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Targeting cultivar onto suitable growing environments by AMMI and SREG GGE biplot analysis- Future challenges

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Genotype x environment interactions (GEIs) is common phenomenon in variety trials and its presence usually complicates variety selection and release decision. This problem can be reduced by gaining insights into GEI processes and genotype adoption. We exploited the additive main effects and multiplicative interaction (AMMI) and genotype+(genotype x environment) interaction (GGE) biplot analysis as the statistical methods for evaluating chickpea promising lines using the grain yield data for Chhattisgarh regions of India. Study demonstrated that the AMMI and SREG (site regression genotype) GGE models were very effective for studying the pattern of GEI and interpreting chickpea grain yield data from multi environment trials. It revealed that the GE interactions were an important source of yield variation and its biplots were effective enough for visualizing the response patterns of genotypes and environments. The AMMI and GGE biplot analysis revealed similar results in identifying the ideal lines and in identifying the best test environments. AMMI and GGE biplot analysis revealed the two lines, G1 and G7, to be highly adapted in three mega environment of these regions. The use of this genotype by farmers would assure them stable performance across various environments. This genotype could also be used in a breeding program to develop new consistent-performing varieties. GGE biplot aided in comparison of performance of genotypes at different locations and determination of relative performance of genotypes at specific locations was done. According to the similar results of the AMMI and GGE biplot analyses obtained from our multi-environment trials data, both of these statistical methods can be used reliably by plant breeder.

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QR codes and steganography based secure fused biometrics

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Information integrity and security research has always been fixated on cryptography for so many years. Recently, a much less common method of security, called digital steganography, has been a growing area of research. Steganography is the art of hiding a secret message in an information container (object). From digital steganography, a technique for content authentication has evolved called digital watermarking. These methods can be efficiently used for ownership and digital data verification such as biometrics among many others. Biometrics spans the measurements and analysis of physical and behavioral characteristics of people for authentication and access control. It is represented by statistics of a face, iris, voice, DNA, fingerprint recognition, and hands geometry identification just to name a few. Fusions of such statistical data introduce fragilities, distortion, loss of information, and ultimately unfaithful recovery of biometrics. These conditions make it imperative to resort to robust methods to overcome such detriments. In this study, emphasis will be placed on methods that ensure truthful biometrics recovery. I present four methods that cartel steganography with quick response, QR codes for data authentication. These methods exploits some specific characteristics of QR codes that are capable of correcting erroneous data due fusions at the levels of sensors, feature extraction, and feature matching and authentication. A special consideration will be on one method that uses QR-codes as a guide to embed steganographic data in containers that can be efficiently used for uni-modal and multimodal traits biometrics that are subjected to unavoidable threats.

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