Applications of Knowledge-Based Systems in the Automotive Industry

Introduction:
AI Targets and Applications in Technics

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March 2015

What is AI?

Turing's test

A software is intelligent when a human cannot distinguish the software's behaviour from another human's behaviour.

Application: Medical Diagnosis

Psychoanalysis: Eliza   1966: Joseph Weizenbaum, MIT

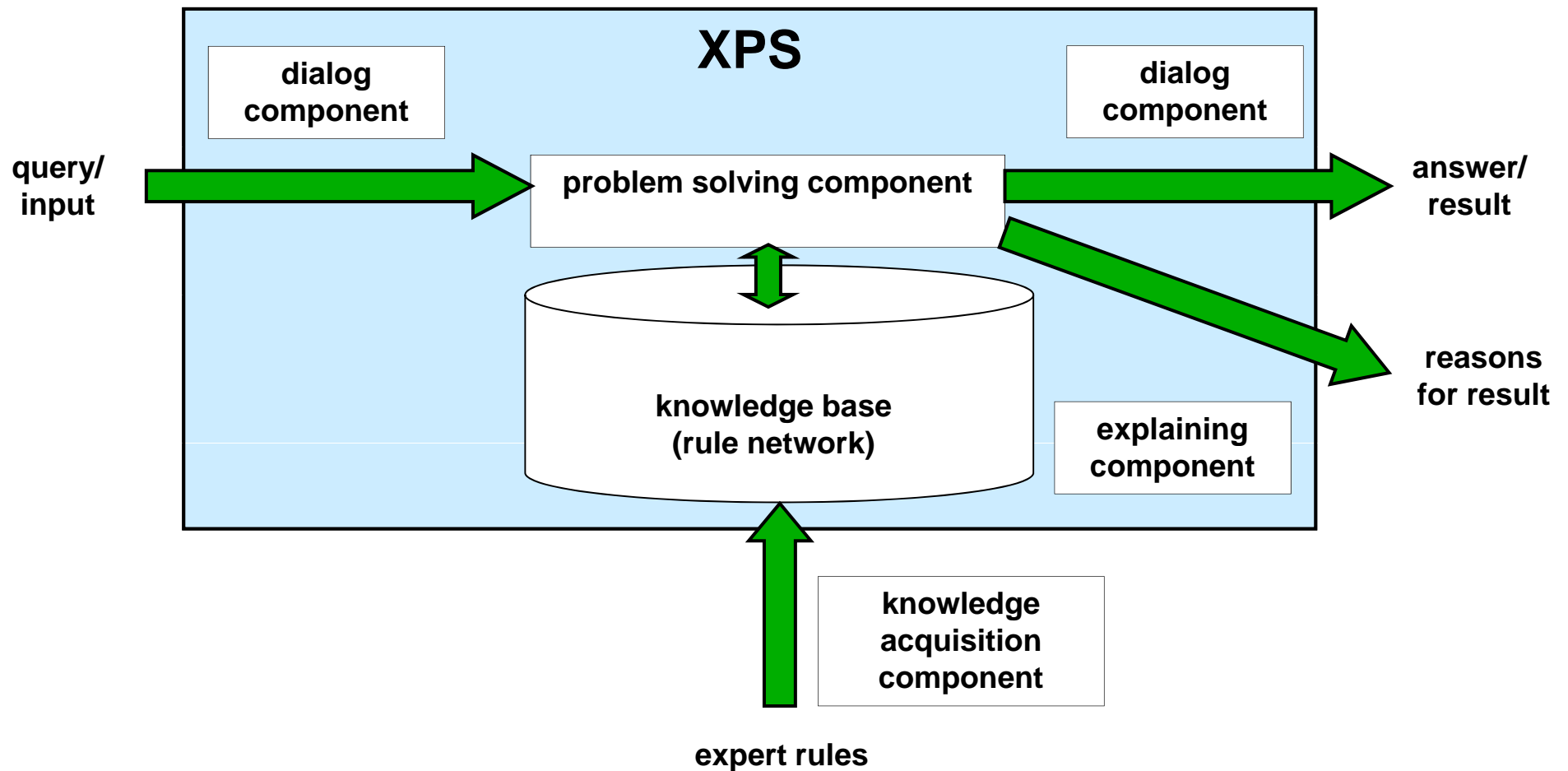A computer conducts a psychoanalytic session and behaves such „as normally expected by a psychotherapist".

- passed Turing's test with a lot of humans

- featured built-in speech assember and composer

- worked on generic rules to react

Medical Diagnosis: Mycin   1972: University of Stanford

- for diagnosis and therapy of infectious deseases

- worked with probabilistic rules

- good results

- little acceptance among physicians due to general distrust in computers

Basic Technology: Expert System

Architecture of an Expert System

XPS

dialog component

dialog component

query/ input

problem solving component

answer/ result

knowledge base (rule network)

reasons for result

explaining component

knowledge acquisition component

expert rules

Application: Technical Diagnosis

What is technical diagnosis?

Objective:
- technical system (e.g. car, train)
- observations (e.g. measured values, fault codes, customer reclaim), not normal.
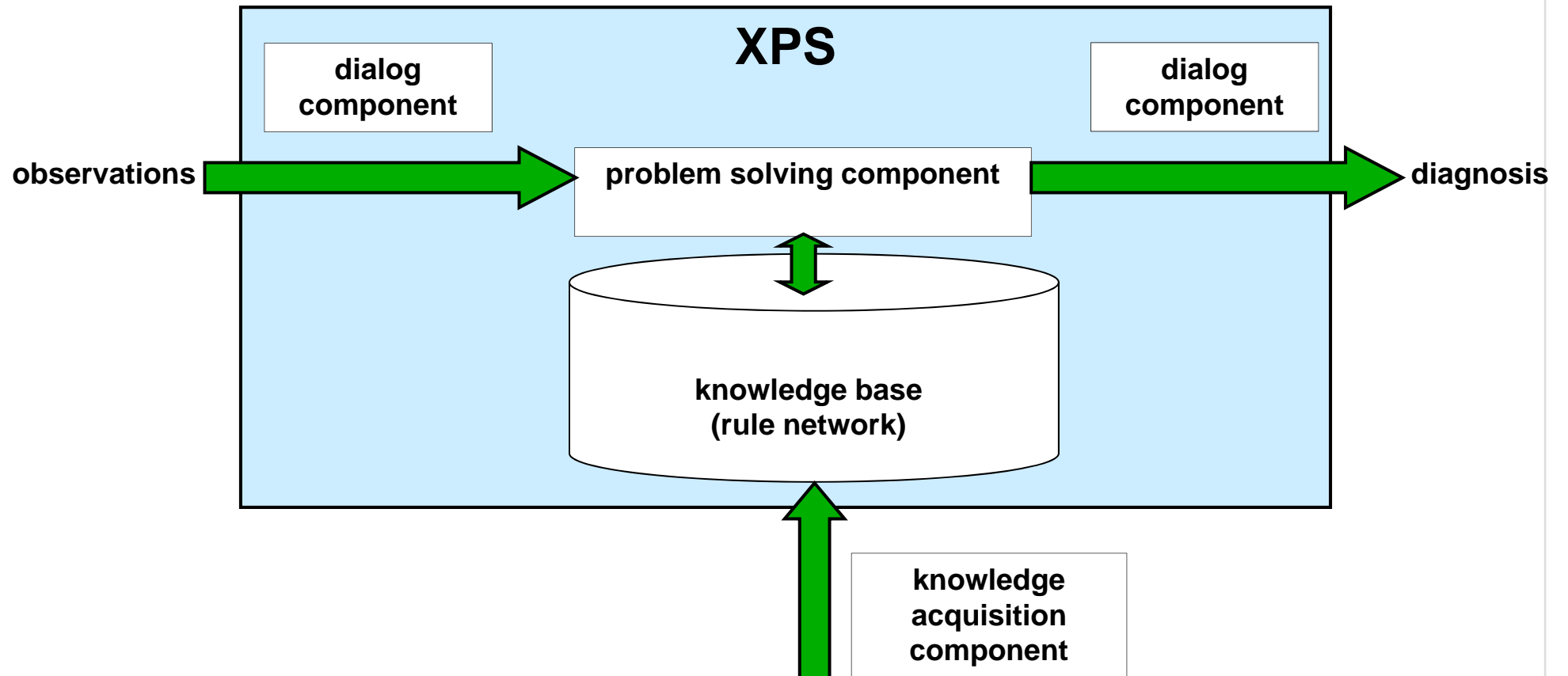
Task:
Identify,
- in which way the system is faulty
- accurate enough in order to recover the normal behaviour of the system.
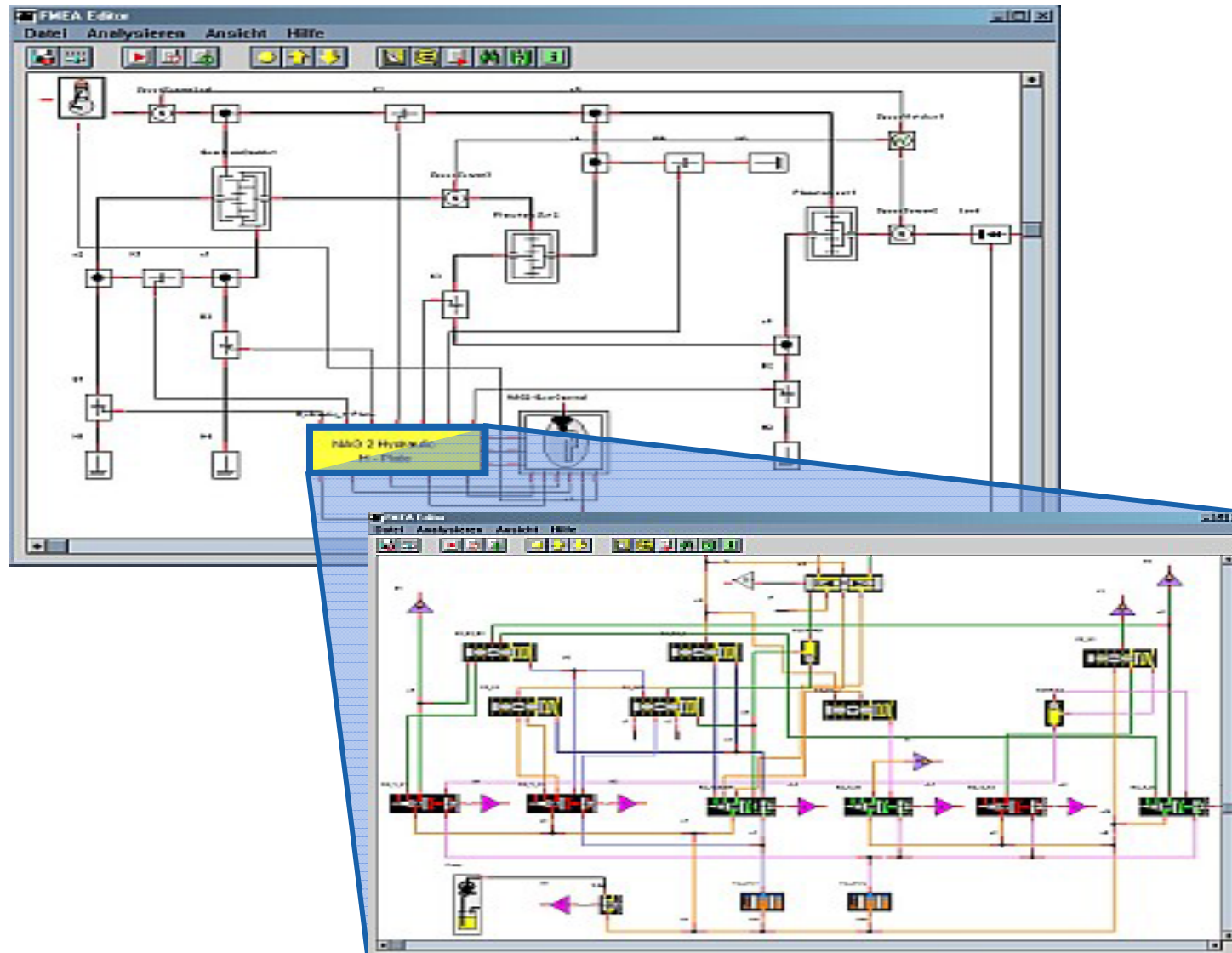
Application: Technical Diagnosis

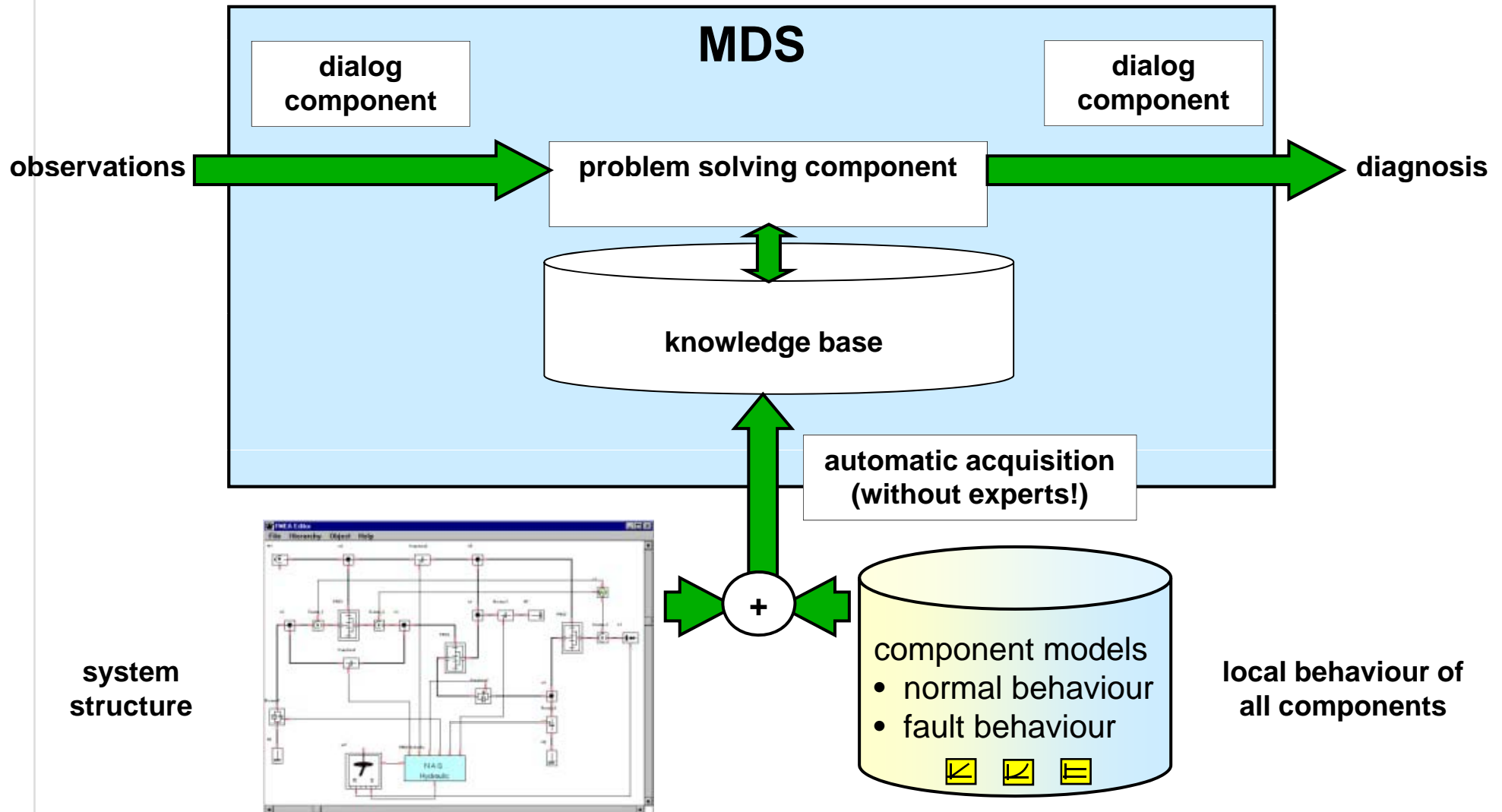## 1970ies: diagnosis = applying rules entered by experts

Application: Technical Diagnosis
What are the real targets of diagnosis?

Application: Technical Diagnosis

1980ies: diagnosis = model-based reasoning

Basic Technology: Knowedge-Based System

knowledge   +   problem solving component   =   KBS

data   processing rules

Architecture KBS (in general)