<u>**Weekly Paper Summary (25 points total)**</u>

Paper Title	Hybrid Predictive Models
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1. **What do you think the paper is about in layman's terms? What did the research focus on, what did the authors find and what are the main conclusions (if any) [5 points]**

This paper is about a type of predictive model that combines the most important attributes of two known types of models. One of these models is an interpretable model, meaning that the process by which it makes decisions is fully understandable by humans, which is its most important attribute. The other model, called a black box model, is a much more complicated model where the predictive process isn't understandable to humans, but has a much higher predictive accuracy, its most important attribute. This new model, called a hybrid model, uses the interpretable model to predict values where the interpretable model has a high enough confidence in its prediction, and uses the black box model for the rest of the data. The predictions made by the interpretable model are still less accurate than they would be using the black box model, but we're willing to sacrifice that accuracy for transparency of the model, whereas those made by the black box model are at a point where it's not worth the accuracy drop of using the interpretable model. Ultimately, this research was successful in that it offered a middle ground between relatively inaccurate interpretable models and highly accurate black box models that can't be understood by humans.

2. How would you extend the research paper – what new area(s) would you focus the paper on? [5 points]

To extend this paper, I would explore more types of interpretable models. The two models chosen limit our understanding of the possible contexts in which this could be helpful. Decision trees for example could be interesting to see because they're notably useful for classification problems. Exploring additional unsupervised machine learning algorithms other than rule based models could also give us more insight into how useful hybrid models are as well.

3. **Discuss at least two real-world applications (not mentioned in the paper) that would benefit from the focus of / applications mentioned in the paper and why [15 points]**

One potential real world application that could benefit from the use of hybrid predictive models is college admissions. As of right now there is no transparency in college admissions and students and parents alike would benefit from knowing why or why not they were granted admission. Accuracy is also paramount because students invest extensive time and resources to get into college so fairness in whether or not they get admitted is important to them. A potential barrier for this is that students that get admitted or not based on the black box model may feel mistreated because they didn't get the benefit of feedback from the interpretable model. Another potential application is predicting whether or not a prison inmate could be granted parole. Interpretability is desirable here because not only would the inmates desire to know why or why not they're granted parole, the public may want to understand what makes criminals most likely to become repeat offenders. Accuracy is also critical here because preventing serious crime could save lives.