

“Higher-order Cognitive Skills” and “Soft Skills” for a Digital World

Human minds are LIMITED

System 1	System 2
Automatic	Reflective
Uncontrolled	Controlled
Effortless	Effortful
Unconscious	Self-aware
Fast	Slow

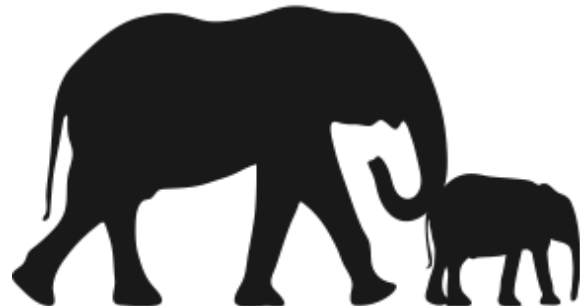
„...is usually so efficient...we have little reason to work hard mentally...“

„We are never going to get there, but we can move in that direction.“

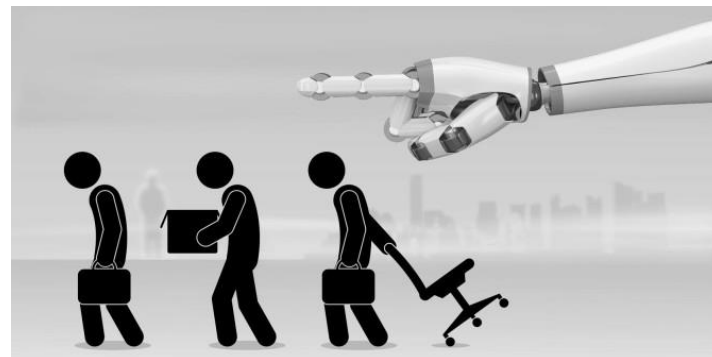
Classical view: What ought we do?

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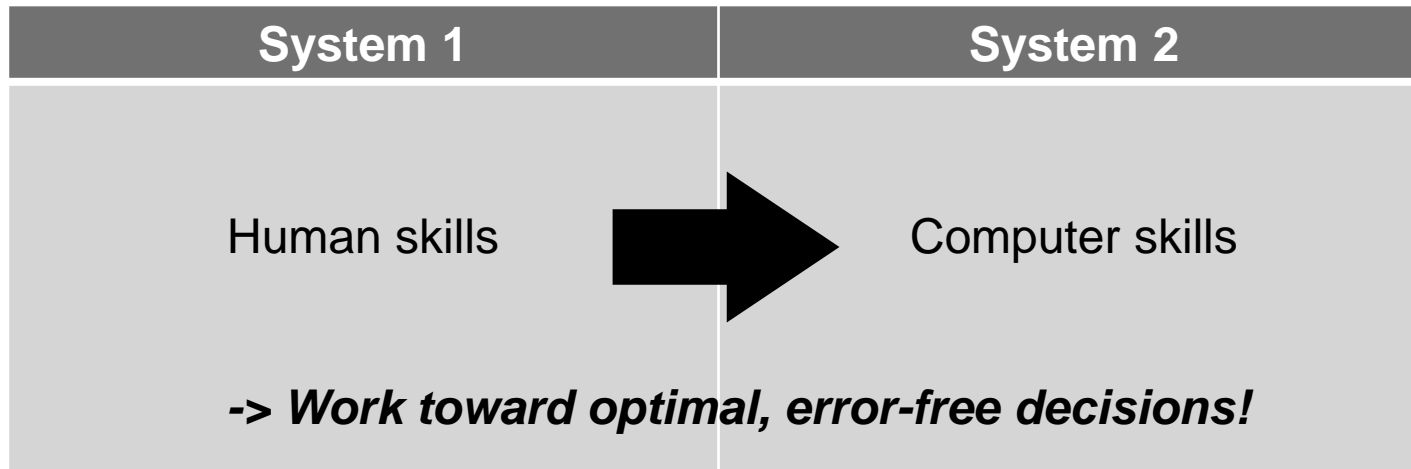
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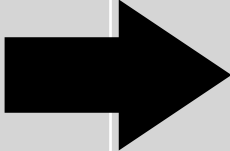
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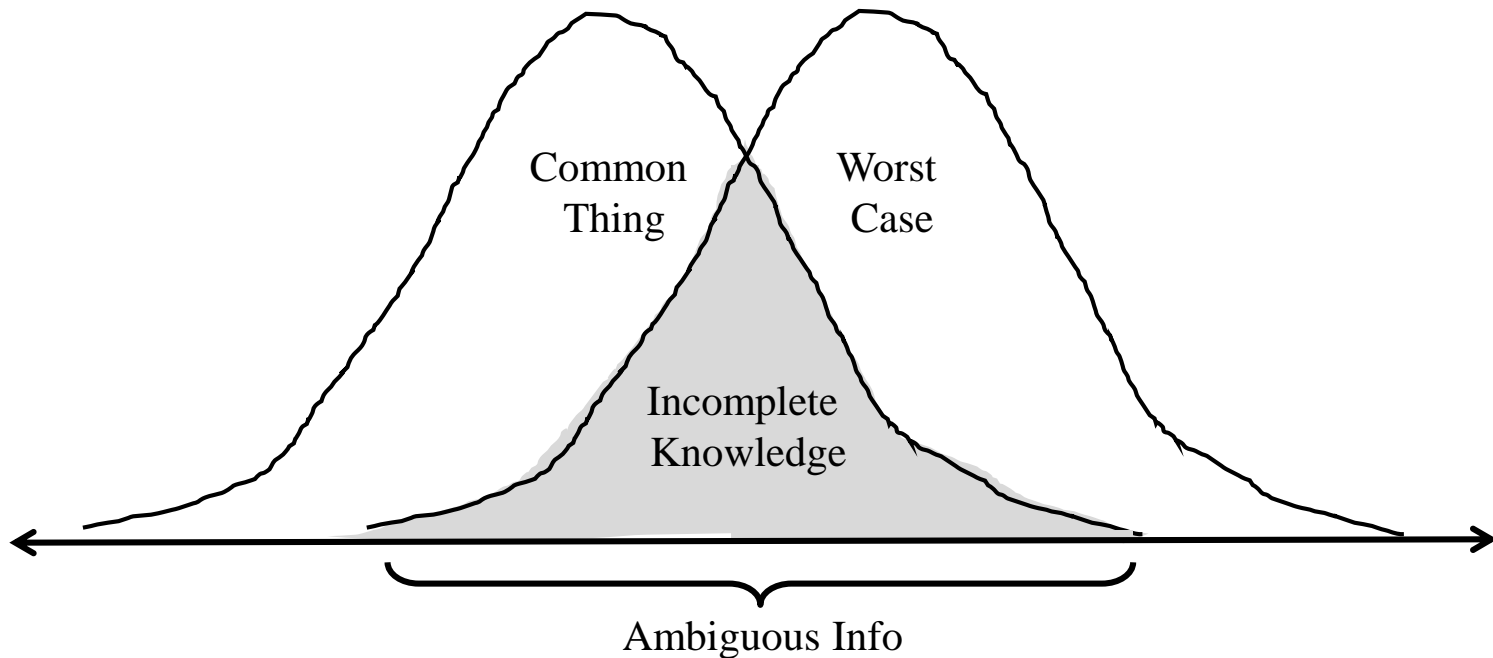
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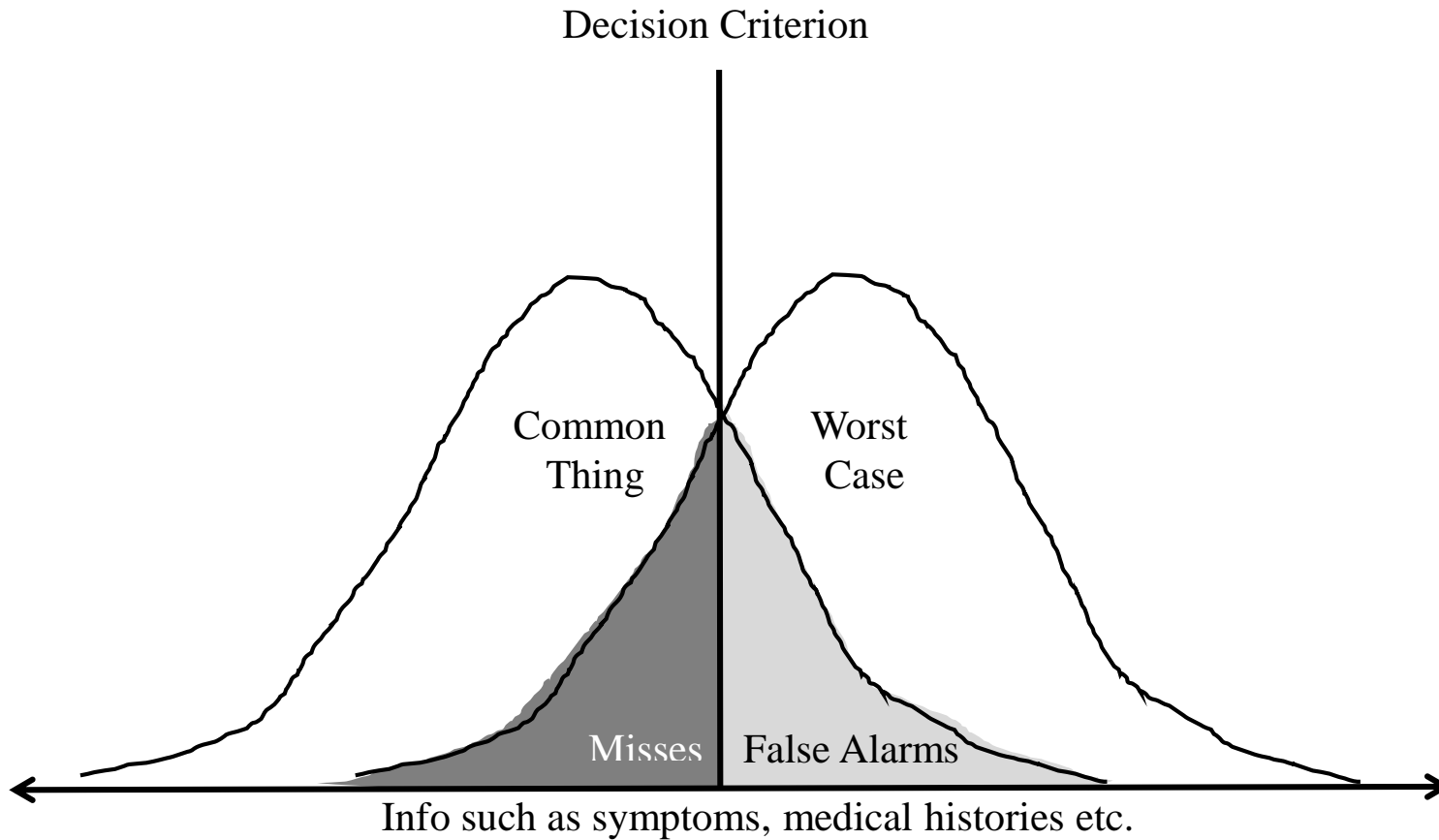
Well-structured versus Ill-structured situations

	System 1	System 2
Well-structured	Human skills	Computer skills
		
	-> Work toward optimal, error-free decisions!	
Ill-structured	<i>-> Incomplete knowledge / ambiguous information</i>	
	<i>-> Fuzzy performance criteria / value tradeoffs</i>	
	-> Errors are inevitable, but manageable!	

Example: Incomplete Knowledge / Ambiguous Info

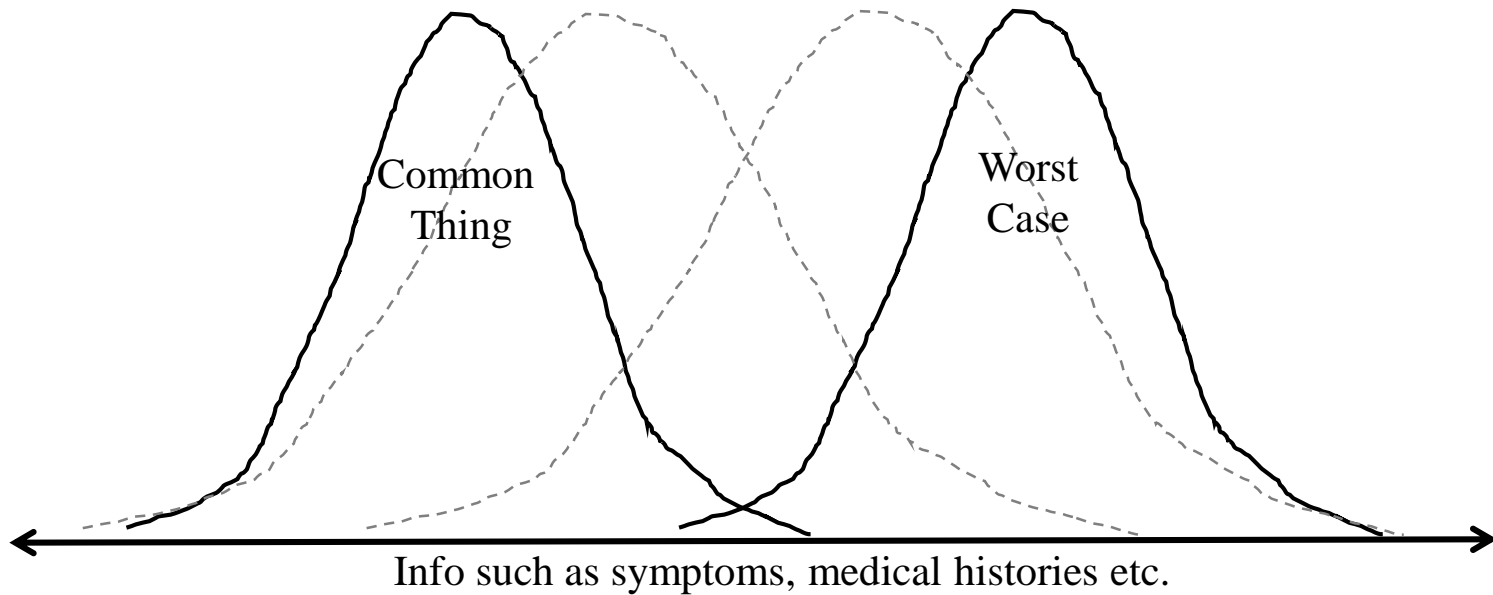


Example: Fuzzy performance criteria / Value tradeoffs



In ill-structured situations: What ought we do?

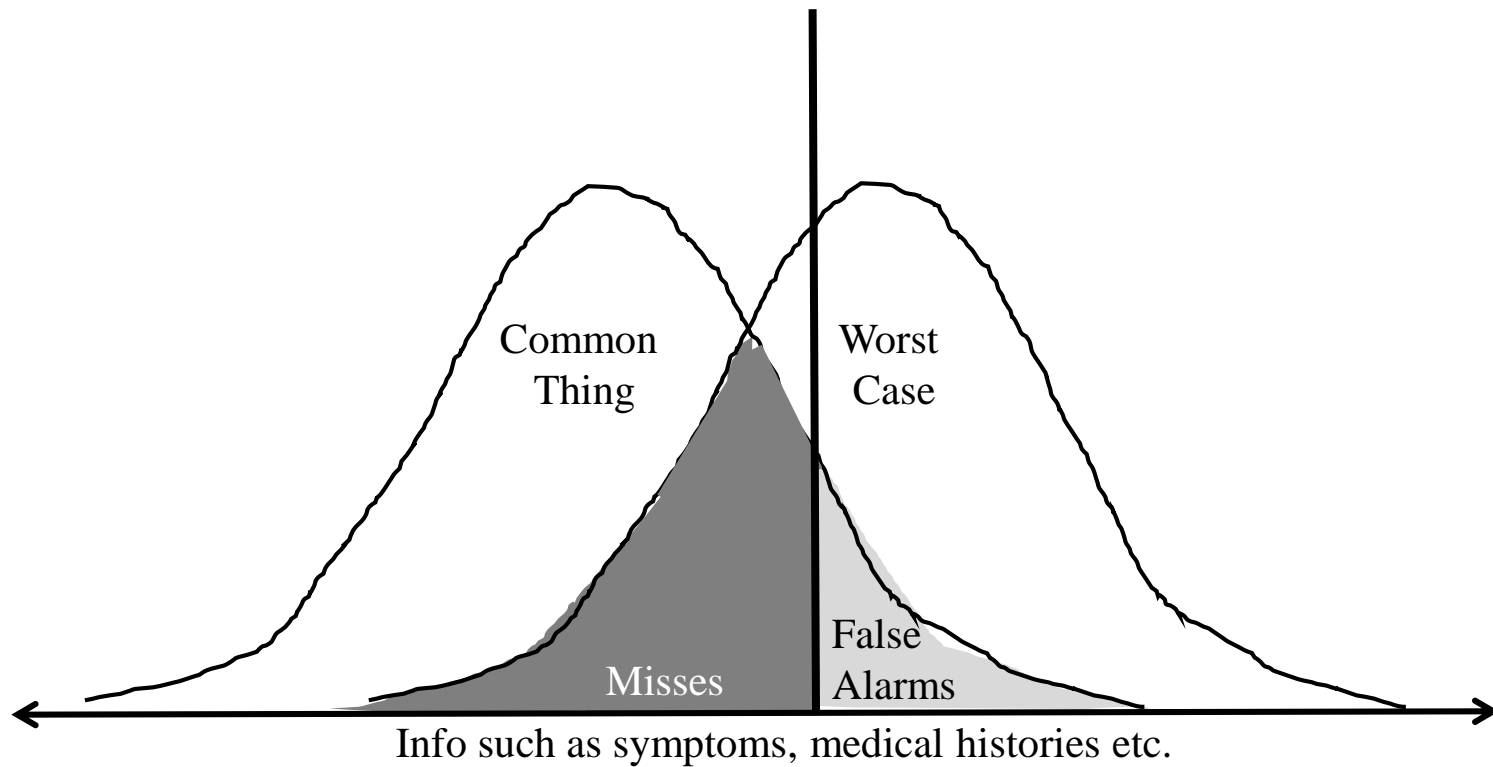
Increase Discriminability -> Search more predictive information



In ill-structured situations: What ought we do?

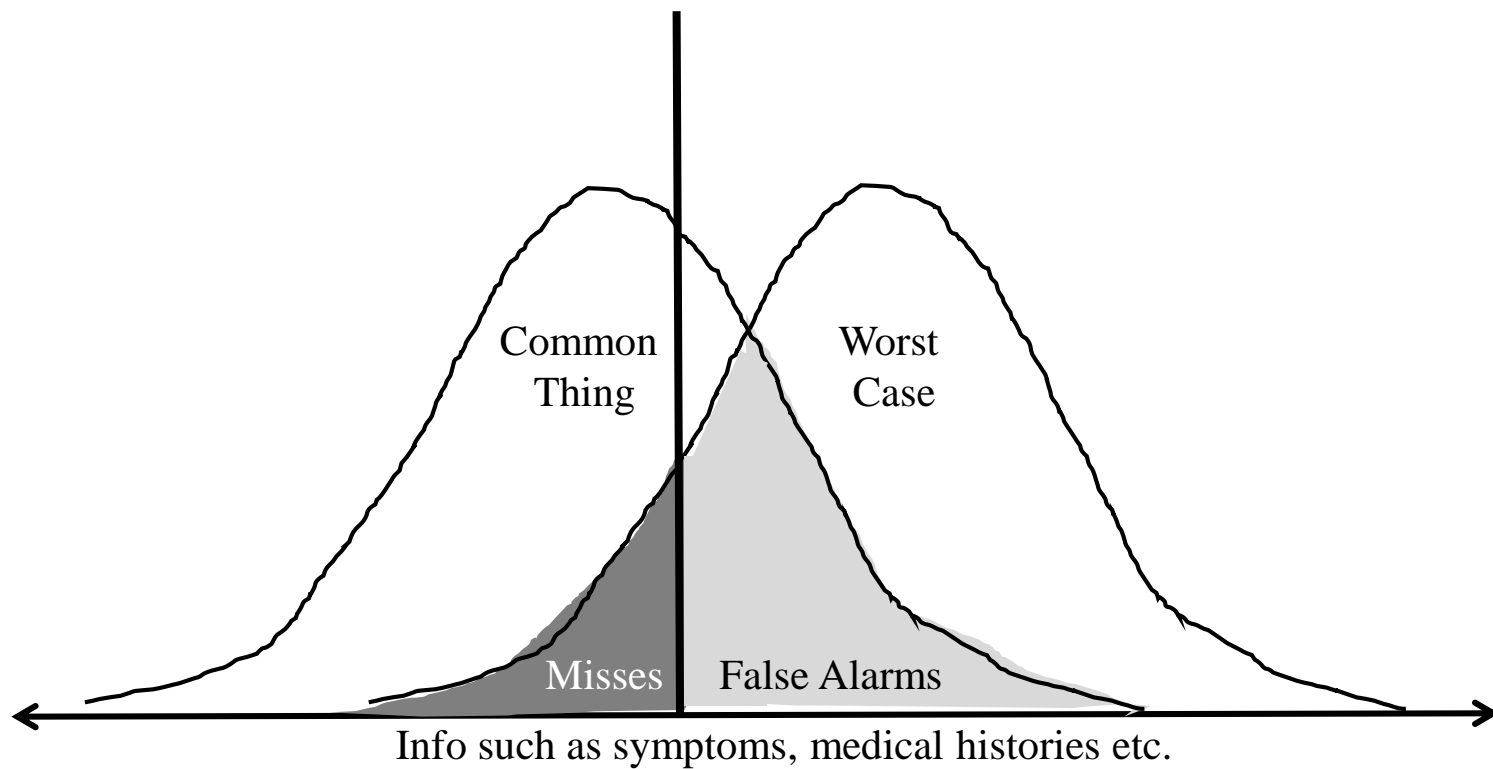
Make „smart“ rather than „dumb“ mistakes

-> tradeoff misses and false alarms



In ill-structured situations: What ought we do?

Make „smart“ rather than „dumb“ mistakes



In ill-structured situations: Boost rather than circumvent System 1

Teach and learn ...

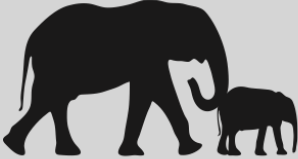
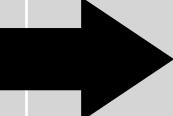

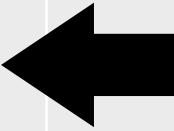
... how to ***increase discriminability:***

- > **teaching “differential diagnostic thinking”, *rather than “subjects”***
- > **learning based on trial and error, *rather than correct solutions***
- > **learning in human-machine teams, *rather than alone***

... how to ***make ‘smart’ rather than ‘dumb’ mistakes:***

- > **learning in rich socio-material contexts, rather than classrooms**
- > **maximizing learning from errors, while minimizing consequences**

The digital future requires a differentiated approach

	System 1		System 2
Well-structured	 <p>Human skills</p> <p>-> <i>Work toward optimal, error-free decisions!</i></p>		<p>Computer skills</p>
Ill-structured	 <p>Human skills</p> <p>-> <i>Errors are inevitable, but manageable!</i></p>		<p>Computer skills</p>