

Drilling process in underground coal mines

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Perception models for coal-rock strength
and drilling conditions

Coal-rock strength

Specific energy

Drilling conditions

GMM cluster

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Stable

Transitional

Harsh

Decision-making models for operating parameters

Feed speed

KDE

Fuzzy rule

Membership functions

Rotation speed

KDE

Fuzzy rule

Membership functions

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Drilling rig closed-loop control system