiens-law>
    2. Citation: Sas, W. (2020) *Wien’s Law Calculator*. Available at: <https://www.omnicalculator.com/physics/wiens-law> (Accessed 10 August 2022).
21. FLIR Lepton 2.5 Specs
    1. Link: <https://www.flir.com/products/lepton/?creative=599400011978&keyword=flir%20lepton%202.5&matchtype=p&network=g&device=c&utm_campaign=americas.us.oem.sec.l.aw.rw.oem-restructure.search&gclid=Cj0KCQjwidSWBhDdARIsAIoTVb2huIKee8_QvXlT0Xcapv28BUCw55E5ks2_vRqo5ROT6_m-sdRDG2YaAqRTEALw_wcB>
    2. Citation: *FLIR Lepton® 2.5 Full Specifications.* (2018) Available at: flir.com/products/lepton/?creative=599400011978&keyword=flir%20lepton%202.5&matchtype=p&network=g&device=c&utm\_campaign=americas.us.oem.sec.l.aw.rw.oem-restructure.search&gclid=Cj0KCQjwidSWBhDdARIsAIoTVb2huIKee8\_QvXlT0Xcapv28BUCw55E5ks2\_vRqo5ROT6\_m-sdRDG2YaAqRTEALw\_wcB (Accessed 10 August 2022).
22. To use for length of gamma rays
    1. Link: <https://www.livescience.com/50215-gamma-rays.html>
    2. Citation: Lucas, J. (2018) *What are gamma rays?* Available at: https://www.livescience.com/50215-gamma-rays.html (Accessed: 10 August 2022).
23. Using for length of radio waves
    1. Link: <https://www.livescience.com/50399-radio-waves.html>
    2. Citation: Lucas, J. (2019) *What Are Radio Waves?* Available at: <https://www.livescience.com/50399-radio-waves.html> (Accessed: 10 August 2022).
24. GPIO Big Explanation Site
    1. Link: <https://www.howtogeek.com/787928/what-is-gpio/>
    2. Citation: Butler, S. (2022) *What Is GPIO, and What Can You Use It For?* Available at: <https://www.howtogeek.com/787928/what-is-gpio/> (Accessed 10 August 2022).
25. Possible Explanation of GPIO Pins on Raspberry Pi 4
    1. Link: <https://roboticsbackend.com/raspberry-pi-3-pins/#:~:text=used%20for%20communication.-,Raspberry%20Pi%204%20GPIOs,header%20will%20become%20quite%20useful>.
    2. Citation: *Raspberry Pi 4 Pins – Complete Practical Guide*. (no date) Available at: https://roboticsbackend.com/raspberry-pi-3-pins/#:~:text=used%20for%20communication.-,Raspberry%20Pi%204%20GPIOs,header%20will%20become%20quite%20useful (Accessed 10 August 2022).
26. What does grounding a circuit do/why does a circuit need to be grounded?
    1. Link: <https://earlybirdelectricians.com/electrical-circuits/>
    2. Citation: *Why do electrical circuits need to be grounded?* (2019) Available at: https://earlybirdelectricians.com/electrical-circuits/ (Accessed 10 August 2022).
27. How Many People in Each Image (USED: Fig. 3 in paper)
    1. Table

       Description automatically generated
    2. Our image, so no citation needed
28. HVAC System Setup Diagram (should probably use somewhere in the paper)
    1. Diagram

       Description automatically generated
    2. Our image, so no citation needed
29. Proper Training/Validation Splits
    1. Link: <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.33.1337&rep=rep1&type=pdf>
    2. Citation: Guyon, I. (1997). A scaling law for the validation-set training-set size ratio. *AT&T Bell Laboratories*, *1*(11).
30. Batch size testing
    1. Link: <https://wandb.ai/datenzauberai/Batch-Size-Testing/reports/Do-Batch-Sizes-Actually-Need-to-be-Powers-of-2---VmlldzoyMDkwNDQx>
    2. Citation: Bierhance, T. (2022) *Do Batch Sizes Actually Need to be Powers of 2?* Available at: https://wandb.ai/datenzauberai/Batch-Size-Testing/reports/Do-Batch-Sizes-Actually-Need-to-be-Powers-of-2---VmlldzoyMDkwNDQx (Accessed: 10 August 2022).
31. How a Dense Layer Works
    1. Link: <https://machinelearningknowledge.ai/keras-dense-layer-explained-for-beginners/#:~:text=The%20dense%20layer%20is%20a,performs%20a%20matrix%2Dvector%20multiplication>.
    2. Citation: Sharma, P. (2020) *Keras Dense Layer Explained for Beginners*. Available at: https://machinelearningknowledge.ai/keras-dense-layer-explained-for-beginners/#:~:text=The%20dense%20layer%20is%20a,performs%20a%20matrix%2Dvector%20multiplication (Accessed 10 August 2022).
32. Activation Functions (used for relu and sigmoid)
    1. Link: <https://machinelearningmastery.com/choose-an-activation-function-for-deep-learning/>
    2. Citation: Brownlee, J. (2021) *How to Choose an Activation Function for Deep Learning*. Available at: https://machinelearningmastery.com/choose-an-activation-function-for-deep-learning/ (Accessed: 10 August 2022).

* 2 Goals: Show what we are doing, educate the readers
  + Abstract
  + Section 1: Intro
    - Lead in
    - Talk about other experiments
    - Explain briefly our setup
    - Mention the success of our results
  + Section 2: system architecture, rp4/pins/camera + setup of algorithm
    - 3 paragraphs: overall system architecture (breakout board, rp4, thermal camera, data flow, input/output), details of camera (logically, details of camera, most people not familiar with thermal imaging, talk about how thermal imaging works, talk about how camera is taking pictures based on temperature/color), details of connections (ports we are using, data transmission)
    - More professional tutorial?
    - Connections to make with jumper wires
    - Maybe not so much the specific settings of the Pi
    - Do I talk about the commands to run and what they do?
    - After image is taken, say it is saved in the file explorer and can be exported for later use on another device
  + Section 3: dataset
    - Like Sec. 2, but with system setup (how many images for training/testing)
    - Label data (excel, manually), describe data (thermal images), explain difference between thermal images and regular, explain difficulties (no face recognition),
      * 1. Image properties (matrices/vectors?, each pixel has a value), 2. How I labeled/trained/testing/how many categories, number of images in total dataset, 3. How we did the simulation, what scenarios are we trying to mimic? Count people to adjust hvac system control, also see thermal distribution
    - After many images are saved, export them to a flash drive
    - Then using that flash drive, manually went through and sorted images into folders based on the number of people in the image
    - Dataset created + can be added to by anyone in the future
      * Trying to make a comprehensive set of images for people trying to train counting models on thermal images
  + Section 4: detailed algorithm + number of classes + training/validation
    - For some figure, use an image, show what it looks like after each convolutional layer
    - 1. Talk through how images were transformed from PGM to arrays, then to a list of arrays (with 1st pixel as number of people, rest as values of temp), 2. Discuss split size quickly and methods for optimizing that, 3. Go over training and validation data generators, 4. Talk about model and metrics used (how many classes, etc.), 5. Finally mention that the model was trained for 200 epochs
    - Talk through the code, what different functions do
    - Talk through the algorithm, what different lines of code do
      * Mention that it was a process of changing variables one at a time, seeing how they would react to different training methods
  + Section 5: results/explanation
    - Sensitivity, specificity, accuracy
    - 1. Shows graphs of results (maybe best scenario), also might be interesting to have for loop (run multiple times with same parameters, then plot all the lines), 2. Explain where error can be attributed, 3. Wrap up, talk about what future studies might bring
    - Training and validation sets are slightly small
    - Results change each time since sets change each time
    - Training accuracy reached around 98-99.5% by the end consistently
    - Validation accuracy varied
      * Sometimes, it finished in the low to mid 90s (due to overfitting)
      * There were a few times, however, that the validation accuracy finished in the mid to upper 90s, with my best (was never replicated, so I can assume it was a lucky split of training/validation) accuracy, finished around 99%
* GOOGLE SCHOLAR