KAWASAKI STEEL TECHNICAL REPORT
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Artificial Intelligence and Wire Rods and Steel Bars

Artificial Intelligence Applications at Kawasaki Steel

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Synopsis :
In February 1984, Kawasaki Steel developed a real-time expert for its round billet-conditioning yard for the first time in the world. Thereafter, the company began to actively apply AI technology to many process control problems such as material flow and automation systems. This paper discusses the evolution of AI techniques to date in the context of FMS for steel production. In particular, the paper describes the application of such AI techniques as expert systems, fuzzy control theory, and near-network systems to planning, control, measurement, learning, and diagnosis in various processes, and their contribution to the expansion of problem-solving methods in an FMS environment.

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Synopsis:

In February 1994, Kawasaki Steel developed a real-time

and chance-free operation, have created tasks which can best be managed by human intelligence and/or experience. The obsolescence of the previously developed sys-

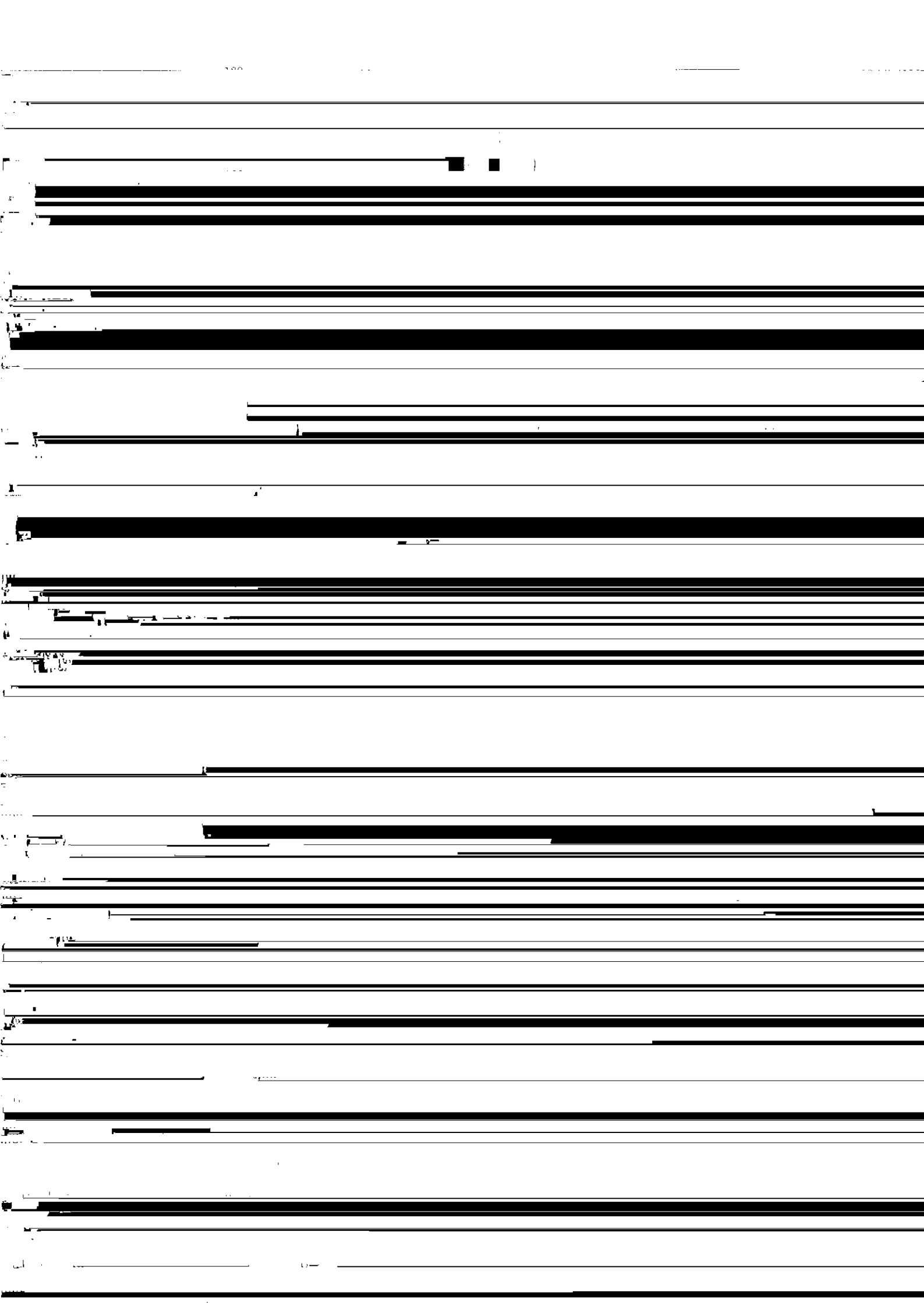


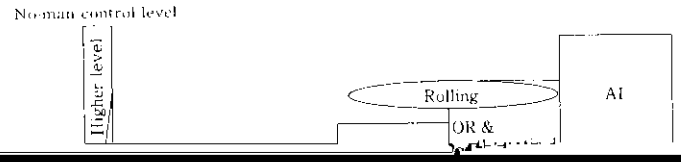
Table 1 Examples of AI applications

Problem types	Applications	Process										
		Raw materials	Ironmaking Energy	Steelmaking Cont. casting	Rolling Pickling Cont. annealing	Stainless steel Surface finishing Silicon steel	Warehouse Shipping yard	Others
Monitoring (interpretation)	Prediction of blast furnace temperature (NN)		○					
	Automatic recognition of marked letters on slabs (NN)			○				
	Classification of surface defects (NN)					○		
	Pattern recognition of microstructure photograph							○
Diagnosis	Diagnosis of coilling machine				○			

[redacted]

cation. It is also possible to classify defects on the surface of steel sheets by applying pattern processing to

3.3 Application to Setup Control Problems


No-man control level
Higher level
Rolling
AI
OR &

tion of the intermediary function between planning and ment time. The development of tools or some type

and control are included, indicating that the company is already following the trend indicating Mizoguchi's B

have been thematized from the viewpoint of technology transmission, and development is proceeding according-