AMTS (Automated Money Transfer Service)

Ashim K. Das

MCI International
2 International Drive
Rye Brook, NY 10573

Abstract

Unformatted natural language messages originating as telex messages, constitute a sizable portion of money transfer instructions that are processed by a Bank. MCI's AMTS Automated Money Transfer Service) provides the international banking community with the latest in automated technology for processing such large volumes of incoming message traffic. AMTS scans incoming messages and sorts out time-critical money transfer orders. In processing these messages, AMTS extracts the unformatted information, using natural language processing techniques, verifies the information it finds and outputs payment instructions to the bank's system. This approach to message handling can reduce staff time and overhead and increase the overall productivity of back office operations. MCII has installed AMTS service for Irving Trust and Chase Manhattan Bank, two of the major Money Centre Banks in the New York metropolitan area.

THE MONEY TRANSFER DOMAIN

The typical International Bank receives large numbers of messages daily from all around the globe. These messages can be categorized into different categories such as money transfers, letters of credit, inquiries, administrative messages etc. These messages originate as unformatted telex messages that requires a significant amount of manual handling. Large resources are tied up in the processing of these messages to sort them between money transfer orders and other types of messages, reading the message and extracting pertinent information and rekeying the information into a format that the bank's payment system can understand. All that work requires operator time, creates costly overhead and is reflected on the bottom line.

A good portion of the above messages have to go through an authentication process known as test key validation before the instruction can be executed. To be able to do this, the originating bank has to be uniquely identified including the city of origin, so that a unique algorithm can be used that has been agreed upon between the sending party and receiving party.

The problem of bank and customer name recognition is very serious. There are many variations of a bank name in use by different people in different parts of the world. For example, the New York branch of Barclays Bank is "Barclays Bank of New York" and is generally referred to as "Barclays, New York." In most cases, people use the name of the bank most common in their own country. The problem is compounded by the fact that there does not exist a single complete database with "standard" bank names.

This seemingly simple task is complicated by the fact that the telexes are often composed by people who speak and use English in a way that is quite different from the way it is used in the United States. Their way of spelling, sentence construction, conventions for amounts and dates are quite different from what the operators are used to. Messages are often written in one very long sentence, that give no clues as to where different sections of the message begin and end. This

contributes to ambiguities in the message. The slightest error in interpreting an unformatted message can cause the incorrect amount of money to be credited or debited to the sending or receiving bank. The results of this can be disastrous.

THE SERVICE

AMTS (Automated Money Transfer Service) is a service offering of MCI International Data Services. It is a value added service that receives unformatted incoming telex messages and separates them into money transfer and non-money transfer instructions. Currently, the service only supports English language telexes. When AMTS categorizes an inbound message as a non-money transfer, the message is re-entered in the processing stream in its original "as received" format.

In processing a Money Transfer Message, AMTS extracts the unformatted information, verifies the information formatted and outputs messages to the receiving bank in either ISO or SWIFT format. In reformatting an incoming money transfer telex, AMTS enhances and expedites inbound message processing by acting as a fast and efficient data entry operator.

THE SYSTEM

AMTS was implemented using Cognitive System's ATRANS package (Automated Transfer of Funds). AMTS is the first application of natural language processing technology that was deployed in the international telecommunications arena. Although the structure of an incoming message can vary, their content is very predictable. The predictability of the content can be used to guide the parsing process and overcome the problems discussed earlier. The Conceptual Dependency (CD) theory for understanding human languages was developed by Roger Schank and his associates at Yale. The knowledge of the input domain is organized in a standard sequence of actions that can be expected to occur in a money transfer. This sequence of actions is known as a script. ATRANS uses an extension of the scriptal lexicons to focus its exceptions based on context localization and resolution of semantic lexical ambiguities. AMTS will separate correctly at least (90%) of the incoming messages, where "separation" can be defined as distinguishing between money transfer and non-money transfer instructions. The AMTS will capture at least (85%) of the fields necessary to execute the money transfer instructions; and the fields will be mapped into an ISO/SWIFT format.

The AMTS message processing consists of 4 different steps and is shown in Figure 1 below:
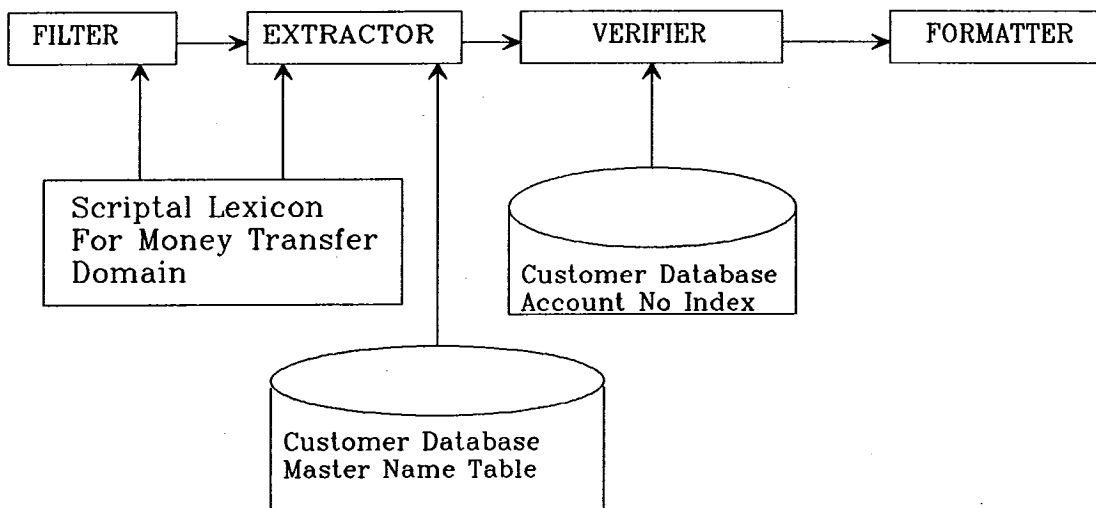

FIG 1.. MCII/AMTS MESSAGE PROCESSING FUNCTION

1. Filter:

 The Filter separates the incoming traffic into unformatted money transfer and non-money transfer messages. When a money transfer telex is encountered, the filter then checks for multiple transactions in a single telex. If multiples are found, the filter separates them into individual transfers.

2. Extraction:

This Extractor extracts the relevant transaction information from the text and tentatively assigns the information to fill output format slots.

3. Verifier:

The Verifier compares the extracted information against multiple sources available to the system. It determines if any of the previously extracted information is incomplete or inconsistent. Where applicable, comments are generated about the missing or inconsistent information for transmission to the repair operator.

4. Formatter:

 The Formatter generates the leader and the standard output format from the verified information. Figure 2 represents the system flow diagram.
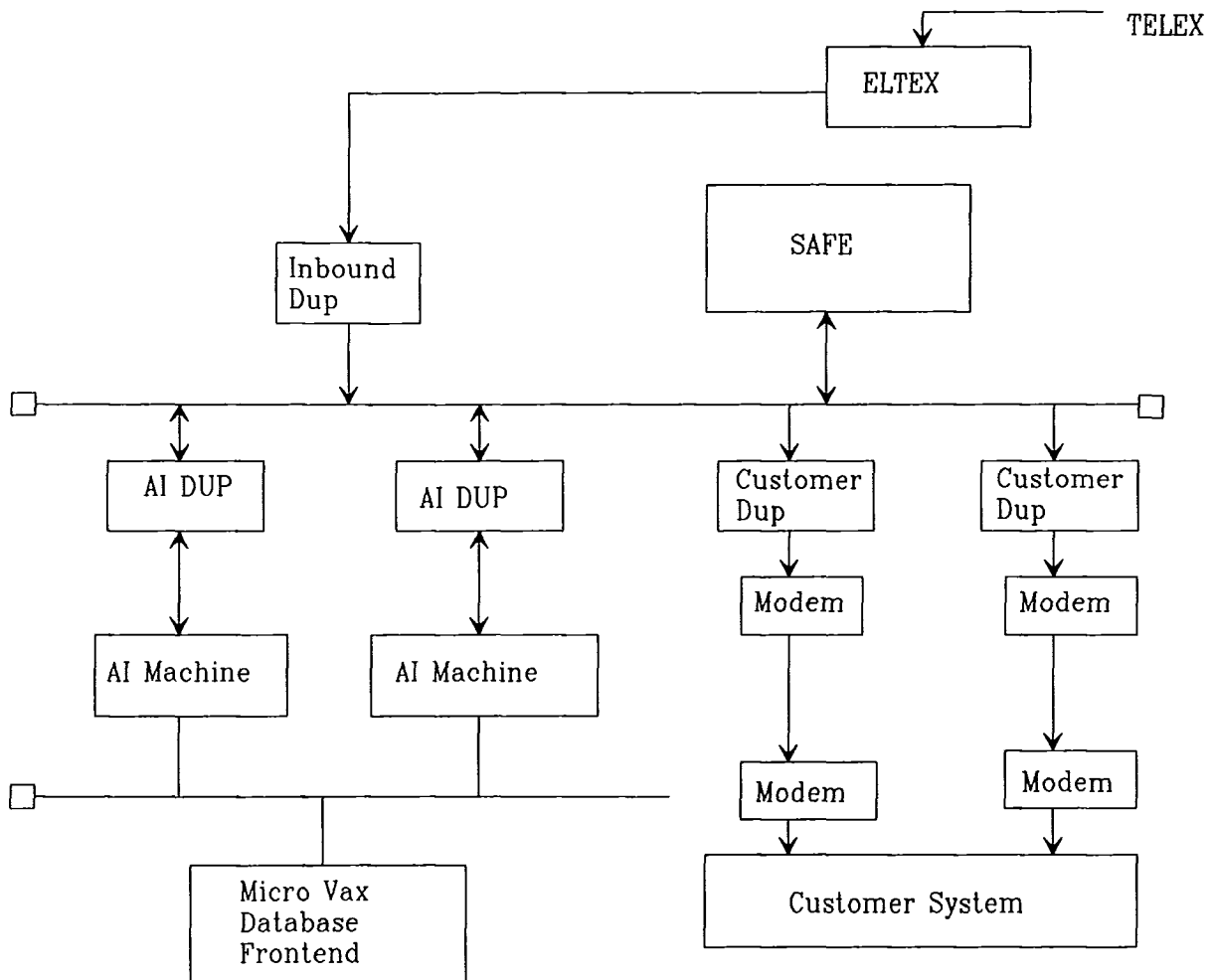

FIG 2 SYSTEM FLOW

MCII receives international telexes from overseas bank correspondents on behalf of its bank customers. Normally, telexes are received, acknowledged, safe stored and then forwarded to the final destination (customer). Telexes come in via the ELTEX (a circuit switch) into SAFE which is a store and forward switch. SAFE stores the message and sends an acknowledgement to the sender to verify that the telex has been received. The SAFE application runs on a DEC VAX 8650. SAFE also has a customer reference file indicating how a telex for that customer is to be handled. If the customer is eligible for AMTS processing, then the message is sent to a Symbolics 3620 that runs the ATRANS application. The SAFE host communicates to the Symbolics processor via an IBM PC that acts as a dedicated User Processor (DUP). The DUP communicates with the SAFE host over a physical ethernet link. After the DUP transmits a copy of the message to ATRANS it holds on to the message until it gets an AI Header and ISO block from ATRANS. It then appends the original message and passes it back to SAFE. The formatted information along with the original text is safe stored and queued to the customer DUP for delivery processing. The AI header includes information such as a possible duplicate flag, the message type, a count indicating the number of transactions present in the message etc. For money transfer messages, an AI Header, the complete ISO formatted message along with the original message is sent to the customer. For non-money transfer messages only, the AI Header, along with the original message, is sent. The customer has the ability to monitor the number of messages that are waiting on queue for AMTS processing. Every half hour a report will be sent to a specified customer destination indicating the queue length. This gives the flexibility to the customer to bypass AMTS processing.

KNOWLEDGE BASE

The System maintains a list of lexicons and a set of rules which determines when this list should be altered, either by activating new lexicons or deactivating presently active lexicons. The lexicons can be viewed as being arranged into a hierarchy. These lexicons contain definitions that activate lexicons at the next level down. This process continues until we hit the bottom of the hierarchy such that specific fields in the transac-

tion can be located. The system analyzes every word in a message, producing a highly detailed representation of its content.

The system also uses several data files that helps AMTS recognize party information for a specific bank. These consist of a Customer Information File supplied by the customer bank and also any standard databases to which the customer has access such as SWIFT, CHIPS, FED etc. There is also a dependency file that provide the means to equate or associate primary bank names with their synonyms, abbreviations or nicknames. Dependencies give AMTS a cross referencing ability which increases its comprehension rate. The performance of the system crucially depends upon its ability to recognize bank, customer, and city names. If one name is unrecognized, the whole structure of a payment message can be misinterpreted. To solve this problem, AMTS uses every possible source of bank name information and combines them into a master index which is used by the name-matching algorithm. The database also supplies a unique account key that enables the customer to extract the account information from the customer database. A successful look up in the database by AMTS will greatly simplify the job of the money transfer operator by eliminating the need to manually access and enter account information.

CUSTOMER BENEFIT

AMTS has been installed and operational for Irving Trust Co. of New York, a major money center bank for over a year. MCI has also started the service for Chase Manhattan Bank. Many of the major banks in the nation have realized the strategic importance of Artificial Intelligence technology to their telecommunications system. AMTS provides them with an advanced technology for processing large volumes of incoming unformatted message traffic and sorting the time critical money transfer orders. It then extracts the unformatted information and outputs the payment instructions to the bank's system. This enables the bank to have a reduced staff in message processing and also streamlines their back-office operations.

It took almost a calendar year of effort from the time the initial meetings were held to the cutover of service. It was a three pronged effort. MCII

Systems Engineering was responsible for identify-
ing the customer requirements along with sales
and marketing. Cognitive Systems implemented the
enhancements and customizations to meet the
specifications. Integration testing and quality
assurance was performed by MCII. The
customer also had to make the necessary changes
to their front end systems and supply the customer
related information for the service.