Algorithmic decision-making systems (ADMS) are increasingly being used by public and private organizations to enact decisions traditionally made by human beings across a broad range of domains, including business, law enforcement, education, and healthcare. Their growing prevalence engenders profound ethical challenges, which, we maintain, should be examined in a structured and theoretically-informed fashion. However, much of the ethical exploration of ADMS within the IS field draws upon an atheoretical application of ethics. In this paper, we argue that the “big three” ethical theories of consequentialism, deontology, and virtue ethics can inform a structured comparative analysis of the ethical significance of ADMS. We demonstrate the value of such an approach through an illustrative case study of an ADMS in use by an Australian bank. Building upon this analysis, we address four characteristics of ADMS from the three theoretical perspectives, provide guidance on the contexts within which the application of each theory might be particularly fruitful, and highlight the advantages of theoretically-grounded ethical analyses of ADMS.