

Initiative

- what is it?
- how is it used?

intuitive idea:

System: “Welcome to National City Bank. Press or say one to open a new account. Press or say two to check your balance. Press or say three to hear about special offers that will save you money”

User: “uh... I want to close my account.”

System: “Welcome to National City Bank. Press or say one to open a new account...”

vs

System: “Welcome to National City Bank. How may we help you?”

User: “uh... I want to close my account.”

System: “OK, transferring you to the next available agent...”

Walker & Whittaker (1990)

- rules to determine initiative (aka control)
- initiative contributes to discourse structure

Jordan & DiEugenio (1997)

- control and initiative are different

Chu-Carroll & Brown (1997)

- task initiative vs. dialogue initiative
- model for predicting initiative holder

Heeman & Strayer (2001)

- adaptive use of initiative

Walker & Whittaker (1990)

Problem: lack of usability in expert systems.

- users can't participate in ways they'd like
 - participating in reasoning process
 - asking questions
- lack of understanding about dialogue
(interpreting fragmentary input)

Solution: mixed-initiative systems

Walker & Whittaker (1990)

Approach (based on previous work):

Define utterance types:

assertions, commands ...

Define rules:

if (Assertion && response to question)

 initiative = hearer

if (Command)

 initiative = speaker

...etc...

Walker & Whittaker (1990)

Example: **Let's Identify Utterance Types and Controllers**

E1: "And they are, in your gen you'll find that they've relocated into the labelled common area"

C1: "That's right"

E2: "Yeah"

C2: "I've got two in there. There are two of them."

E3: "Right."

C3: "And there's another one which is % RESA"

E4: "OK um"

C4: "VS"

E5: "Right"

C5: "Mm"

E6: "Right and you haven't got ... those labels"

Walker & Whittaker (1990)

Types of Control Shift: **Abdication**

E1: “And they are, in your gen you’ll find that they’ve relocated into the labelled common area”	Assertion	E
C1: “That’s right”	Prompt	E
E2: “Yeah”	Prompt	C

Walker & Whittaker (1990)

Types of Control Shift: **Repetition/Summary**

E1: “And they are, in your gen you’ll find that they’ve relocated into the labelled common area”	Assertion	E
C1: “That’s right”	Prompt	E
E2: “So, they’ve definitely relocated into the common area”	Prompt(?)	C

Walker & Whittaker (1990)

Types of Control Shift: **Interruption**

E1: “And they are, in your gen you’ll find that they’ve relocated into the labelled common area”	Assertion	E
C1: “Actually, they’ve not relocated into the common area at all.”	Assertion	C

Walker & Whittaker (1990)

Observation: **Subsegments**

A: The maximum amount will be \$400 on their tax return

B: 400 for the whole year?

A: yeah, it'll be 20%

B: um hm

A: Now if indeed they pay the \$2000 to your wife...

Note: the indented turns are a subsegment,
the first and last turns are related.
This is a hierarchy.

Walker & Whittaker (1990)

Observation: **Initiative and Collaborative Plans**

Interruptions are needed, for collaborative plans:

- if listener L believes speaker S doesn't know a relevant fact, L should interrupt.
- if listener L believes speaker S's assertion is ambiguous, L should interrupt
- if listener L has identified an obstacle or knows of a step that has already been done(?), then interrupt.
- if listener L has identified an ambiguity in the plan, then interrupt.

Walker & Whittaker (1990)

Summary:

- identified initiative in dialogue
- observed discourse structures and collaborative elements (plans, grounding?)

Notes:

- this is an analysis; no specific discussion of systems yet?
- very simple/straightforward approach - will it cover everything?

Jordan & DiEugenio (1997)

Summary: divide initiative/control into

- control: dialogue level
- initiative: problem-solving level

Importance for systems:

- Lack of initiative = impasse in problem-solving
- Reaching agreement (repetition = loss of initiative)
may mean time to move on to new problem
- Solution may be blocked by earlier commitment. (?)

Chu-Carroll & Brown (1997)

Problem: Walker/Whittaker/Stenton model of initiative failed to distinguish between task and dialogue initiatives.

Solution: new model of dialogue, with predictive model.

Task initiative: “tracks the lead in the development of the agent’s plan”

Dialogue initiative: “tracks the lead in determining the current discourse focus”

Chu-Carroll & Brown (1997)

S: I want to take NLP... Who is teaching NLP?

A: You can't take NLP because you haven't taken AI, which is a prerequisite. **(Takes dialogue initiative, not task initiative)**

vs

S: I want to take NLP... Who is teaching NLP?

A: You can't take NLP because you haven't taken AI, which is a prerequisite. You should ... satisfy your requirement, and [audit] NLP. **(Takes dialogue initiative and task initiative)**

Chu-Carroll & Brown (1997)

Approach: identify set of cues

- explicit request
- linguistic information: Discourse
eg: question, lack of new information
- domain knowledge: Analytical
eg: invalid or suboptimal idea

All of these can influence the **dialogue** initiative.
Some can also influence the **task** initiative.

Chu-Carroll & Brown (1997)

Exercise: working with cues - can we come up with examples?

How could “repetitions” be used to give the hearer task initiative?

How could “invalidity - action” be used to give the hearer task initiative?

How could “suboptimality” be used to give the hearer task initiative?

How could “ambiguity - action” be used to give the hearer task initiative?

Chu-Carroll & Brown (1997)

Conclusion:

What have we learned from working with this (?)

Is it usable as more than an analytic tool?

Heeman & Strayer (2001)

Problem: Systems don't adapt their initiative systems.

Solution: Use discourse (intentional) structure. (?)

Approach:

Identify initiative take-over, by:

Forward acknowledgement (anticipating speaker and filling in what they're going to say)

Other-Contribution (add content that's not predicted from initiator's speech)

After which initiative returns to initial holder.

Heeman & Strayer (2001)

Examples:

Forward acknowledgement (anticipating speaker and filling in what they're going to say)

A1: We should move the train to -

B1: To Spotsylvania, and load it up with oranges.

A2: Right, and then we'll move it to Chicago.

(?)

Heeman & Strayer (2001)

Examples:

Other-Contribution (add content that's not predicted from initiator's speech)

A1: We should move the train to -

B1: We should make sure we load it up with oranges before we move it.

A2: Right. We'll load it and then we'll move it to Chicago.

(?)

Overall Conclusion

- identification of problem in system-initiative system
- initial work on concept of “initiative” to resolve that
- refinement/extension of those concepts
- applying ideas not only as analytical tools after the fact, but also to (potentially) control the system
- all this is done as other ideas in discourse structure, grounding, etc. are developing.