

## Layer 1: Frame — The Four Questions *What decisions does my system need to make?*

FRAME

<b>AGENCY</b>	W08	<b>PROACTIVITY</b>	W09	<b>COLLABORATION</b>	W10	<b>CONTEXT</b>	W11
<b>How much should the system do?</b> <small>Parasuraman et al. (2000)</small> <ul style="list-style-type: none"> <li>Levels of automation (1–10)</li> <li>Four decision factors</li> <li>HAX guidelines</li> </ul>		<b>When should it act?</b> <small>Horvitz (1999)</small> <ul style="list-style-type: none"> <li>Act / Ask / Wait</li> <li>Four designer questions</li> <li>Expected utility</li> </ul>		<b>How do they work together?</b> <small>Johnson et al. (2014)</small> <ul style="list-style-type: none"> <li>OPD: Observability, Predictability, Directability</li> <li>Collaboration spectrum</li> <li>P11 Variability, P12 Imperfection</li> </ul>		<b>What does the system know?</b> <small>Dey (2001), Jiang et al. (2023)</small> <ul style="list-style-type: none"> <li>6 context dimensions</li> <li>SA-1, SA-2, SA-3</li> <li>Contextual integrity</li> </ul>	

## Layer 2: Guide — The Principles *How should my system behave? What values should it uphold?*

GUIDE

<b>INTERACTION PRINCIPLES — WHAT TO DO</b>	<b>ETHICAL PRINCIPLES — WHAT TO ASK</b>
<p><b>P1</b> Make clear what system can do</p> <p><b>P2</b> Make clear how well system can do it</p> <p><b>P3</b> Show how system arrived at output</p> <p><b>P4</b> Communicate uncertainty</p> <p><b>P5</b> Scope services when uncertain</p> <p><b>P6</b> Support understanding of context</p> <p><small>P1–P10: Amershi et al. (2019)   P11–P12: Weisz et al. (2024)</small></p>	<p><b>P7</b> Explain when needed</p> <p><b>P8</b> Balanced initiative</p> <p><b>P9</b> User correctness</p> <p><b>P10</b> Smooth initiative transitions</p> <p><b>P11</b> Generative variability</p> <p><b>P12</b> Productive imperfection</p>
	<p><b>Transparency</b> <span style="float: right; font-size: small;">73 / 84 guidelines</span></p> <p><b>Justice &amp; Fairness</b> <span style="float: right; font-size: small;">68 / 84</span></p> <p><b>Non-maleficence</b> <span style="float: right; font-size: small;">60 / 84</span></p> <p><b>Responsibility</b> <span style="float: right; font-size: small;">60 / 84</span></p> <p><b>Privacy</b> <span style="float: right; font-size: small;">47 / 84</span></p> <p><small>Jobin et al. (2019) — 84 AI ethics guidelines surveyed</small></p>

## Layer 3: Build — The Components *How do I make intelligence visible and controllable in the interface?*

BUILD

<b>Confidence Indicators</b>	<b>Processing States</b>	<b>Explainers</b>	<b>Override Controls</b>	<b>Adaptation Indicators</b>
<small>Show how certain the system is about its output</small>  <hr style="border: 0.5px solid #008060;"/> <p style="font-size: x-small; color: #008060;">P4, SA levels</p>	<small>Reveal what the system is doing and why it takes time</small>  <hr style="border: 0.5px solid #008060;"/> <p style="font-size: x-small; color: #008060;">P3, OPD-O</p>	<small>Help users understand how the system arrived at a result</small>  <hr style="border: 0.5px solid #008060;"/> <p style="font-size: x-small; color: #008060;">P3, P7</p>	<small>Let users correct, undo, or redirect system behavior</small>  <hr style="border: 0.5px solid #008060;"/> <p style="font-size: x-small; color: #008060;">P9, P10, OPD-D</p>	<small>Signal when and why the system is changing its behavior</small>  <hr style="border: 0.5px solid #008060;"/> <p style="font-size: x-small; color: #008060;">P6, P8</p>

## Layer 4: Evaluate — The Method *Does my design serve the right values? Who benefits, and who is harmed?*

EVALUATE

<b>VALUE SENSITIVE DESIGN</b>	<b>SIX-STEP ETHICAL AUDIT</b>
<p><b>1. Conceptual</b> — stakeholders, values, tensions</p> <p><b>2. Empirical</b> — observe real impact on real people</p> <p><b>3. Technical</b> — analyze what the design enables and prevents</p> <p><small>Friedman &amp; Hendry (2019)</small></p>	<p><b>1.</b> Stakeholder map</p> <p><b>2.</b> Values inventory</p> <p><b>3.</b> Tension identification</p> <hr style="border: 0.5px solid #c00000;"/> <p><b>4.</b> Five-principle check</p> <p><b>5.</b> Failure scenario</p> <p><b>6.</b> Redesign</p> <hr style="border: 0.5px solid #c00000;"/> <p><b>Contextual integrity</b> (Barth et al., 2006) — Does the system violate information norms the user expects?</p>