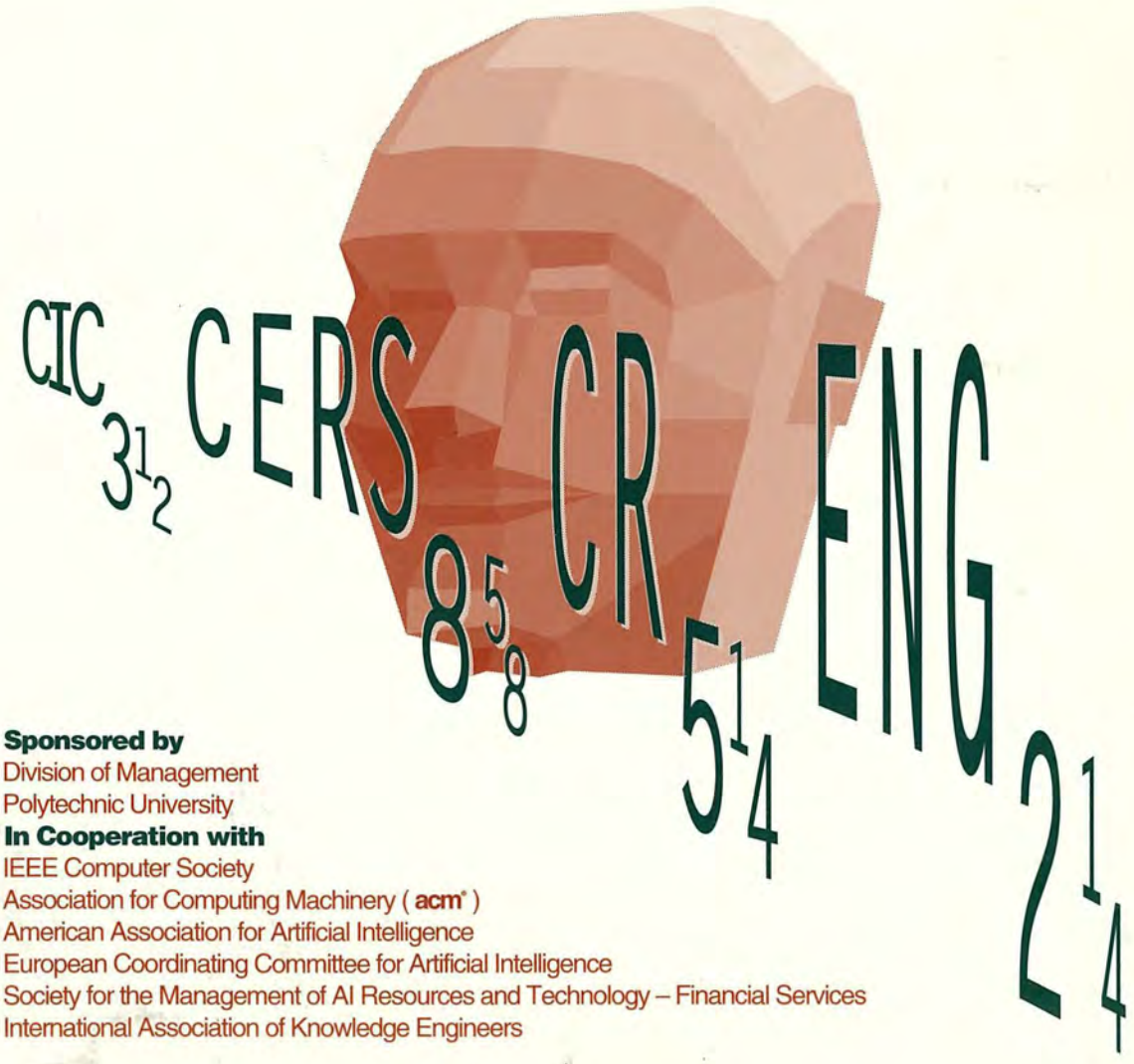
Proceedings

The First International Conference on

ARTIFICIAL INTELLIGENCE APPLICATIONS ON WALL STREET

October 9–11, 1991 **New York, New York**



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Introduction

> On the third day of my arrival [on Wall Street]... the complicated general instrument for sending on all the lines, and which made a very great noise, suddenly came to a stop with a crash. Within two minutes over three hundred boys – a boy from every broker in the street – rushed upstairs and crowded the long aisle and office, that hardly had room for one hundred, all yelling that such and such a broker's wire was out of order and to fix it at once. It was pandemonium, and the man in charge became so exited that he lost control over all the knowledge he ever had. I went to the indicator, and, having studied it, thoroughly knew where the trouble ought to be, and found it... Doctor Laws appeared on the scene, the most exited person I had seen. He demanded of the man the cause of the trouble, but the man was speechless. I ventured to say what I knew what the trouble was, and he said "Fix it! Fix it! Be quick!"... In about two hours, things were working again...
>
> Thomas A. Edison, describing his first job on Wall Street in 1868. Reported in *Edison, His Life and Inventions*, by F.L. Dyer and T. C. Martin, Harper & Brothers: New York 1910.

Wall Street's on-going need for new and faster ways to process knowledge has a long history. The first real relationship between electronic information processing technologies and Wall Street was established by S. Laws in 1866. Laws set up an information service where gold quotes were telegraphed from the New York Gold Exchange to a "central." There, the quotes were distributed to any subscriber connected to an "indicator." Indicators displayed quotes on a moving dial marked in eighths; four electronic pulses from the central were required to move the dial between the fractions. The dramatic innovation here was that subscribers were not required to know Morse code to use the system! Within a year, Laws' Gold Reporting Telegraph had fifty subscribers, and his Gold Indicator Company hired a 21-year old telegraph operator named Thomas Edison to keep the central system from crashing.

In 1867, a competing system was developed by D. Callahan at the New York Stock Exchange, where a printing wheel was substituted for a display wheel. Callahan's innovation was the utilization of a new kind of printing telegraph (called a *ticker* because of the sound of the impact printing). His Gold & Stock Telegraph Company at 18 New Street was so well capitalized that they used insulated wires (costing 40 times as great as bare wires), to prevent the short-circuits caused by mice and insects.

Both systems relied on the telegraph and telegraph operators. In some ways, the telegraph operator was similar to today's knowledge engineer. The telegraph operator was a highly paid technologist whose primary task was to write and read Morse code, the standard representation of the day. Reconstructing transmitted code was difficult: because of the "noisy domain" (misspellings, missing words, missing sentences, poor insulation, crashes), translation was based on the context

and semantics of the material. Edison said that receiving operators often had to make up 20% of the text. Good operators had to be constantly aware of current news events and price movements in the primary markets. Semantics-based translation is still a difficult and interesting AI domain in automated news understanding.

The competition between tickers and indicators ended with a merger. In 1869 the new Gold & Stock Telegraph Company then hired Edison and Franklin Pope, a fellow telegraph operator (they founded Pope, Edison & Co., with offices at 78 Broadway), as consultants. Edison developed a "universal ticker" to be used on an international scale. His user interface design was that the new system should be simple to operate, because "they did not have the experts we had in New York to handle anything complicated." Today, his design ideas would be called "object oriented." The parts were standard and interchangeable. In those days, Edison said there were three types of interchangeability: first, the parts fit; second, they will almost fit; third, they do not fit, and can't be made to fit (an observation that still unfortunately holds today for many software systems). Approximately 1200 universal tickers were installed.

At the *First International Conference on Artificial Intelligence Applications on Wall Street,* we will hear about the newest applications of knowledge-based technologies for financial service applications. Even though terms like "artificial intelligence," "knowledge engineering," and "expert system" did not exist in the 1860's, I am sure that Edison and his colleagues would understand the concepts discussed in the quality papers published in these *Proceedings.*

It is indeed appropriate that this conference is held in cooperation with the IEEE. Franklin Pope, Edison's partner, became president of the American Institute of Electrical Engineers (a forerunner of the IEEE) in 1886. The IEEE has been extremely helpful; I want to thank Robert Werner and Henry Ayling, of the IEEE Computer Society for their help in organizing the *Proceedings.*

I also want to acknowledge the help of our other cooperating societies: AAAI, ACM, ECCAI, IAKE, and SMART-F$; our paper session and panel session chairs, our invited speakers, and of course, our Program Committee. Special thanks to Yuval Lirov of Salomon Brothers for his help with scheduling the speakers. Finally, I want to thank our Sponsor, the Division of Management of Polytechnic University. Special thanks to our Finance Chairman, Dean Ernest Racz; our Local Arrangements Co-Chairs, Mary Bianchi and Romolo De Santis; and Charles Wildermuth, all from Polytechnic University.

Roy S. Freedman
Inductive Solutions, Inc.
July 22, 1991

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