

A Context-Sensitive Framework for Mobile Terminals for Assisting Type 2 Diabetes Patients

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Summary

- Background
- Context Sources
- Context Modelling
- Rule Processing
- Adapting the Phone
- Diabetes Tool

Enhancements

- Contribution
- Conclusion



Background

Diabetes Self-Management

Key Result Areas:

1. Blood Glucose Measurements
2. Nutrition Management
3. Physical Exercise

And for Type 2 Diabetes not using Insulin:

4. Education



Background



© NST Self-Help Tool

General Problems:

- Timing of Calls/Messages
 - At night
 - In meetings
 - During physical exercise
- Missed alerts
 - High ambient noise
 - Low ring tone
- Backlight causing discomfort
- Conflict with phone services
- Graphical content issues

Context Sources

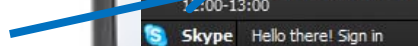
Always keep battery in check



Check time of day



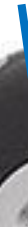
Consider busy status from calendar



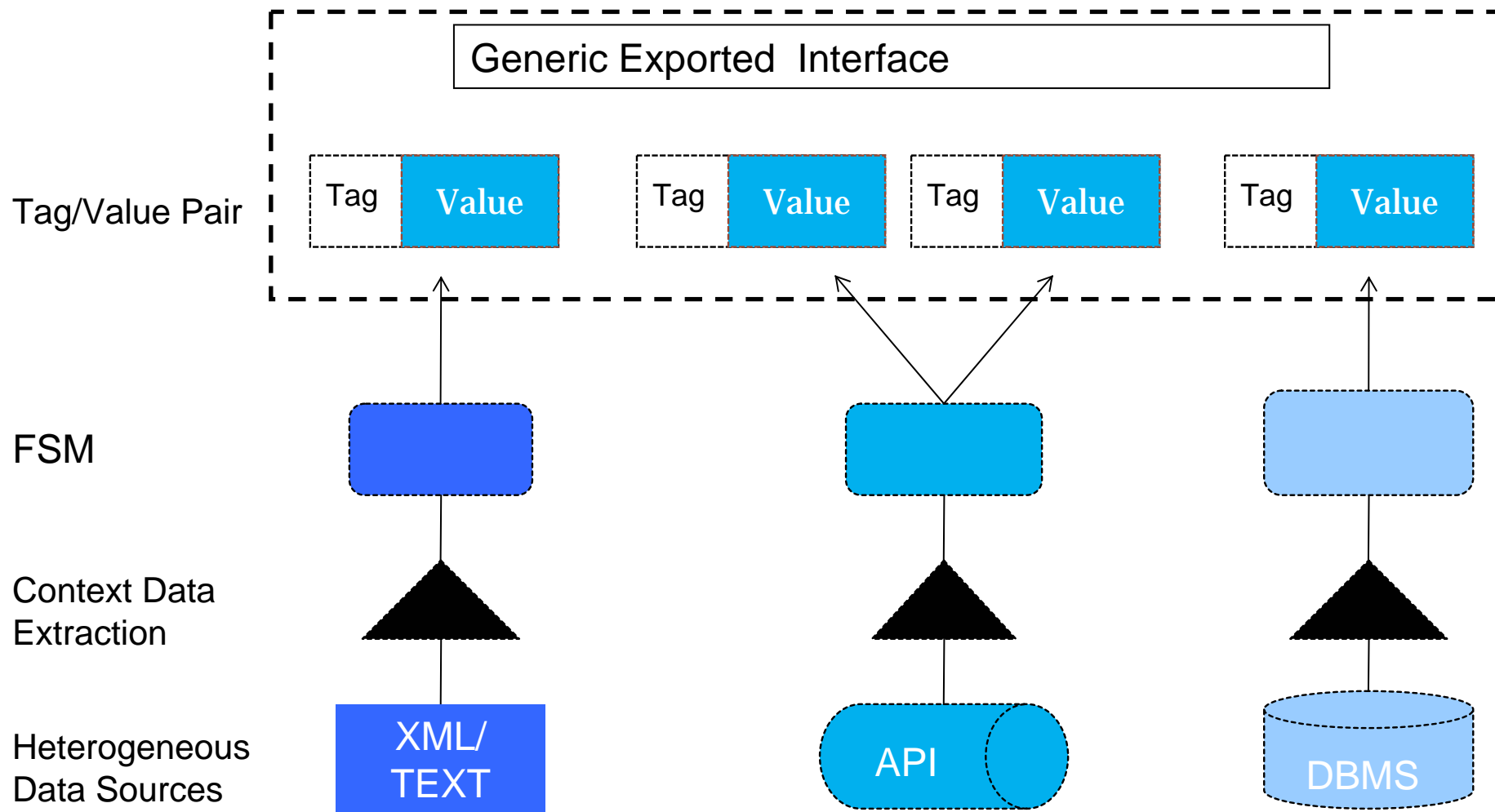
Calculate ambient noise using microphone input



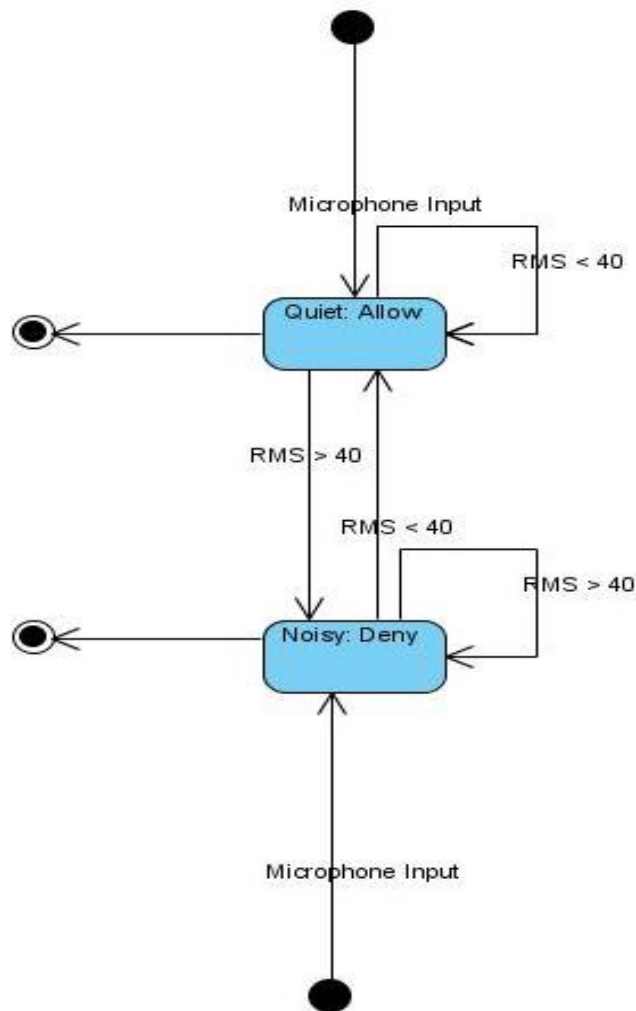
Calculate ambient light using camera & adjust backlight



Context Modelling



Context Modelling



Tag Value

NOISE	1
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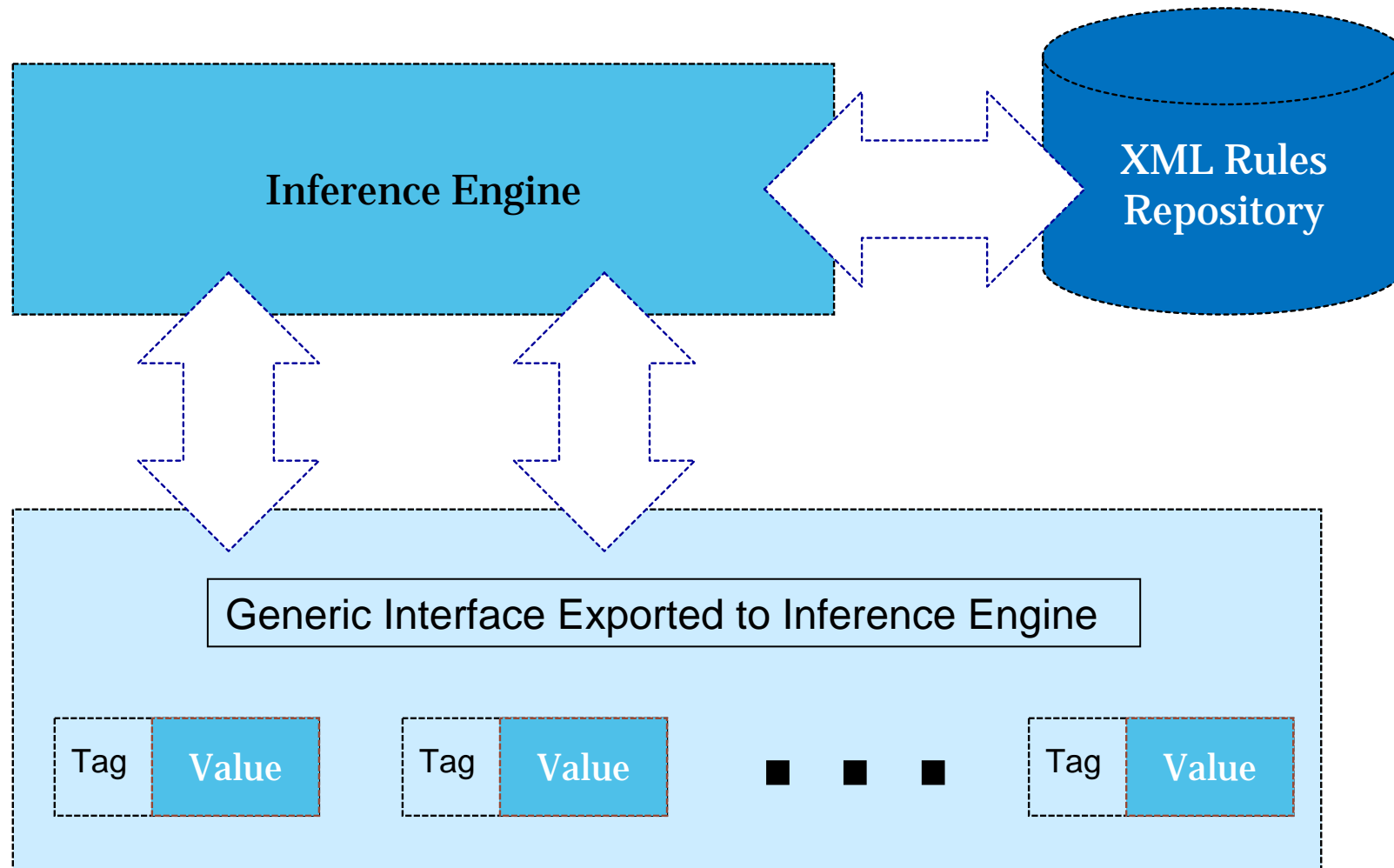
TIME	0
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- Deterministic 2-State Finite State Automaton

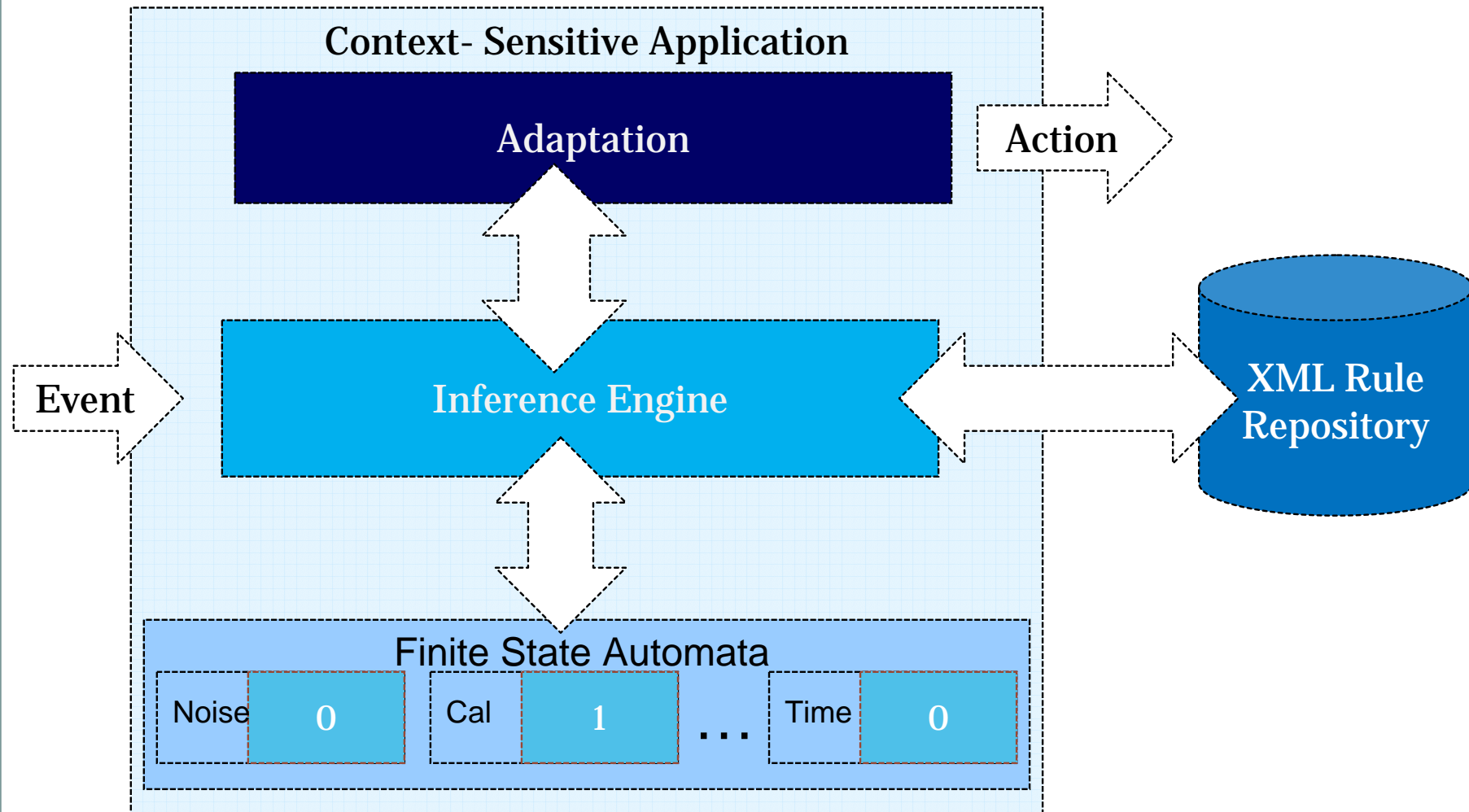
- 1-bit Binary Representation

State Transition Table	< 40	> 40
	Quiet	Quiet
Noisy	Quiet	Noisy

Rule Processing



Adapting the Phone – Event-Driven



Adapting the Phone

- Adapt Backlight
- Adapt Volume
- Adapt Alert Method
 - Volume-adjusted Ring
 - Volume-adjusted Beep
 - Vibration
 - LED Flashes
 - Voicemail
 - Defer Alert
 - A Combination
- Adapt Self-Help Tool



Diabetes Tool Enhancements



© NST Self-Help Tool



- Sound Effects
- Graphical Enhancements
- Feedback Timing
- Message Themes
 - General Education
 - Positive Reinforcement
 - Meal Advice

Contribution

- Stimulated creative thinking when identifying potential sources of context information, especially from otherwise unlikely sources.
- Designed a potentially useful generic abstraction of context data using simplified state machines with a 1-bit binary representation.
- Demonstrated how an event-driven architecture can be a solution to constructing context-sensitive applications in resource-starved environments.



Contribution

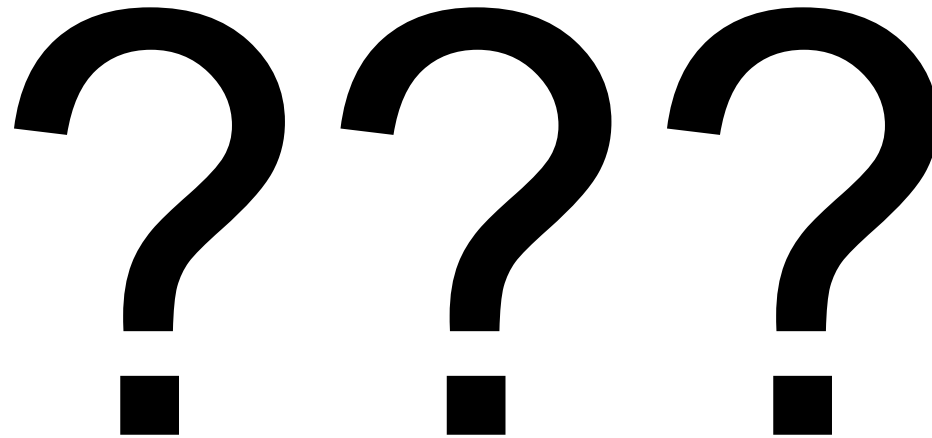
- Demonstrated how a complete separation of rules from logic enhances customizability
- Contributed to enhancing usability of disease management tools on mobile platforms.
- Developed reusable components and objects.



Conclusion

- Context information can be used to enhance usability of patient-operated disease management tools on mobile terminals
- Longitudinal tests are required to examine whether increased usability translates to patients retaining use of the tools over longer periods

Thank You for Listening!!!



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