

Intelligent Agent for detection of ATM Theft

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Abstract

ATM service is considered as more profitable service of a bank. There are many pre caution have been determined to use an ATM but still some threats are face by customer to use an ATM, such as existence of another person with a customer will be encountered as threat for ATM. The focus of this paper is to design the architecture of an intelligent agent which incorporates with ATM agent to detect the existence of unknown person with customer and takes some safety steps for customer. Finally proposed intelligent can be enhanced to detect the more theft face by customer of ATM.

Keywords: ATM, Intelligent Agent, Threats.

1. Introduction

In artificial intelligence, an intelligent agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through effectors. The rational performance of an agent is observed in terms of the performed task. In computer science intelligent agent refers to software agent which is not a rational agent [6].

Automatic Teller Machine (ATM) is a profitable service of bank which allows the customer to access the financial transaction in public space. A customer need a magnetic chip card to access the financial transaction. ATM agents are used to replace the function of bank teller or clerk of bank [7]. During the use of ATM many thefts are face by customer such as theft of couriers, theft of personal identification number, burglary of ATMs and theft of money from ATMs by bank. Besides these, another theft is encounter for customer which is the existence of another person in ATM room. To overcome this theft an intelligent agent is proposed, whose objective is work with coordination of ATM agent and make the secure financial transaction of customers. The functions of proposed software intelligent agent are formally described by using Object Constraint Language (OCL) for further enhancement and evaluation of proposed intelligent agent [8].

2. Intelligent Agents

In AI, Intelligent Agent is used to observe and act upon an environment to achieve some predefine goals. Intelligent agent may have ability to learn from its environment. In computer science, an intelligent

agent is referred to as software agent while in economic it is refer as agent. A simple agent is also known as agent function which maps every possible percept sequence to a possible action. Agents are classified as physical agent, temporal agent, spatial agents, processing agents, learning agents, decision agents and believable agents. The environment of an agent can be define in different way such as observable or partially observable, deterministic or stochastic, episodic or sequential, static or dynamic, discrete or continuous and single agent or multi agents [3].

3. Automatic Teller Machine

An automated teller machine (ATM) is a computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space. With the use of an ATM, customers can access their bank accounts for cash withdrawals and check their account balances. ATMs are normally placed inside the premises of banks, but can also be placed in different locations such as shopping centers/malls, airports or restaurants. Now-a-days Automated Teller Machines (ATM) is considered as very common technology for dispensing notes to cash-holders. The ATM structure for cash withdrawal differs across countries [2].

The first ATM was installed in the USA in 1969. ATMs have a positive effect on the nominal currency growth, but this effect is not very robust. Among all profitable services of bank ATM is consider as more profitable service because t attract number of non-bank customers. The structure of ATM comprise on main components such as CPU, magnetic chip card, PIN pad, Secure crypto processor, function keys and vault. The main theft which are relevant to ATM are [1,4].

- Theft of couriers who fill ATMs with cash
- Theft of personal identification numbers
- Theft by electronic data interception
- Theft by fraudulent electronic transactions
- Theft of money from ATMs by bank
- Burglary of ATMs
- Vandalism of ATMs
- Fraudulent use of ATM cards obtained from customers through dummy ATMs that keep their cards.

4. Object Constraint Language

The Object Constraint Language (OCL) is a formal language used to describe expressions on UML models. These expressions specify the invariant conditions that must hold for the system being modeled or queries. The main features of OCL language are:

- OCL is pure specification language
- OCL is not a programming language
- OCL is a type language.

The basic constructs and its description is shown in table-1.

Table-1: Basic constructs of OCL

Basic Constructs	Description	Example
Context	Define context for the expression.	<ul style="list-style-type: none"> • context Person • context Company inv: • context c : Company inv: • context Person::income (d: Date) : Integer
Self	Refer to the contextual instance.	self.TotalPerson=0
Pre, Post	Constraints on operations	Pre : TotalPerson=0
Initial and Derived Values	Represent the initial or derived value of an attribute	Init : Self.Totalperson=0
Basic types	Boolean, Integer, String, Real	-----
Enumeration Types	It defines a number of enumeration literals	context Person inv: gender = Gender::male
Comment	It describe comments	-- this is a comment
Classifiers	types, classes, interfaces, associations and data types.	-----

Basic Constructs	Description	Example
Selection	Comparison of values	If condition then statements end if

5. Architecture of proposed Intelligent agent

The function of proposed intelligent agent is incorporated with the function of ATM Agent. This is revealed as informally through use case diagram of UML for security purpose and shown figure-1 [5].

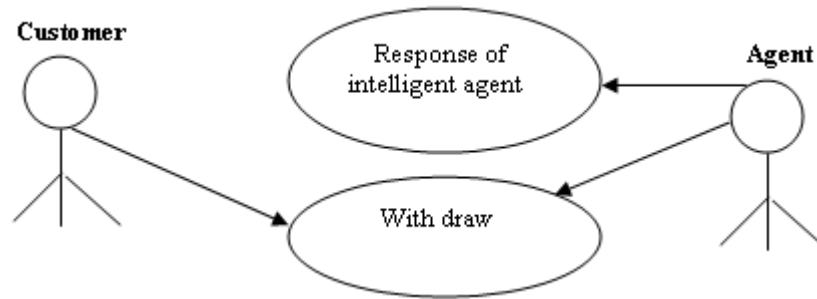


Figure-1. Use case diagram of Proposed intelligent with ATM agent

The structure of proposed intelligent agent with ATM agent is shown in figure-2. The architecture of proposed intelligent agent is divided into two parts. The first part comprise on sensor of intelligent agent which detect the existence of more than one person in room of ATM and send information to first software module of second part of intelligent agent. The second part comprise on two software modules. The function of first module is to interact with sensor of first part and retrieve information, process the information and send to second module.

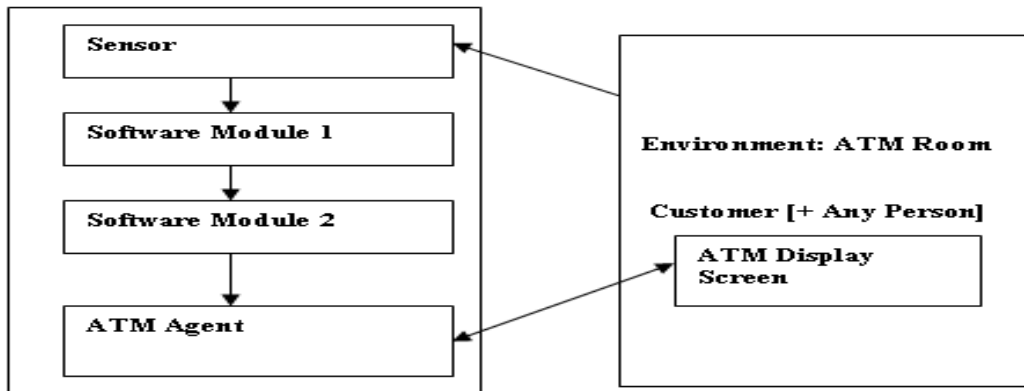


Figure-2. Structure of Proposed intelligent agent with ATM agent

The second software module interact with ATM agent and display information for customer about the existence of another person, and it also prompt to customer for continuation of transaction in normal or secure form. If customer wants to continue transaction in secure form then second software module makes the integrated processing with ATM agent and process the transaction of customer in secure form. The processing of both software modules based on the algorithms which allow the communication among customers, ATM agent and sensor. The function of proposed intelligent agent with ATM agent is shown in figure-3.

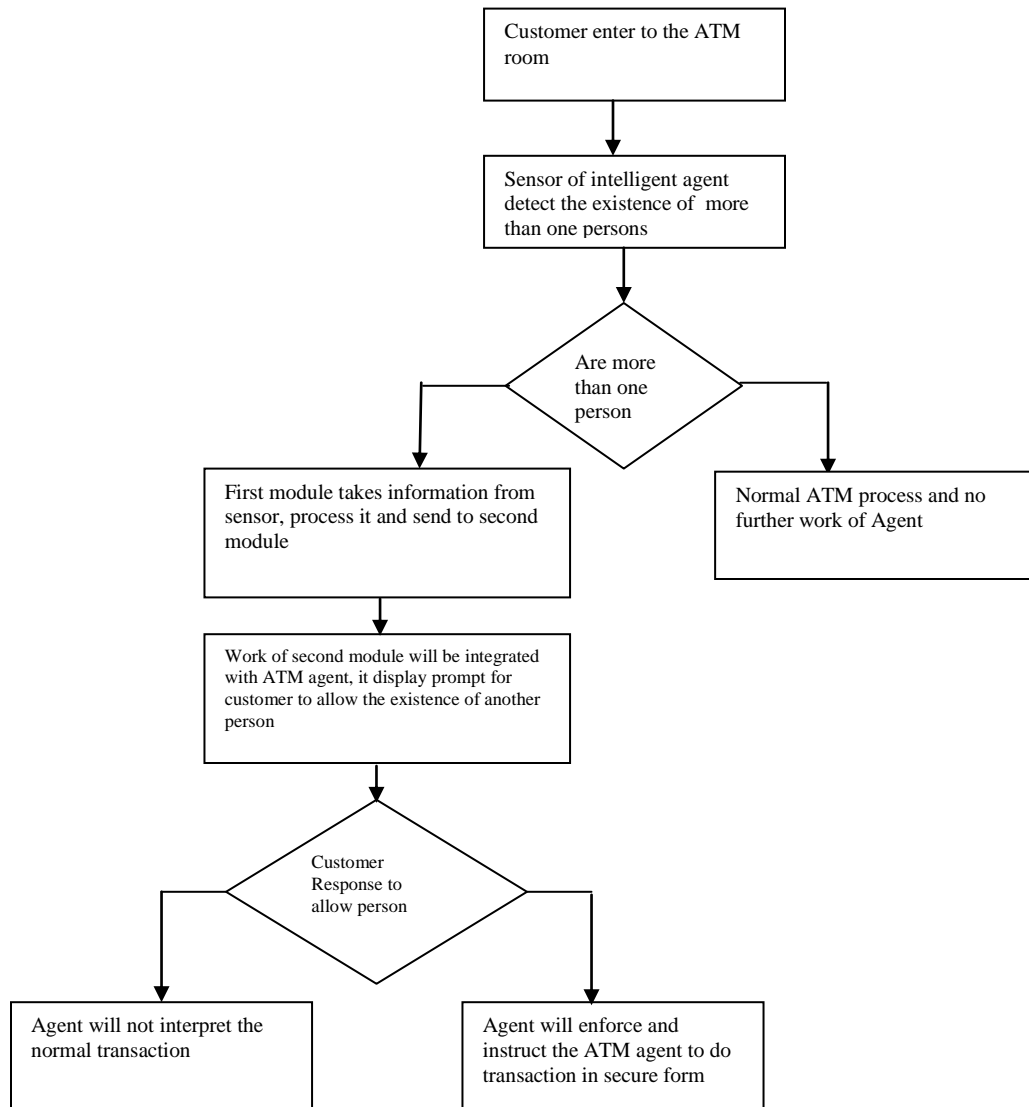


Figure-3. Flowchart for function of proposed intelligent agent with ATM agent

For formal specification of the working of proposed intelligent agent three context are defined which are Sensor, Customer, ATM Agent, Module1 and Module2. The OCL expressions for formal specification of sensor's work are:

```

-- Expression to define Sensor context
Context Person
Context Person: Response=boolean
Context Sensor::TotalPerson : Integer
Init : Self.Totalperson=0
Derive : Self.TotalPerson=Person.size();
If Self.TotalPerson>=2 then
    Context Module1::Observe(Self.TotalPerson)
End if
  
```

```

Context Module1
Context Module1::Observe(TP : integer)
    Self.Process();
  
```

```
Context Module2
Context ATMAgent.Info: String
Self.Info=Module2.Process()
Context ATMAgent:Display(Info)
If Person.Response=True then
    Context ATMAgent.NormalTransaction()
Else
    Context ATMAgent.SecureTransaction()
End if
```

6. Conclusion and future work.

Financial transactions of customer through ATM are faced by number of thefts. Among these thefts one is related with the existence of more than person (causes robbery on gun point) in ATM room. The focus of this research is to propose an intelligent agent, whose function is incorporated with the function of ATM agent, to make the transaction of customer more secure. The structure of proposed intelligent Agent is divided into two parts i.e. sensor and software modules. The functionality of software modules can be modified to remove those thefts which are face by customer in ATM room. These thefts are proposed for future work.

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