# HAEMATEC — An Expert System for the Interpretation of the Complete Blood Count Results produced by the Technicon Blood Cell Analyzers

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The Technicon H* (H1, H2 or H3) instruments are sophisticated blood cell analyzers that are used all over the world to perform complete blood counts. With the use of blood count results a large number of diseases and blood disorders can be diagnosed. HAEMATEC is an expert system that facilitates a medical technician, in a hematology laboratory, with the interpretation of the complete blood count results that are produced by the H* analyzers.

The system has been in routine use by a private pathology firm, Van Drimmelen and Partners, since August 1992. Branch laboratories of this firm are distributed over the whole of South Africa.

The system is embedded in Van Drimmelen's Laboratory Information System (LIS). This allows the system to obtain relevant demographic data needed for interpretations, to use coded comments from the LIS and to write finished interpretations to the LIS. From the technician's point of view the expert system appears to be a part of the LIS. HAEMATEC functions next to the H* in the laboratory and performs interpretations as new blood count results are produced. Interpretations, which may also include recommendations on other investigations that should be performed, can be modified by a technician. If no further investigation is necessary, the technician will send the interpretation (electronically) to the pathologist who will verify the interpretation and send it to the physician. In the case of blood samples that need further investigation HAEMATEC indicates which investigations should be pursued and, in some occasions, offers a differential diagnosis.

The system runs on a Hewlett Packard mainframe under UNIX. A PC version is also available. It is rule-based and applies about 1400 rules. The inference engine and other non-knowledge base components were developed in C.

For the firm the partial automation of the blood count interpretation process have numerous benefits, of which the most important are: The system introduces a significant reduction in the average time to perform a complete blood count interpretation. It also introduces another opinion on every blood count interpretation to assist the technician with his/her interpretation. As the system's knowledge was obtained from experts with vast experience, this feature is considered to be very valuable.

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