

# Convergence to Local Minimum

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## A Recent Personal Experience

Three different groups with three different speech technologies

All have different dogma regarding user and machine behaviors

“Please clearly say the phrase <password>.”

“Say your birthdate, for example 18 June, 1949.”

“Did I get that right, yes or no?”

All were adamant that their solution was:

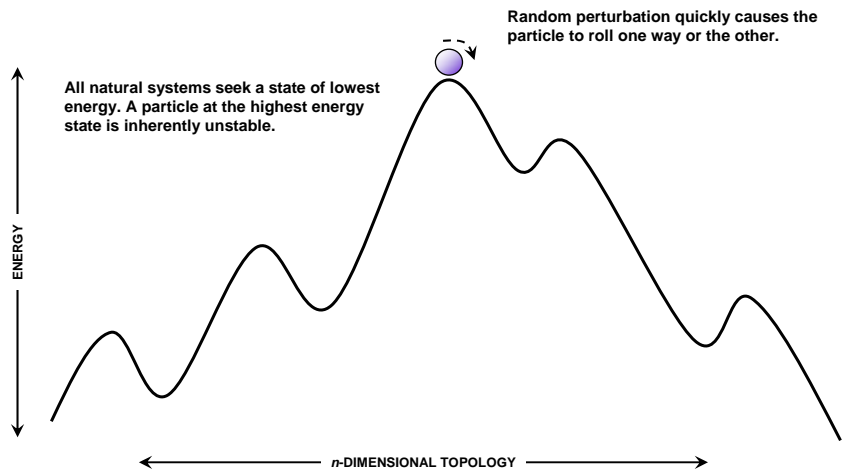
Best—could not be changed

Based on vast data and experience

The most natural and pleasing to the ear

All thought the other solutions “sounded odd”

## Entropy—A Physical Analogy

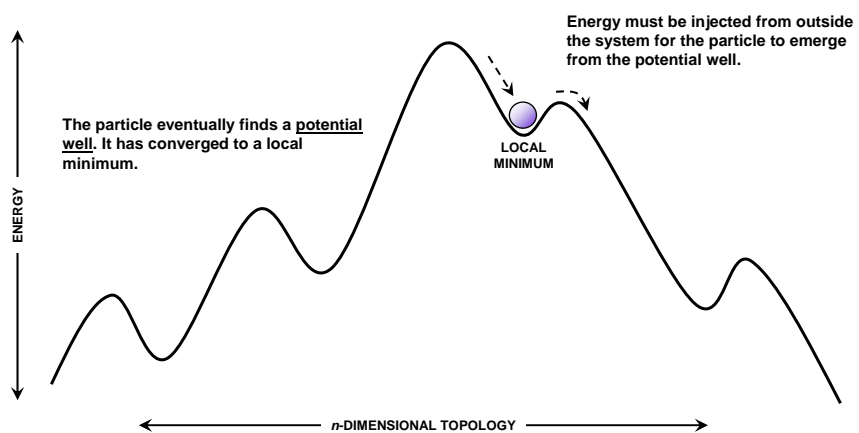


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## Convergence to a Local Minimum

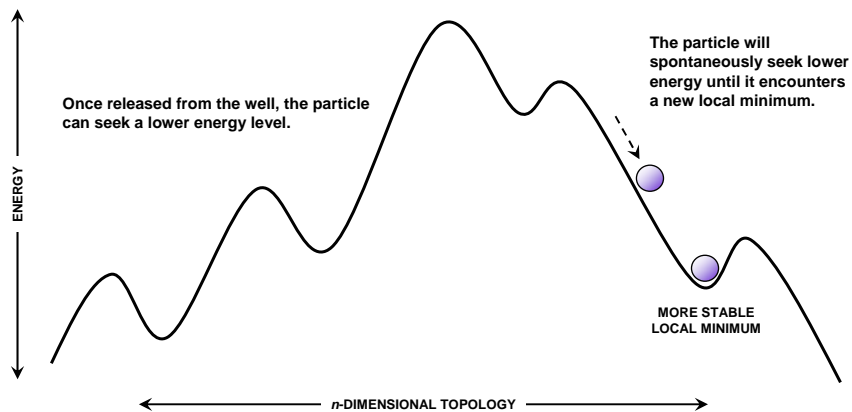


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## The Analogy with User Interface Design

Overall system performance is multidimensional

A number of different elements contribute to observed behaviors

Attempting to change single elements often degrade rather than improve

Once testing arrives at a point where every change makes things worse ...

The human-machine system has converged to a local minimum

Only multiple changes (including paradigm shifts) will lead to improvement

Many UI designs reach their local minima and then become fixed

The "energy" required to overcome the potential well can be great

Multiple elements must be changed concurrently to be effective

The change always requires a new idea or an alternative hypothesis

Resistance to change is common and often insurmountable

This is an example of groupthink, commonly observed in design

Fussing with single elements becomes "deck-chairs on the Titanic"

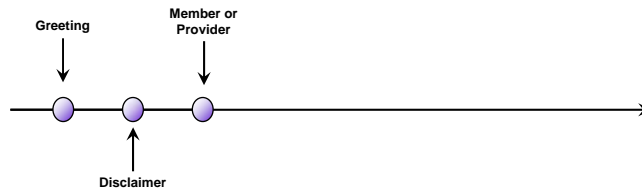
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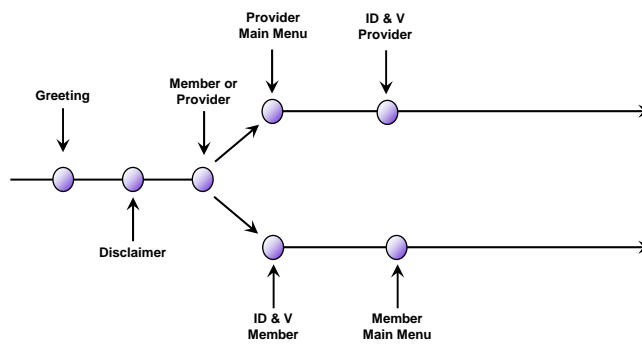
## Beads On a String

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## Beads On a String

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## **Positive IVR Trends**

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Contemporary IVR systems are improving

Fewer bad practices

- Long greetings (including web announcements)
- Tedious error recovery
- Over-emphasis on personae for speech recognition
- Backward-looking and error-centric or machine-centric dialogues
- Ebullient grounding (“Got it!”)

More good practices

- Speech recognition applied properly
- Smaller and tighter grammars
- Better integration of NL, directed dialogues, DTMF

## **Positive IVR Trends**

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Utilization numbers are rising in many segments

Less “containment” and “trapped-user” syndrome

Better understanding of tradeoffs and balances

Five competing goals CAN be balanced

- 1) self-service
- 2) access to human agent
- 3) routing
- 4) call-handling time
- 5) marketing and branding

## **Top Stubborn Problems**

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### Conflicting decisions due to conflicting business goals

- Customer satisfaction versus cost savings
- Ads, slogans, and promotions up front
- Constant confusion over agent access rules

### Scripting atrocities

- "For ..." and "To ..." prompting
- "And ..." and "Or ..." composite prompts
- These are borrowed from touch-tone and almost always wrong for speech

### Interactive effects and low-level behaviors

- Turn taking and barge-in errors plus poor recovery
- Inability to manage speech and touch-tone together
- Instability and error amplification

## **Result of Design Mistakes**

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### Users:

- Get lost in menus and other selection lists
- Make wrong selections
- Listen to menus or instructions multiple times
- Hang up
- Opt out to human agents

These behaviors are commonly observed with both touch-tone and speech

## **Discussion—How Is Change Likely to Come About?**

Standards

Design philosophy

Cost-lowering software tools

Professional societies such as AVIOS

Open source

Other

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