

We chose for our project to use a DAMN-style architecture, in which each behavior outputs votes which are considered by a central arbiter in determining the final motor output. While we had originally planned on using a motor schema-style architecture, we decided a DAMN architecture would be a better fit when we learned that the action space was more discrete than we had originally realized - the robot can only turn 90 degrees left or right in addition to moving forward or backward (or not at all), and so there's only 5 action options in any given time step. We divided our behaviors into zombie-avoidance, finding food (and getting) food, avoiding obstacles, and exploring the world. Each behavior calculates a distribution of votes over the possible actions and returns it to the arbiter. For our sensors, we settled on a 4-camera setup. Our reasoning for this was that we wanted our architecture to be primarily reactive, and able to make decisions based on immediate sensing without a lot of complicated sensor fusion. While we played with the idea of using depth sensing, we decided that having less accurate depth sensing was a price worth paying for having fields of view on all sides of our robot.

Initially, we decided it was worthwhile to keep a memory of what zombies, food, and other world items. Upon further experimentation with the zombie world, we found that keeping a map is not very helpful. First, the world is not sparse with objects, so keeping a map for long term purposes was not that useful. Further, like any other internal model, a map would often not align with the real world and lead us to make decisions based on false beliefs. We can instead observe the world with cameras to keep reactions better. Lastly, we chose not to attempt knocking berries off of stumps. This was because it turned out to be very costly timewise, leaving us vulnerable to approach by zombies.

After lab 1, our team was unsure of whether to aim for more of a motor schema based architecture or a subsumption based architecture. What we did decide on was the core behaviors we needed to implement: exploring, searching for food, finding previously seen food, fleeing from zombies.

Lab 2 was quite conflicting to us, as so many new options were laid out on the board. The awe of lidar attracted us, as we were aware that current self driving cars companies like waymo and nuro swear by it, but on the other hand we liked the idea of using a receiver to maximize safety, as we would always know when we were in danger. We knew we couldn't use both, so we decided to try and play around with each on our own time after the lab to determine which was more practical. As for architecture we decided on a mix between DAMN and motor schema.

The introduction of only 90 degree turns in lab 3 caused us to move away from motor schema, as now we would no longer be able to turn in an infinite number of directions. This helped us too by simplifying the process, and making everything more discrete. We considered hacking the turning, but that would heavily depend on being able to track the current angle, which we cannot do so very easily.

Lab 4 signaled another major shift as we decided to rely on cameras after experimenting with lidar and the receiver had gone poorly. To deal with the properties different fruit colors have, we keep an internal probability table for the probability of each fruit to have each property, which is updated for every each berry we consume.