

**Product Interview Reflection Paper**

**Class:** ECE/CS585

**Team Name:** Cold Fries

**Project Name:**

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**Introduction**

The responsibilities of being a pet owner will sometimes keep you from being able to get out and away from the house for prolonged periods of time. The need to repeatedly feed animals daily is a menial task that we hope to relieve pet owners from - giving them extra time in their day and removing the chance of missing a feeding time. Our product, the ARF (automatic remote feeder), utilizes our skills as electrical and software engineers to build a feeding machine that can repeat daily tasks for the owner in their absence. The coding and software side of our group is using the internet and applications to be able to connect Raspberry Pi to the structure and give the owner options that would allow them to schedule feeding times and connect in different ways with the pet while the owner is away, this ensures the pets are fed at their optimal times by the owners. Our team interviewed three individuals, two of which are engineers and the other is a business major. Each person owns at least a dog or multiple dogs and a cat. The interview questions involved: opinions on the relevance of the product to market needs, functionality, features of the product, pricing, open criticism, whether we can compete with similar products, and the overall aesthetics of the product in terms of ease of use and installation.

**Interview #1 - Kyle**

Kyle is an owner of 2 dogs, a corgi and great dane. When inquiring about the current design of the product, he suggested that the water portion of the ARF could be a separate module, or optional entirely. He also suggested that if there were multiple feeders, that the multiple feeders could be modular, allowing for the units to be separated for multiple pets with different feeding needs. This is in reference to his corgi being a good and calm eater while his great dane would eat too quickly, which could lead to possible issues. Asking about the price range for a product such as this, he said that a price range of $80 to $150 would be a nice sweet spot. If it was any cheaper than that, we would be losing money in comparison to other similar products on the market, if this were to make it to the market.

Asking if he would purchase something like our product, he said he wouldn’t. This answer is due to how his two dogs would use the product; however, if he could train his dogs to eat from the feeder properly, then he would consider purchasing this product. Some of his concerns were that the feeder should be able to allow not just dispensing in cup increments; also fractions of a cup, like half a cup or a quarter of a cup. The modularity of the product would also be greatly appreciated if an owner would have more than a single pet, so that they can separate the feeders according to their pets’ needs and eating habits. With regards to his great dane, he was concerned on how the feeder could implement slowing dispensing food, or something of the sort that would force the pet to eat slower if the need arises. A camera was also a concern of his in that it would be useful, but wouldn’t particularly mind if the product didn’t have one.

**Interview #2 - Matt**

The second person we interviewed was Matt, and he is the owner of one cat. We gave our design first and asked follow-up questions. We asked if Matt had any features he would have wanted any features on our product for his dog. He did not respond with any features he notably wanted. In contrast to the other interviewees, Matt has a cat so a slow-feeder option the others wanted may not apply to a smaller animal like a cat. We also asked if there was anything he would want changed in our design. He wanted our product to be battery powered, and if possible have analytics on a display, but this was an optional thing he wanted. He believed it would be a nice addition and just something for the impressive factor, but it wasn’t necessary but would make him slightly more inclined to buy the product. We asked Matt for any concerns, and one big concern he had was what if the connection was cut off, such as the internet while they were away for a trip. He suggested that it may be bad for longer trips, but for someone being away at work, it may be nice. He also suggested a unique design idea of a sensor chip inside of a collar that could also activate our device. The final thing he wanted to let us know was that he would not pay or think a camera is worth paying any extra. Our final question to him was if he would buy this product and his price range for the device. He said he would buy the product just so his pet could do what he wanted when he needed food, and that he would pay at most $80 to $150.

**Interview #3 - Sandy**

Sandy is the owner of a dog of mixed breed, of which is hyperactive. A notable feature she would want as a pet owner would be a slow feeder option to optimally feed the pet in a way that they wouldn’t eat too fast. This is due to the fact that if they were to eat too quickly, that could cause issues for the dog’s health. With the current design that we have, she suggested that the feeder could have a built-in water dispenser, along with the food dispenser. However, she expressed concern over how the cleanliness of the feeder would be maintained, as well as if the food would go stale or not. Regarding that, the food will inevitably go stale, but that depends on the size of the container, and how often the food is dispensed and how much is dispensed each time (With the design of the food container, we plan on creating a screw design for a lid so that it keeps it airtight). In regards to her budget, she recommended that she would be willing to spend around 50$ to 100$.

We had asked if she would purchase this, and her response was that she would be buying this for the sake of convenience, but if the price is too high, she would simply do this herself to save money. Some final concerns she had would be the current structure of the product could be a bit bigger to satisfy the needs of some of the bigger animals from having to bend down too far or have another for a bigger design built for the bigger animals. She gave us insight that the electrical side might not work as some of the areas where this could be placed might not provide an outlet to power it. Another concern she had was that some of the dogs might be scared of the feeder if it produces a loud sound. She also notes that the feeder should be able to be easily taken apart, to ease cleaning of the product.

**Conclusion**

When looking at people to ask for the interview, we chose a sample side from different sample groups. With Kyle and Matt both being electrical engineers, they were able to give us insight on the electrical aspect of the ARF feeder, showing us different ways to implement electronics that may help. In addition to the advice given by Kyle and Matt, Kyle has both a small and calm dog and a larger dog that differs greatly from the corgi, allowing for a large range of how dogs may behave; Meanwhile, Matt was able to give us insight as a cat owner, showing how they are low maintenance and would not require a large portion of the components. When asking Sandy, the reason as to asking her was that she was a business major and was able to give us insight on the business side of the feeder while also giving us her viewpoint with her dog, which is a large and hyper dog. Although we had a large spectrum as to pets and their behaviour, we were able to conclude some key points and features from our project based on their input.

When it comes to the power drain aspect of the ARF, we run into more of an issue. Since this project is connected to the IoT, this means that it will constantly be connected to the internet, causing a massive power drain that will consume a significant amount of energy if it were to be connected by battery. A way that we are able to go around this is by creating a sleep mode. The device will consistently be on sleep mode, in which it does not drain as much power, it is only when the user begins to dispense the food where the device will then connect to the internet and then use more power. Electrical power we plan to keep under 4 amps of power draw at any one time by at least half an amp or 3.5 total amps. Our infrared sensor that tells when the hopper is getting low on food uses about 0.2 amps at all times. The pi itself with HDMI, internet wifi, and the sensors on it will take up to 1.5 amp. The servo will use up to 1.2 amps maximum at any point. Any additional loads will use less than 1 amp power draw. We should not have to max our capable current draw of 4 amps at any one point or prolonged period of time. Our current transformer could be bumped up to a higher amperage but for now we plan to stick with the 5V and 4 amp wall wart transformer.

The mechanical aspect of the project, one thing that was said that must be implemented is a tight seal for the food. Since the food will be in a container for an X amount of time, we want the seal to be tight so that the food doesn’t become stale and the animal isn’t able to break into our product. In addition to that, since the product will consist of dry food, there will be dust build up in the mechanical portions, allowing for potential clogs. With that, we want all the food housing units to be detachable so that it will be easily washed. The food bowl itself will also need to be detachable, as food bowls get dirty quickly (we have the option so that the consumer can use their own food bowl).

Analyzing the project at a component level, we were able to find some options that help with the creation of the pet feeder, allowing it to be more user friendly. We wanted to add a manual distribution (Many people that were asked would want something like this), where we plan on adding a button that is only accessible from the back (so that it becomes much harder for the pet to press on its own), this will allow for the dispensation of food without the use of the website GUI. On the software side, multiple variable scheduled timers will be very convenient, attracting more people when it comes to marketing the product.

Looking at this from a business aspect and marketability, what most pet owners have in common is a water dispenser of some sort for their pet (typically it is a gravity feeder). If we were to implement a water dispenser at some point, we want it to be easily removable and easily refillable. Since most owners already have a water dispenser, we decided to void the water dispenser from our design for the time being and only focus on the food dispenser aspect, where we will then add the water part later if need be. By getting rid of this feature, this will save money when it comes to creating the ARF, allowing us to market the price of the feeder at a significantly less price, attracting more consumers to buy the product. With the given components and the functionality of the ARF, we find that the price that people are willing to pay vary from $80 to $150. When looking at the components that have been purchased and the amount of money spent, we realistically can create the pet feeder for roughly 150$, given that we bought very general parts and made it do what we wanted. Looking at this from a mass distribution aspect, by creating exactly what we need in bulk, this dramatically decreases the prices, reducing the cost to make the ARF go from $150 to about $50.