

# White Paper for F.E.R.B Project



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## Business Problem/Background

According to a recent ASPCA article written in 2023 by [aspcanet.org](https://www.aspcanet.org/press/2023/04/23/20230423.asp), "Approximately 6.3 million companion animals enter U.S. animal shelters nationwide every year. Of those, approximately 3.1 million are dogs"(ASPCA, 2023). According to an ASPCA's rehoming resource survey, "pet problems are the most common reason that owners rehome their pet, accounting for 47% of rehomed dogs"(ASPCA, 2023).

However, pet problems aren't essentially the problem of the pet, but more the predictive nature of the human. Nobody returns a vehicle because the vehicle would not drive itself or become surprised by a poor grade when they did not do their homework. So, why don't we apply this same logical standard to selecting a pet? Even more important, what can we do to ensure that the proper expectations are well understood to better develop a successful 'forever' pet choice.

If we did not have such a high influx of rehomed pets, then we could better serve existing pets and use accumulated resources to help in more beneficial ways. This business problem stands to address a direct issue with clearing up the misconceptions prior to committing to a breed of dog based on trends or aesthetics alone. Instead, it seeks to assign a "better fit" that supports with a "level 4 success" to attain the correct family to pet relationship & expectations. This approach encourages the intent of finding common ground for the foundation from which to build their forever home on.

The ASPCA (The American Society for the Prevention of Cruelty to Animals) has been around since 1866 and was founded by Henry Bergh. Their mission statement is, "to provide effective means for the prevention of cruelty to animals throughout the United States." (ASPCA, 2023) They are a privately funded non-profit 501(c-3) corporation within the nation, and have long been accepted as setting the recognized standards in animal welfare. With their endorsement, project FERB could assist in gaining the necessary strides towards improving not only the quality, but longevity of successful animal adoptions and care.

Assignments using calculative predictions with the known nature of a breed's intelligence and human time commitments can offer some proper reflection on your choices, to better ensure a good family fit. Our project titled "FERB"(Friendly Educational Repository Bank-of pets), aims to offer the proper predictive support your family needs using classification segments for intelligence to given breeds, and informed choice selections of expected hourly human commitments in the first year. These features are based on the expected training times to match with the observed repetitions required for behavior training success.

## Implementation Plan

The business problem 'FERB' seeks to resolve is the success rate for long term adoptions from both rescue institutions, kennel club associations, & local missions. This will assist in both breed endorsements and vested pet market industry, while also freeing resources previously reserved for rehoming outcomes. Therefore, industries offering endorsement for classifying expectations & setting standards on decisions around candidates for desired family pets are imperative to their success story. Institutions such as the AKA (American Kennel Association) & publicly endorsed rescue centers can seek to gravitate towards a methodology platform that employs FERB and thereby ensuring all party's expectations and subsequent selection of pets are, "the right fit for the right family".

So, what does the right fit look like and how do we know when we find it?

"The purpose of life is the life of purpose" - Robin S. Sharma (NDA)

If the above quote offers us any indication into how to live life with purpose, we can quickly recognize the answer is often in the question, and since no man is an island but all islands carry hidden treasures, what are the treasures any family or person seeking a pet is truly on the hunt for?

Essentially, what questions will give us the answers we seek so we know what treasures we are truly looking for? With this line of thinking, the greatest answer for how to treasure hunt is often with a map. This is where FERB can help, this project can better identify and create an objective sense of locating better outcomes. Offering a type of proverbial map that helps us find the true treasures that sometimes we didn't even know we were looking for, but also helping us avoid the 'booby-traps' that sometimes lead us to unintended failure.

So, what do we need to sustain us to avoid such failures? What do we need to feed FERB?

Everyone hungers for information and FERB is no different. Data is FERB's favorite food, and the more we feed him the better he will become, but where will we get this data to feed our FERB? By distributing breed developments into the arena of mixed breeds, or even other pets we can expand FERB's proverbial belly. However, the accumulative reference into survey use or supportive analysis regarding supplemental income will provide excellent "nutritional source".

How big will FERB get?

The more we use FERB with follow up and survey studies the better AND bigger he could get. However, the framework of how to build this into the model are already provided as a foundation from which to build on. By keeping a similar metric for input, the output should provide a predictive function with the random forest classifier. Placing a secure stake in accuracy as it constitutes the metric elements from the existing framework.

Why we need FERB more than FERB needs us?

The element of human decision making known as motive, often says more about us than we would say about ourselves. FERB could help us understand the aspects involved with decision making, human attachment, or even gain insights into untapped behavioral explorations as a data source by proxy. In turn, this could yield additional funding and support for future endowments or financial incentives beyond just the commercial or non-profit realms.

## What are questions 'FERB' is seeking to resolve and thus help discover true treasure?

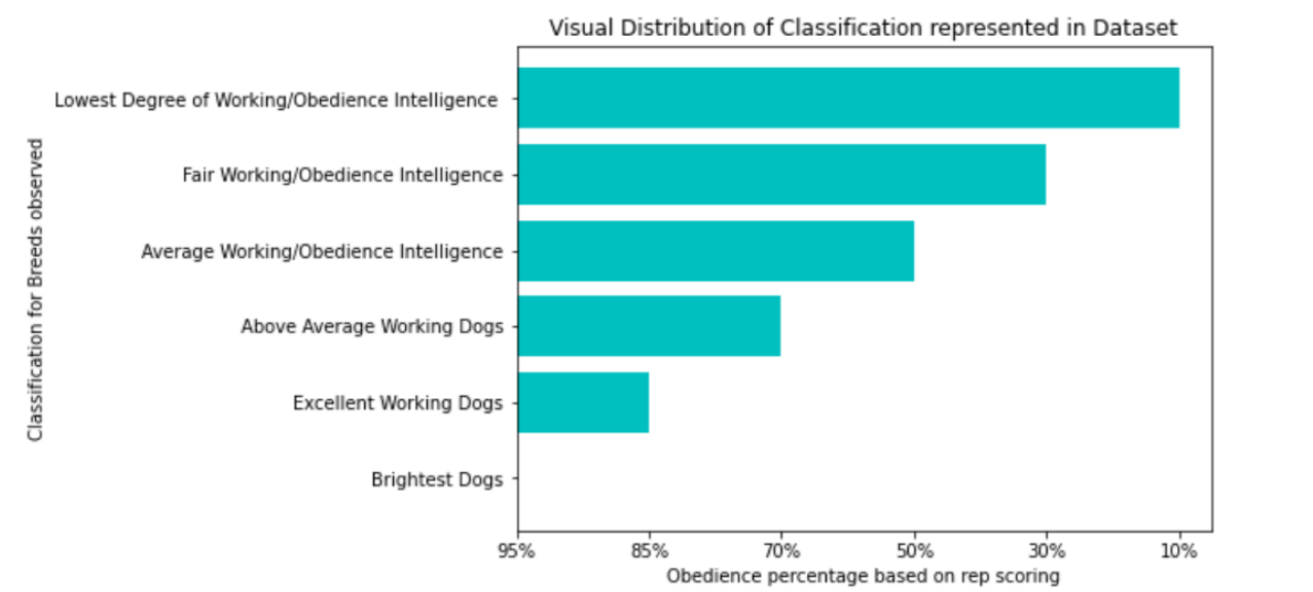
**Hopeful Future Uses or Additional Applications** This procedural step will reinforce the aptitude for a long lived and vested interest in an adoption success story, which is profitable all around. The introduction of this procedural policy for FERB screening, will help create a trusted platform of analysis, and provide a newly tapped market source for future endorsements. Additionally, FERB stands to yield positive cause and effect with regards to nature vs nurture research studies and grants as a means for improving beneficial sourcing catalogs on desired animal and human conditioning behavioral research studies. This would thereby create a dual branch of income potential and start the business model for future reputational endorsements or supplemental data collections tapped for commercial use.

# Data Explanation (Data Prep/Data Dictionary/etc.)

For the purpose of creating the Random Forest ML model A.K.A. "project F.E.R.B. (Friendly Educational Repository Bank-of-pets" I have sourced the dataset from data.world, found here:

-([https://data.world/len/dog-size-intelligence-linked/workspace/file?filename=dog\\_intelligence.csv](https://data.world/len/dog-size-intelligence-linked/workspace/file?filename=dog_intelligence.csv))

This dataset consists of 136 observations derived from selected breeds. Each breed corresponds to and is chronicled for, the repetitions needed to train that breed of dog. This training metric was developed from accumulated repetitions required until success regarding an undisclosed behavior trait was achieved. Then, a given proportional obey score by ranking from an array (['95%', '85%', '70%', '50%', '30%', '10%']) was assigned to all the acquired observations within the dataset. Finally, additional unique classifications were granted to the subgroups of specific breeds and range. These subgroups were then labeled relative to their ranks assigned from above: (['Brightest Dogs', 'Excellent Working Dogs', 'Above Average Working Dogs', 'Average Working/Obedience Intelligence', 'Fair Working/Obedience Intelligence' & 'Lowest Degree of Working/Obedience Intelligence '])



I will be extrapolating and creating the necessary formulative components from which to train the model with. Ultimately, the assignment of breed specified Classifications are pre-established, and assumptive metrics for the expected daily training are based on the associated 'obey' scores. These scores are ranked into 1 of 3 'levels\_4\_success'. Each level (1 thru3) represents the expected hours/day of consistent training on the desired behaviors in the first year of adoption.

The assumptive goal of FERB is to assign the appropriate 'classification' and subsequent list of breeds based on the agreeable commitment levels of expectations in both training and obedience scores. For the purpose of the model, Breeds, reps\_lower, and reps\_upper will be dropped. Breeds alone will be used as a later resource for a provisional list of ideally fit breeds associated with the user's predictive classification, or as a feature parameter selected with their chosen 'level\_4\_success' employed as an automated selection refining process.

## Data Dictionary

Item	type	# used +/-
Breed	string	not for model
Classification	string	target var.
obey	decimal	indep. var.
reps_lower	integer	dropped
reps_upper	integer	dropped
level_4_success	integer	mapped assign

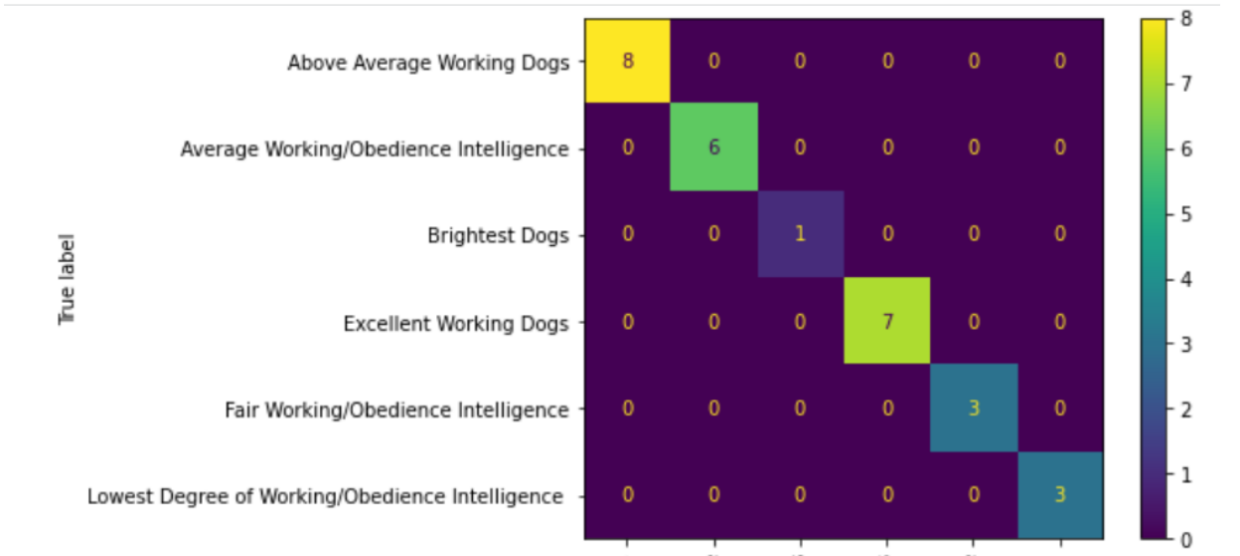
# Methods

I chose to use a random forest classifier for the classification predictor, and to accommodate future expansions of collected datapoints for model training. I will accept the sourced dataset's predetermined delineation amongst the limited breeds for classification as well established and usable starting metrics. The focus features will be based on the given 'obey' scoring derived from repetitions needed in training for behavioral conditioning. Ergo, this obey rank is a delineator for time required to achieve successful behavior training. Using the classification within a created subset from the obey ranks, FERB will serve to predict the determinative breeds for the target feature 'Classification'. This is a trained approach derived from the associated data and is specified by the desired behavioral characters chronicled and expected from both parties to yield a usable list of breeds predicted for success by their associated classification.

As a demonstrative example, I will divide the intelligence obey rates into subclasses consisting of three categories of intensity. The lower rates as: ('1' = 1 hour minimum/day training repetitions) and ('2' = 2hours commitment/day) with the highest at ('3' = 3hours/day minimum). Each is set with the application of their fulfillment during the first year of the developing adoption story. This assumption will lead to the understanding that a requirement of less intensive training time vs. more intensive are as an agreeable commitment from family members for the first year. In turn, this should serve to ascertain the 'time expected before yielding the desired behavior traits', and thus encourage proper expectations of from their pets leading to a beneficial adoption story. The commitment levels required by family members can be correlated to intelligence obey scores as a type of measured variable used to cater for success of outcomes. They are an indicator that behavioral problems will require a modicum of investment from family members. This approach is setting the time allotted for the pet towards breed specified improvements and inculcating a responsibility from both parties rather than affixing a deterrent for the breed and rehoming. Instead, FERB aids in establishing and reinforcing plausible expectations for training times associated with instilling the desired traits. FERB also does this while still giving regards to the breed's obey rate, which is garnered from provable repetition limits. The assignment of rank in hours/day, is the assumed window from which the feature label "level\_4\_success" was created to easily enact the repetitions needed. This is calculated by using a logical time window that allows for the rates of required repetitions in training, which is then associated as a categorized classification assigned to specific subsets of breeds.

# Analysis

I have run an analysis using the random forest classifier for the FERB model. I placed the "classification" as the target feature and used the "obey" and "level\_4\_success" features to train the model as proposed by the project. I have established a well-trained model with a perfect accuracy score of 1.0 showing for a perfect predictive score via a rendered confusion matrix.



This score assessment is in part due to the limited dataset size and distinctly defined correlative features. With the integration of mixed breeds and additional sample observations, this accuracy rate may decrease due to a shift in the

weights for features. However, perfected accuracy is expected until further training datapoints can be incorporated into the model. The greatest determinate for improved model training is associated by both an assigned intelligence from more mixed breeds, and other missing breeds. These observations could help expand the range of required repetitions before the desired behavior conditioning is realized, and the levels of proposed hours needed/day as commitments from humans to achieve these repetition ranges.

The following shows the rates of features impact on classification using the RFC:

FEATURE	IMPACT
obey_50%	0.281563
obey_30%	0.144319
level_4_success_2	0.131046
obey_85%	0.101698
level_4_success_3	0.085775
level_4_success_1	0.082493
obey_95%	0.064177
obey_10%	0.056583
obey_70%	0.052346

## Conclusions & Recommendations

My conclusion is the accuracy of FERB is responding appropriately for the purpose, but the limited training data as a correlation to classification is too small. Further supplementation of datapoints to reference from, in the form of mixed breeds and intermediate "level\_4\_success" ranges, could help yield better statistical reads of target classifications. However, as time and supplemental datapoints are fed to the model strength in a more comprehensive analysis, and predictive nature to real world outcomes should become more apparent. Consequently, a decline in rehoming pets could be witnessed over time due to the advent of reinforced improvements deterring "pet problems" from the onset. FERB could eventually become a valuable resource and a preliminary policy implemented to support improvements with success stories for 'forever' homes.

The concept of cataloging these data points could also serve as a valid resource for research and consumer marketing inference. Housing the non-identifying data or non-PII (personally identifying information) could in turn draw not only intrigue and trust from prospective families, but also financial gains by way of donations and partnership on investments with the ASPCA. Using FERB as an essential standard in procedural methodologies in the adoption experience could demonstrate unseen and under-studied aspects relating to human behaviors and attachment. This could improve overall understanding surrounding how to help improve outcomes for both animal and human experiences. Therefore, I strongly recommend further investments and support around the maintenance and development of FERB and its concept as a new necessary standard positively worthy of implementation.

## Appendix

### Definitions

TERM	MEANING
FERB	(Friendly. Educational. Repository. Bank-of pets)
ASPCA	(The American Society for the Prevention of Cruelty to Animals)
AKA	(American Kennel Association)
Classification	subgroups of breeds based on observed intelligence rate
Obey	(percentage of observed breed specific repetitions needed for behavior training in porportion to all observations)

TERM	MEANING
Reps	(repetitions)
level_4_success	(the required minimum as hours/day to accomplish the obey reps as catagorized for the classification of breed)

References

ASPA(2023), "About Us", aspca.org, <https://www.aspca.org/about-us>

ASPA(2023), "Pet statistics", aspca.org,<https://www.aspca.org/helping-people-pets/shelter-intake-and-surrender/pet-statistics>

Fishmen, Len (2016), 'Intelligence of Dogs', data.world.org, [https://data.world/len/dog-size-intelligence-linked/workspace/file?filename=dog\\_intelligence.csv](https://data.world/len/dog-size-intelligence-linked/workspace/file?filename=dog_intelligence.csv)

Fishmen, Len (2016), 'Data dictionary', data.world.org, <https://data.world/len/dog-size-intelligence-linked/workspace/data-dictionary>

Final Considerations for Ethical Assessment

Some ethical considerations for this topic are the potential to inadvertently create a bias towards specific breeds of dog. Unintentional consequences which could eventually lead to setting trends which endanger a subclass or even specific type of dog breed. The endorsement or deterrence of specific breeds could be perceived as a more common output. In turn, this could unfairly become regarded as desirable vs undesirable and cast negatively on the extremes of some breeds. Consequently, causing under breeding and overbreeding of subclasses.

Additional constructs into the perceived conditioning of behavior and reflections towards intelligence equating value, are another potential consequence. Factors for perceptual reinforcement to lean into response times as a provable method for unit metrics of worth, are setting up the constructs of catastrophic proportions into the human psyche. Disclaimers announce this method is as a means of animal psychology only and is constituted from a subjective reliance on interpretations. These views should be properly conveyed with any resulting outputs. Maintaining that all scoring subclasses are established by a set of subjective standards alone should hopefully help to curb this potentially corrosive perception.

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