MIPS WORK-STATION FOR MINERALOGIC ANALYSIS

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ABSTRACT. The system offers powerful image processing
capabilities. The general purpose menu programs in the MIPS
system provide a flexible means of extracting particle size
information for a wide range of materials from a micro scale in
the material sciences.
Accurate measurements can be made of the individual components of
a particular material.Application areas include: inclusions in
analysing samples, grain boundaries, particle sizing.In a
research laboratory there are samples providing more detailed
information about its mineral characteristics, with final
detection of components and their agglomeration, and pseudo
colour improved interpretation.

Image analysis system features dedicated imaging hardware and
software combined in an integrated system for mineralogy.
The MIPS (MIcroscopical Particle Survey) system is an dedicated
purpose picture processing IBM PC/XT, PC/AT based systems.
Connect tv.camera to a low resolution optical microscope systems
will be able to analyze the two dimensional images of particles
and domains sizing.The particles image obtained by microscop is
taken from video signal output of the system.
MIPS system acquires, digitises this image and stores it in
its image memory (256 x 256 x 8 bit).Here local image processing
is possible.This image will be displayed.For maximum operator
convenience are used two monitors: monochrom and color for the
image presented and the other one is the control monitor where
all operational information, menus and results appear.Dedicated
application software package is available the user with complete
acces to the functions of the system with a simple MENU format.
In mineral processing with physical separation technique, the
effective concentration of an ore often depends on the degree of
liberation achieved during grinding.Traditional liberation
analysis has been an expensive and time consuming process.
The locked and liberated program provides a detailed
characterization of the composition distribution of particle
populations.
The results include area fraction of ore as a function of
particle sizing and the relative amounts of included, locked and
free grains.
Dedicated application software package is available the user
with complete access to the functions of the system with a simple
MENU format wich requires minimal training
Menu directs the user logically through an image analysis
sequence, wich allows the operator interact with the image: image
acquisition, optical correction, particle detection after
boundaries have been reconstructed, particle size distribution,
individual frame information summaries for statistics.

An entire analysis has been frame-based on an analysis of % area count for each features.

The MIPS image analysis system for automated analysis uses an automatic sample handling device.Two stepper motors drive microscope stages in the X and Y movement.With stage automation the operator defines the total area to be analysed and 200 - 500 images sequential analysis are to be performed for each samples.

The MIPS system will then automatically analyse the fields without operator intervention.

For optical correction entry of two matrix calibration factors, created during acquisition, this correction may be applied by software as a grey level linear tarnsformation.This feature corrects artifacts in an image wich may be caused by systematic effects such as uneven illumination or optical abberation.

Features to be measured are selected by virtue of their grey level contrast.Feature analysis involves the characterization of a feature in terms of its grey level intensity and its frequency histogram or predefined thresholds.The program is capable to analyse individual features even though the features are overlapping and partially hidden by predefined thresholds to produce contours.

This dedicated software package is capable of computing advanced statistical results from feature analysis data bases.All statistical data is plotted cummulatively for an analysed filed of samples.

We continually improve our software programs and create new application packages based on the needs of our users in research labs.

CONCLUSION : The advantages of this system are its simplicity, rapid data processing, and high accuracy.

The system described is a powerful, cost-effective, measuring tool that enables the scientist to evaluate quantitativ two dimensional densitometry of ore particles in a time saving manner.At the same time to obtain a permanent record of graphics and tabulated data.

The program is intended for use on a hard disk but can if required run on a floppy.

The simple MENU format requires minimal training.

References:
1. M.Bocu, S.Selinger: Work-station for mineralogic analysis.CAIP'89 Berlin.
2. M.Bocu, S.Selinger, M.Vaida: Analize granulometrice cu sistemul bazat pe prelucrari de imagini. PROCOMP'89 Bucuresti.

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