Aggressive behavior (AB) is a major challenge for individuals with Autism Spectrum Disorder (ASD) and their families. Current treatments often rely on chronic medication administration with several negative side effects for the general populace, often worse for people with ASD. This study proposed a novel approach to identify aggressive behavior and eventually find a method of treating aggression in ASD. An analysis pipeline utilizing open-source software was developed to aid in the quantification of stress-induced aggression (SIA) and social interactions in wild-type mice and the 16p11.2$^{flx/flx}$ mouse model for ASD. By analyzing the human-annotated behavior of these mice before and after an acute stress induction assay, thresholds for determining behaviors using positional data of the body parts of each mouse were created. This positional data was extracted from DeepLabCut, a deep-learning tool for feature estimation. The quantification of aggressive behavior by the developed model compared to traditional human-labeled annotation offered several advantages. These advantages include reduced unconscious bias, scalability, and objectivity, all of which will be integral to not only this study but can lay the groundwork for a much wider variety of behavioral analysis studies. Ultimately, we discovered that the model showed validated success in identifying social interaction as a behavior, and was more objective in accurately identifying aggression as a behavior than a human annotator. Among the experimental groups, it was observed that 16p11.2 KO mice showed no significant change in aggressive behavior after the stress induction protocol, albeit a small sample size, but did show a reduced level of social interaction in the post-stress period compared to WT animals, in line with the current understanding of the phenotype of this model. Further exploration of the genetic variations involved in ASD using our developed software could yield insights into the circuits underlying aggressive behavior. Ultimately, this study successfully created a tool that automatically classifies behavior in multi-animal ethographic studies but simply scratches the surface of the genetic underpinnings of aggression in ASD. However, from a software standpoint, it lays the groundwork for assessing the effectiveness of novel pharmacologic interventions that reduce reliance on medication with negative side effects, with the ultimate aim of assisting those with ASD and their families.