

Context-Intention Interactive Computing

A Personalized Digital Reading Environment

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Motivation

Current AI assisted reading systems **do not effectively model user intent, metacognitive states, or reading motivation**, leading to systems that either over assist or misinterpret the users goals, this is because **current system do not attempt to understand why a user is doing something** acting more like a PDF reader with a built-in chat bot rather than smart assistive technology.

Problem

- Reading assistant and chat bots do not attempt to gauge user intent
- Reading Tools do not take any metacognitive states into account like stress and exhaustion.
- Users don't understand or trust how an AI assistant comes to a decision

Cognitive Reading Graph (CRG)

- Visualises cognitive effort during reading
- Highlights focus, difficulty, and important concepts
- Makes AI reasoning more transparent
- Supports metacognitive awareness and self-regulation
- Enables personalised reading support

Reader Behaviour



Intent + Cognition Tracking



AI Analysis



CRG Visualisation



Adaptive Support

solid nodes are also each assigned a colour

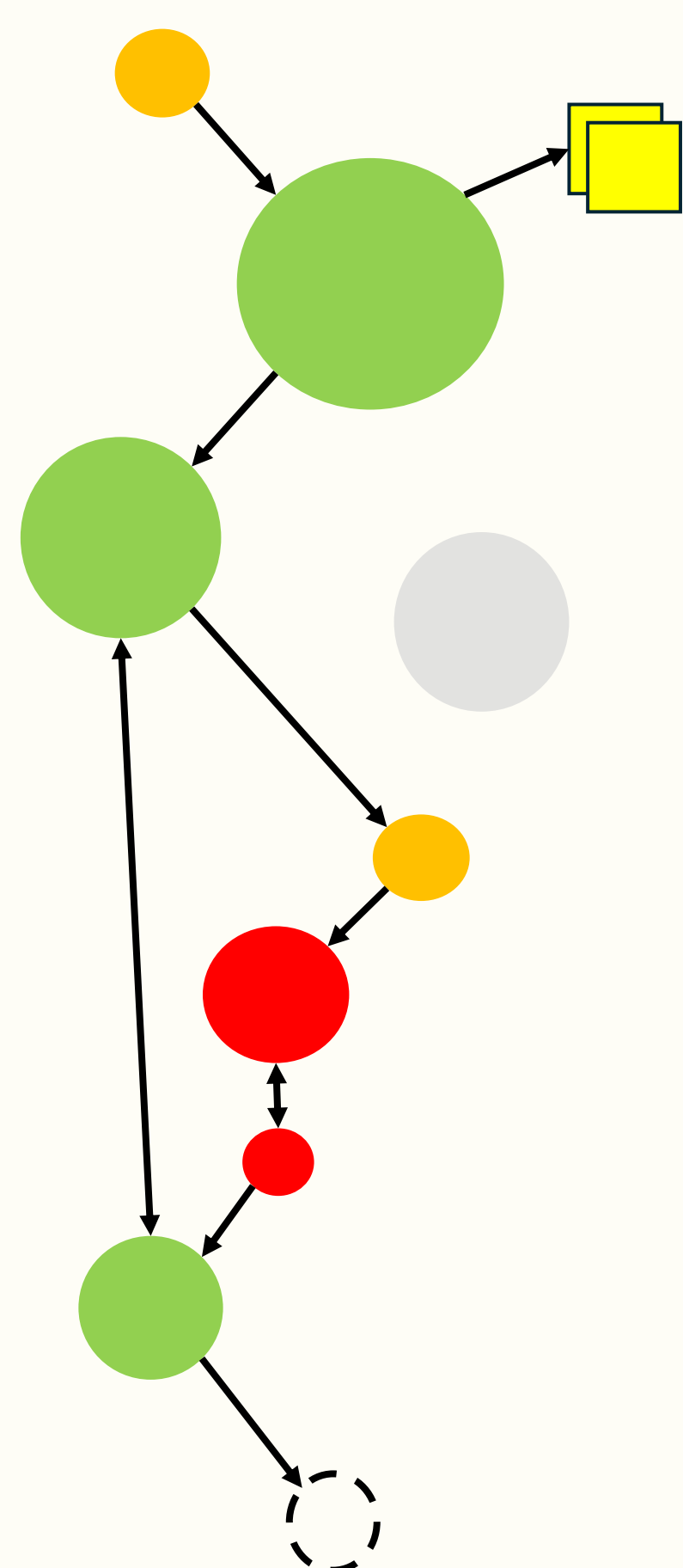
- Ideal cognitive load
- High cognitive load
- Strained cognitive load

Application of CRG

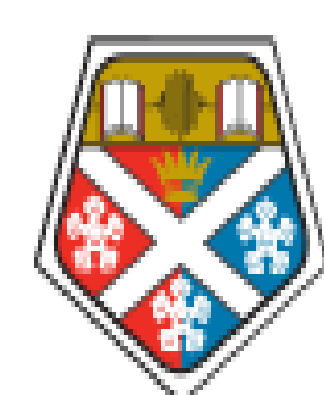
- CRG is built up as the reader progresses
- Each node represents a key sections of the text
- Edges depict reading path from the top down
- The size of each node is based of predicted relevance
- solid nodes are sections where the reader has spent time.
- Ghost nodes are areas which the reader has skipped

Expected Benefits

- Improve understanding of ones reading comprehension
- Better cognitive awareness
- Personalized reading support
- More user relevant AI responses
- Greater AI Transparency such as visualized importance
- Reduced cognitive overload



Example of CRG



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