# APPLICATION OF AI TECHNIQUES TO THE ANALYSIS OF THE CO-OCCURRENCE OF DIAMOND AND ITS SATELLITES IN ALLUVIAL DEPOSITS.

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Diamond satellite minerals have been successfully used for many years in different regions all over the world as a mean to locate diamond primary deposits. When the diamond primary source rocks are eroded, ilmenite, diopside and pyrope grains are released from the matrix of those rocks. These minerals are far more abundant and less resistant than diamonds, forming concentric aureole in the soils (and alluvium) around the primary source, thus allowing diamond prospectors to estimate the primary deposit's location.The estimation and valuation of alluvial diamond reserves poses a different and more difficult problem. Several authors have addressed this problem, caused by:- Sampling - in order to find a diamond, even in those favourable conditions, large sampling volumes have to be used. - Mineralisation characteristics - diamonds tend to occur in clusters associated to morphologic traps.Satellite minerals have also been tested for alluvial diamond reserves calculations using classical statistical techniques, without a firm conclusion regarding its usefulness. It is not possible to prove or disprove the practical utility of diamond satellite minerals as a tool to estimate the diamond reserves of an alluvial deposit. The potential usefulness of the use satellite minerals as a predictor of diamond grade induced further investigation to prove or disprove its real value, testing techniques other than classical statistics.The application of Artificial Intelligence techniques - regression tress and rule induction - to this problem, using Angolan data, improves the overall satellite minerals predictability power of diamond grades.