PROJECT PROPOSAL

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Automated Troubleshooting, Maintenance and Diagnostics For Internal Technical Support – an Expert System Approach

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The Future of Technical Troubleshooting and Support Solutions

Through its revolutionary and groundbreaking Application Service solutions, XYZ [1]Systems Inc. is bringing a new and innovative approach to Troubleshooting and Internal Technical Support.

This project aims to reduce costs associated with problem resolution and increase productivity in the Call Center environment. XYZ Systems Inc., a privately held company located in California and New York, prides itself on being able to remain focused on the new challenges in diagnostics and maintenance that test IT personnel and their troubleshooting capabilities.

The project is led by a team of experienced programmers and designers whose background includes working with Knowledge-based Diagnostic Expert Systems. In collaboration with a small group of talented and experienced associates, they are preparing to offer a tool based on Artificial Intelligence technology that will provide innovative and efficient solutions in this underdeveloped area.

Our vision for the future is designed with advanced features such as an interactive diagnostic aid that eliminates the need for IT personnel to use cumbersome troubleshooting manuals. The result is a productive IT technician who can spend less time on repetitive maintenance and analysis, and thus contribute much more to the overall profitability of their company.

Working closely with your company's technical staff, the project team will closely supervise and implement a system that is compatible with the existing architecture through a smooth and uninterrupted transition. XYZ Systems Inc[1]. has the facilities and technical capabilities to ensure the proper operation of its systems in any setting. The applications will go through a stringent testing process in order to verify their complete reliability.

Meeting the challenges of the future and providing breakthrough solutions continues to be the key driver in our overall business philosophy. As the technical world within a company's infrastructure continues to expand and become more complex, the company will continue to strive towards creating systems that will make them more manageable and cost efficient for the future.

[1] XYZ: Company and Client project details have been removed to protect confidentiality. Specific references can be provided upon request.

Proposal for the development of Automated Troubleshooting solutions – an Expert System Approach

Overview:

As businesses become increasingly web-centric, multi-tiered and distributed, there are increasing numbers of second-party software packages 'strung' together within a single System. In many cases such as Internet Retail, the software modules are interfaced with shopfloor, warehouse or shipping/ transportation equipment. Where previously, debugging a problem could in most cases be confined to a single platform, software application, or functional area, it is now necessary to analyze and diagnose multiple sub-systems, platforms and hardware, and their interfaces.

Thus the level of Troubleshooting and routine Maintenance analysis has risen dramatically from basic application debugging to include higher Operational levels. People involved in maintenance and production support have to learn and remember many routine tasks and emergency procedures. Support personnel have to undergo exhaustive and expensive training in using repetitive fault- tracking procedures to accommodate the increased number of sub-system components.

The knowledge transfer from experienced Support personnel to new hires and the training involved in acclimatizing them to repetitive procedures is a costly exercise in time and resources. It is almost entirely dependent on Human availability and learning curves.

Some companies use hierarchical Support structures to deal with problem resolution. Call Centers deal with user interface issues, and higher levels of Support called in as needed. High importance is given to methodical debugging of workflow. In many cases, event logs are also entered into a Knowledge Base for future reference. Debugging tools exist at the technical 'compiler' level, and Operating/ Troubleshooting manuals are available for investigating the process flow.

Although the above basic methods are being used to alleviate the overload on support personnel, there is a continuing dearth of intelligent enterprise-level Decision Support tools in the field of Troubleshooting, Diagnostics and Maintenance. There are very few digital diagnostic aids available that combine

advanced back-end technology with a user-friendly, intuitive front-end interface suitable for use in mainstream Internal Technical Support.

In recent years, IT re engineering efforts have made rapid progress towards Object Oriented paradigms, migration to "thin" clients, network connectivity, web- based and wireless architecture. There are mainstream tools available for creating and analyzing modular designs, and these support the thought process in these areas. But in the areas of maintenance, diagnosis and problem resolution, there are few resources readily available to match the growing levels of complexity in fault-tracking procedures.

The unique advantage offered by Diagnostic Expert Systems could be used to significantly improve troubleshooting in the interlinked & manifold systems of the 21st century. An Expert System can be used to diagnose all system parts simultaneously, thus reducing the manual labor and time involved.

Similar to the use of Medical Diagnostic software by Doctors, Maintenance checking and fault tracking systems used by Aircraft mechanics, or Artificial Intelligence software embedded in applications like CRM, an AI Tool to perform debugging and routine maintenance procedures would add great value in replacing or supplementing manual tasks. It would encompass and address problem resolution both at lower Technical and higher Operational levels.

Although the use of Artificial Intelligence-based systems in industry for Reliability Centered Maintenance and diagnosis of machine parts is not new, and expert systems have been used for highly specialized functions like maintenance of Aircraft engines, their use as diagnostic tools in the mainstream corporate environment is relatively limited.

And yet resolving issues in companies today can be as resource- consuming as checking an Aircraft engine- on the positive side, more companies are adopting systematic and structured approaches to workflow analysis albeit at a conceptual level, thus lending their environments more easily to being modeled and diagnosed similar to Aircraft parts.

In addition to the software, there is a critical need for rules, models and standardized procedures based on which to automate troubleshooting and escalation procedures. The proposed architecture for web- based deployment of a diagnostic Expert System would enable these rules to be introduced and implemented throughout the company, providing a framework for progressive automation in this direction.

Salient Features

This application would enable a company to organize internal Support tasks into manageable, fixed and expanding Rules databases, plus use an AI engine as a time- saving analytical aid, bringing the advancement of this underdeveloped area on par with others like Billing, *e*FulFillment and *e*CRM. For companies that have already initiated steps towards building Knowledge Databases of Rules and procedures, this would be an efficient way of utilizing this data for routine & mission-critical analysis.

The AI tool could also be used for generating executive-decision Reports from the rules database for in-depth analysis.

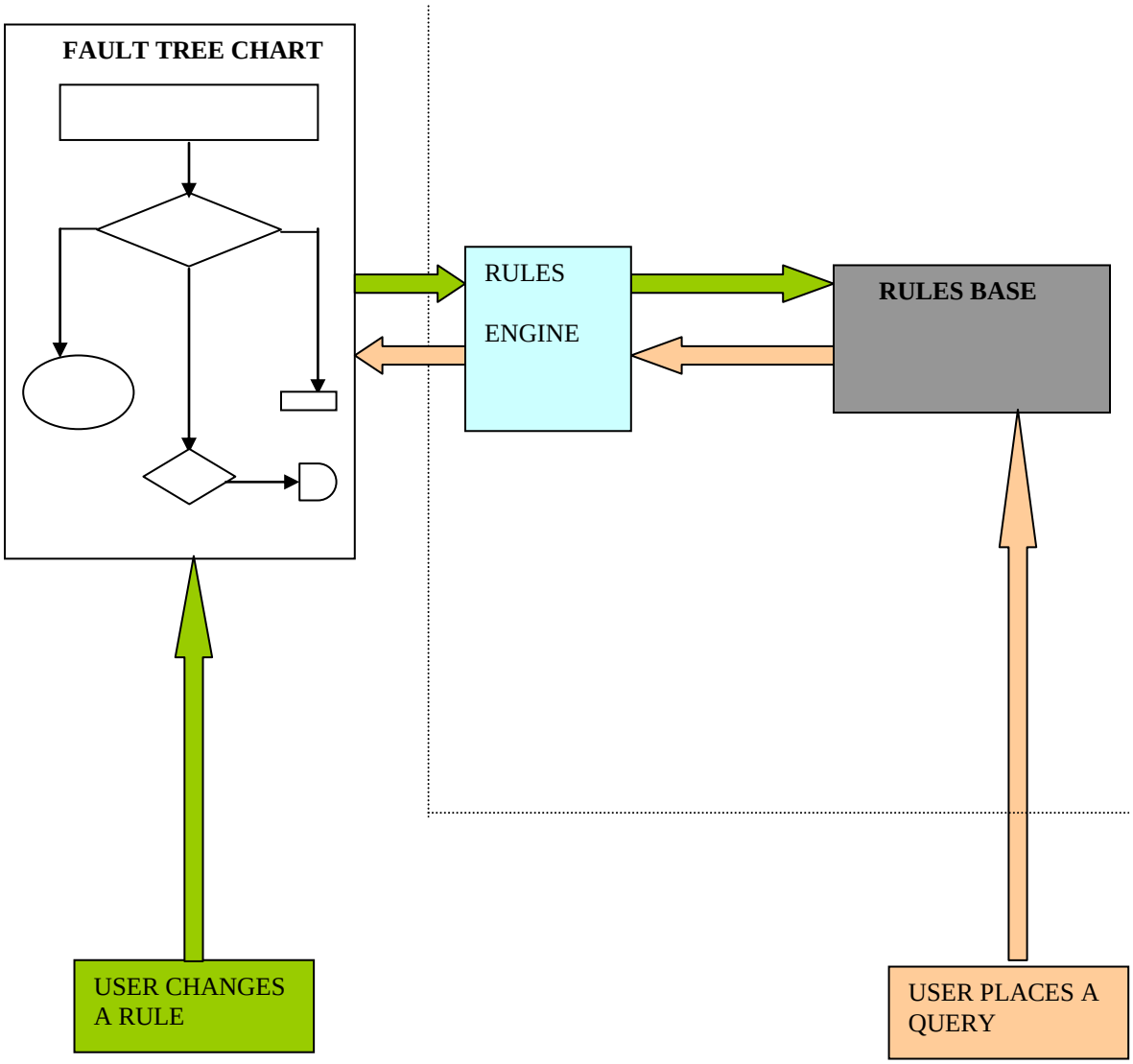
Instead of depending on static documentation or memory, Support Personnel would have recourse to an interactive Fault Tracking Tree that maps out a "Thought Route" -from abstract to "nuts and bolts" levels. An important benefit of this software is that it would streamline and automate not just Technical, but also Administrative issues resolution, including Escalation and Emergency procedures in the company.

When support personnel experienced in problem resolution leave a company, they carry with them much of their Analytical and fault-tracking know-how – if these are transferred into an Expert System at the time of resolution, new hires would have this cumulative knowledge to rely on. This ongoing retention of all diagnostic procedures in a logical, interactive and reusable format would greatly reduce training time and and operating cost.

The operating plan to deploy this Expert System would involve creating a knowledge base if there is none, then creating Fault Tree decision charts and transferring these into the Expert System. Once in place, this system would imbibe new problems and procedural rules as they arise.

System Design

The basic components of this system as shown below, consist of a *database* of rules, a *rules engine* to transfer rules into and from the database to a frontend, and a *frontend interface* that can represent these rules in the form of Fault Tree decision charts.



Market Analysis

The increased dependence on IT capabilities within an organization has led to a greater need for improved diagnostic and internal maintenance support. Growth is expected to continue for the foreseeable future as the need for more efficient IT departments continues to become a priority for many organizations.

As the marketplace continues to develop and evolve, our company will continue to provide products and services that meet the needs of our customers, allowing them to fully optimize their resources and contribute to a better managed enterprise.

Competition

We feel the key factors that will ultimately differentiate us from our competitors are--

- improved methods provided to the customer to allow them to capture, store and update their business rules extracted from an ongoing process, and the ability to view diagnostic procedures in a graphic format through a user-friendly interface.
- improved tools for creating Fault Tree charts for a diagnostic process, and importing them into a knowledge base.
- improved modeling for routine maintenance and mapping of escalation procedures within an organization.
- a flexible application that interfaces effectively with other enterprise systems, and is designed to sustain and capture extensive changes in system architecture in all functional areas.

With the explosive growth in application services, there is intense competition among B2B and related companies to establish a superior presence. Our strengths and capabilities lie in the groundbreaking solutions we provide in a critical niche area of *e*Business, and the ability to provide not just a well-designed product but also the complete service and support that the customers expect.

Target Markets

Buyers of the proposed Application can be classified into the following broad categories:

- Call Centers.
- Later-stage startups with expanding, high-flux IT environments.
- Companies using IT systems based on a "chain" of disparate platforms and software applications that need to be maintenance checked and analyzed.
- Examples of these types of systems can be found in Web- based Retail, Call Center Support, Administrative and Manufacturing IT environments.

Operating Plan

The project implementation will be split into 6-month phases. Phase I will involve the design and development of the AI Expert System as an Intranet application, based on infrastructure provided by a chosen vendor company.

Phase II will focus on understanding the Client company's environment and tailoring the Expert System application to fit it. It will begin with data gathering at the client site and transferring data into rules for the knowledge bases, and charting decision fault-tree charts based on ongoing processes, existing documentation and event logs. Then the AI engine will be tested against these databases. By the end of Phase II the client should have a fully functional tool that has been customized and configured to fit their specific needs.

Sales Forecast

- We plan to sell this product at *(TBD)* [2]per customer, which would include streamlining their troubleshooting processes, and the deliverables spun off from these comprising of knowledge bases, tools for creating and processing fault tree decision charts .

- Based on the above Figures, we aim to build a customer base of atleast 4 customers during the (Marketing) Phase II of the first year.

[2] TBD: Financial details have been removed from this document. They can be made available upon request.

Projections

Worst Case:

In the event that the product does not attract the anticipated number of customers within the specified time, the basic technical infrastructure we would have incorporated into the project could be easily re- cycled to serve a wide variety of related functions that would benefit from the use of AI- based software, like customer survey and profile Report generation or network maintenance.

This project aims to deliver powerful results not just at a technical level in the form of the product/ application itself, but also introduce the customer to new methodologies and practices to automate their diagnostic and escalation processes, and thus provide the basis for any future development. Metaphorically, *The Tools may die, but the Methodology lives on!*

Best Case:

Within the first year the product will make an entry and establish itself as a pioneer and distinctive presence in the marketplace for Artificial Intelligence-based solutions for Troubleshooting IT Operations, Systems Diagnostics and Maintenance.

Investment Offering:

Incubator assistance and Angel investment funding in the range of *(TBD[2])* is sought as startup and marketing capital for the first two phases, to be completed within a six-month to one-year time period. Subject to the first phase performance and growth factors (measured by number of clients attracted) being positive and profitable, we aim to grow and evolve as providers of customized Artificial Intelligence software designed to fill a critical niche in the eBusiness environment.

[2] TBD: Financial details have been removed from this document. They can be made available upon request.