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NSF 04-604	NSF PROPOSAL NUMBER

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C-5

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1564-2014	☐ A RENEWAL ☐ AN ACCOMPLISHMENT-BASED RENEWAL	

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE	ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE
Old Dominion University CS Dept	Old Dominion University Office of Finance
AWARDEE ORGANIZATION CODE (IF KNOWN)	102 Alfred B. Rollins, Jr. Hall
RED AI	Norfolk, VA 23529-0046

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE	ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE
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IS AWARDEE ORGANIZATION (Check All That Apply)
(See GPG II.D.1 For Definitions)   ☐ FOR-PROFIT ORGANIZATION   ☒ SMALL BUSINESS   ☐ MINORITY BUSINESS   ☐ WOMAN-OWNED BUSINESS

TITLE OF PROPOSED PROJECT Restaurant Effieciency Desision Artifical Intellegance (RED AI)

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PREPROPOSAL NO., IF APPLICABLE
$ 76,600	6 months	January 2008	

CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW

☐ BEGINNING INVESTIGATOR (GPG I.A.3)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.D.1)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.D.7)
☐ NATIONAL ENVIRONMENTAL POLICY ACT (GPG II.D.10)
☐ HISTORIC PLACES (GPG II.D.10)
☐ SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.D.12)

☐ VERTEBRATE ANIMALS (GPG II.D.12) IACUC App. Date _____
☐ HUMAN SUBJECTS (GPG II.D.12)
   Exemption Subsection ____ or IRB App. Date _____
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES
☐ FACILITATION FOR SCIENTISTS/ENGINEERS WITH DISABILITIES (GPG V.G.)
☐ RESEARCH OPPORTUNITY AWARD (GPG V.H)

PI/PD DEPARTMENT	PI/PD POSTAL ADDRESS
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NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME				
Janet Brunelle			757 - 683 - 4832	brunelle@cs.odu.edu
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

NSF Form 1207 (10/99)

Certification for Principal Investigators and Co-Principal Investigators

I certify to the best of my knowledge that:

(1) the statements herein (excluding scientific hypotheses and scientific opinions) are true and complete, and

(2) the text and graphics herein as well as any accompanying publications or other documents, unless otherwise indicated, are the original work of the signatories or individuals working under their supervision. I agree to accept responsibility for the scientific conduct of the project and to provide the required project reports if an award is made because of this proposal.

I understand that the willful provision of false information or concealing a material fact in this proposal or any other communication submitted to NSF is a criminal offense (U.S. Code, Title 18, Section 1001).

Name (Typed)	Signature	Social Security No.*	Date
PI/PD Janet Brunelle			
Co-PI/PD			
Co-PI/PD			
Co-PI/PD			
Co-PI/PD			

Certification for Authorized Organizational Representative or Individual Applicant

By signing and submitting this proposal, the individual applicant or the authorized official of the applicant institution is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made because of this application. Further, the applicant is hereby providing certifications regarding Federal debt status, debarment and suspension, drug-free workplace, and lobbying activities (see below), as set forth in the *Grant Proposal Guide (GPG),* NSF 00-2. Willful provision of false information in this application in addition, it's supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

In addition, if the applicant institution employs more than fifty persons, the authorized official of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of *Grant Policy Manual* Section 510; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts that cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

Debt and Debarment Certifications (If answer "yes" to either, please provide explanation.)

Is the organization delinquent on any Federal debt?   Yes ☐   No ☒

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal Department or agency?   Yes ☐   No ☒

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This certification is required for an award of a Federal contract, grant or cooperative agreement exceeding $100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding $150,000.

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The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all sub awards at all tiers including subcontracts, sub grants, and contracts under grants, loans, and cooperative agreements and that all sub recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME/TITLE (TYPED) Janet Brunelle		

TELEPHONE NUMBER 757 - 683 - 4832	ELECTRONIC MAIL ADDRESS brunelle@cs.odu.edu	FAX NUMBER 757 - 683 - 4900

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Submit ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.B. Submission of this information is voluntary and is not a precondition of award. The information will not be disclosed to external peer reviewers. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPROMISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Janet Brunelle

Gender: ☐ Male   ☒ Female

Ethnicity: (Choose one response)   ☐ Hispanic or Latino   ☒ Not Hispanic or Latino

Race: ☐ American Indian or Alaska Native
(Select one or more)   ☐ Asian
☐ Black or African American
☐ Native Hawaiian or Other Pacific Islander
☒ White

Disability Status: ☐ Hearing Impairment
(Select one or more)   ☐ Visual Impairment
☐ Mobility/Orthopedic Impairment
☐ Other
☒ None

Citizenship: (Choose one)   ☐ U.S. Citizen   ☒ Permanent Resident   ☐ Other non-U.S. Citizen

Check here if you do not wish to provide any or all of the above information (excluding PI/PD name): ☐
REQUIRED: Check here if you are currently serving (or have previously served) as a PI, co-PI or PD on any federally funded project. ☐

Ethnicity Definition:
Hispanic or Latino. A person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race.

Race Definitions:
American Indian or Alaska Native. A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
Asian. A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
Black or African American. A person having origins in any of the black racial groups of Africa.
Native Hawaiian or Other Pacific Islander. A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
White. A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

WHY THIS INFORMATION IS BEING REQUESTED:

The Federal Government has a continuing commitment to monitor the operation of its review and award processes to identify and address any inequities based on gender, race, ethnicity, or disability of its proposed PIs/PDs. To gather information needed for this important task, the proposer should submit a single copy of this form for each identified PI/PD with each proposal. Submission of the requested information is voluntary and will not affect the organization's eligibility for an award. However, information not submitted will seriously undermine the statistical validity, and therefore the usefulness, of information received from others. Any individual not wishing to submit some or all the information should check the box provided for this purpose. (The exceptions are the PI/PD name and the information about prior Federal support, the last question above.)

Collection of this information is authorized by the NSF Act of 1950, as amended, 42 U.S.C. 1861, et seq. Demographic data allows NSF to gauge whether our programs and other opportunities in science and technology are fairly reaching and benefiting everyone regardless of demographic category; to ensure that those in under-represented groups have the same knowledge of and access to programs and other research and educational opportunities; and to assess involvement of international investigators in work supported by NSF. The information may be disclosed to government contractors, experts, volunteers and researchers to complete assigned work; and to other government agencies in order to coordinate and assess programs. The information may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998).

NSF Form 1225 (10/99)

11

TABLE OF CONTENTS

For font-size and page-formatting specifications, see GPG Section II.C.

Section		Total No. of Pages in Section	Page No.* (Optional)*
Cover Sheet (NSF Form 1207) (Submit Page 2 with original proposal only)			
A	Table of Contents (NSF Form 1359)	1	4
B	Project Summary (not to exceed 1 page)	1	5
C	Project Description (including Results from Prior NSF Support) (not to exceed 15 pages) **(Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**	15	6
D	References Cited	2	21
E	Biographical Sketches (Not to exceed 2 pages each)	2	23
F	Budget (NSF Form 1030, plus up to 3 pages of budget justification)	2	25
G	Current and Pending Support (NSF Form 1239)	1	27
H	Facilities, Equipment and Other Resources (NSF Form 1363)	1	28
I	Special Information/Supplementary Documentation	-	-
J	Appendix (List below) **Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**	1	29

Appendix Items:

Management Plan

Evaluation Plan

Marketing Plan

Funding Plan

Staffing Plan

Resource plan

Risk Management Plan

*Proposers may select any numbering mechanism for the proposal. The entire proposal, however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

NSF Form 1359 (10/99)

46

Project Summary

The restaurant business is a tough place with low profit margins. Consider what it takes to be successful in this industry – an owner or manager has to keep track of his or her staff, both in front and back, inventory, customer flow, and work to maintain an inviting atmosphere. Currently there are many products available, which focus on the collection and organization of data regarding each of these elements separately. In addition to all the work required to record this data, the wise manager or owner will invest a considerable amount of time in its analysis. In light of all this, a well managed restaurant averages about 4% net profit, provided they are able to avoid the typical fate of young restaurants – going out of business within the first three years of operation.

Obviously, something is missing. Our product seeks to correct this. There is no doubt managers and owners benefit from well-organized representations of their restaurants statistics. Indeed, the ideal solution might be a system designed to collaborate as much of this data as possible. Further, if given the ability to identify problem trends with the purpose of highlighting them for presentation to these owners and managers would increase their efficiency. In the event there existed a product incorporating all these features that has the added capability of providing suggestions for efficiency maximization, tested through internal simulation that product would soon become a restaurant managers' essential sidekick. To this end, we have taken it upon ourselves to create a top-notch restaurant efficiency decision Artificial Intelligence. RED AI for short.


REDAI

Restaurant Efficiency Decision Artificial Intelligence

Project Description

## *HISTORY AND INNOVATIVE ASPECTS*

In its original form, this product was based on the premise that shorter wait times at restaurants would lead to increased customer satisfaction and, consequently, increased restaurant profit. The original system would model the customer arrival trends and wait times, and record the staff schedule information - the number, type, and distribution of restaurant staff. The staffing and customer flow information could then be analyzed using a software inference engine to determine the restaurants' overall service potential as a function of the schedule. Once these rules are extrapolated, it would require just a few simple calculations to determine how to construct the schedule to meet the now statistically predictable customer flow trends. This concept, stated just so, was given the name "Wait Reducer." The first innovation - this balancing of the schedule against the historical customer flow - had not been offered by any available software package and, as included in the final product, is referred to as service efficiency.
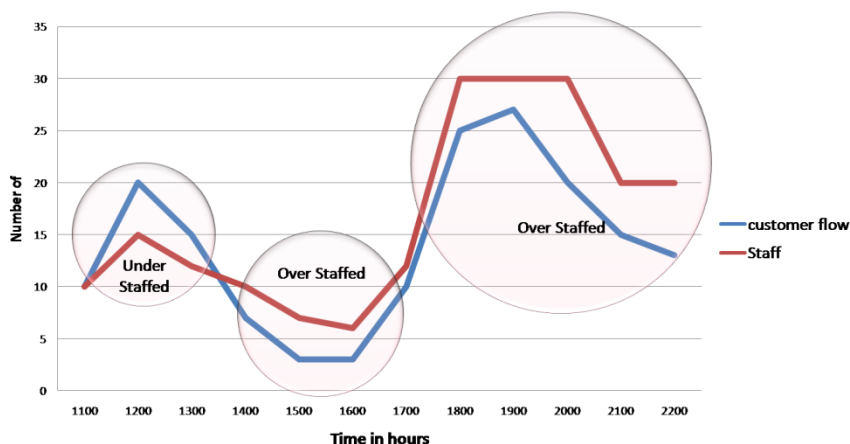
Soon, upon the realization of greater resources, the project found room to quickly grow into a much more comprehensive restaurant-modeling package. Market and competition research revealed that, while there were several systems available for recording data on just one element of a restaurant - for example: schedule, customer flow, or inventory - there were none who attempted to take all these elements into consideration. Adding the ability to record this, or the possibility of importing information from these several disjoint types of systems, was a logical next step and would allow a system that could provide a comprehensive foundation upon which to begin analysis. At this point, the experience of our domain experts became crucial. Between interviews and surveys, however, we were learned that the four key measurable profit-factors of a restaurant were the staff schedule, the customer flow and ordering trends, the menu itself, and the inventory management plan. Producing a single system designed to collect all available data on these four factors was the third innovation.
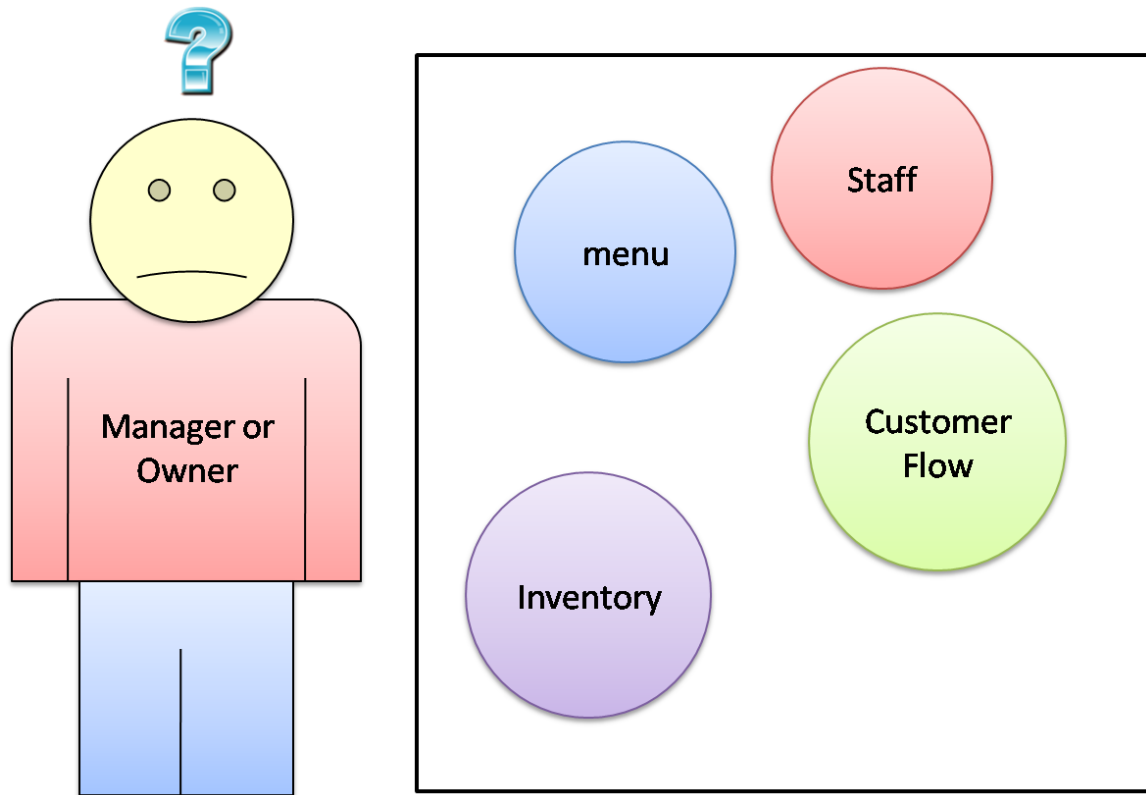
While there exist several independent consulting companies who might provide software suites to collect and store data on many of restaurants profit-factors, there were two significant drawbacks. First, in most cases, the collaborated data is sent back to a consulting company for off-site analysis and, second, the associated price was just what one might expect of a paid efficiency consultant. The third innovation, then, was simply the next logical step following the second. Already designing a system to collect and model the profit-factors, providing functionality for "smart reporting" would eliminate the need for private, external consultants. The term "smart reporting" might well describe this third innovation.
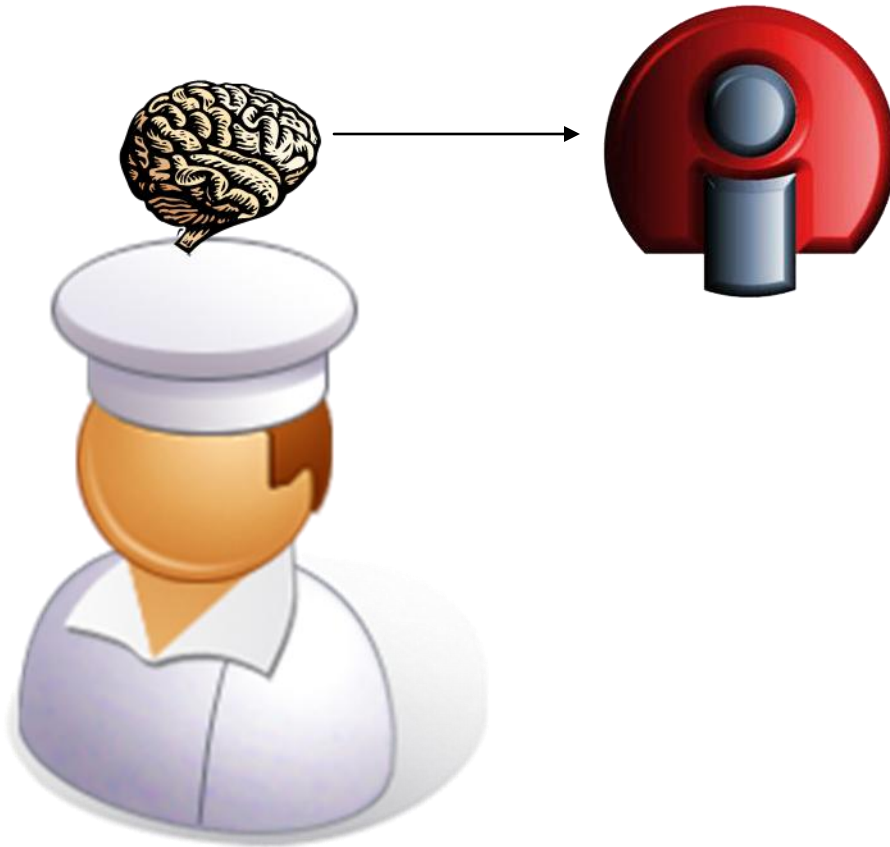
Restaurant Expert

The comprehensive collaboration and smart reporting were added to the service efficiency. This package was reintroduced as "Queuebacca" - the restaurant manager's efficiency sidekick. Quickly, the marketability of the name came into question. While a name change might have been simple, however, further concerns arose as to the true unrealized potential of the combination of the elements already proposed for inclusion. Taking a cue from the original "Wait Reducer," it became apparent that the least common denominators of restaurant profit were not the individual profit factors taken individually, but rather the relationship between pairs of these profit-factors. Referring to our domain experts once again, our inductive reasoning found support from their years of experience. Just as with the service efficiency introduced in Wait Reducer, the menu efficiency - ca-

pitalizing on customer ordering trends with strategic pricing, and the inventory efficiency

- appropriate hi/low stock limits and minimizing spoilage with an effective staging and

preparation plan, and their governing rules could be learned using a software inference

engine. The fourth innovative aspect then is the ability to model the three efficiency rela-

tionships that most affect a restaurants profit.
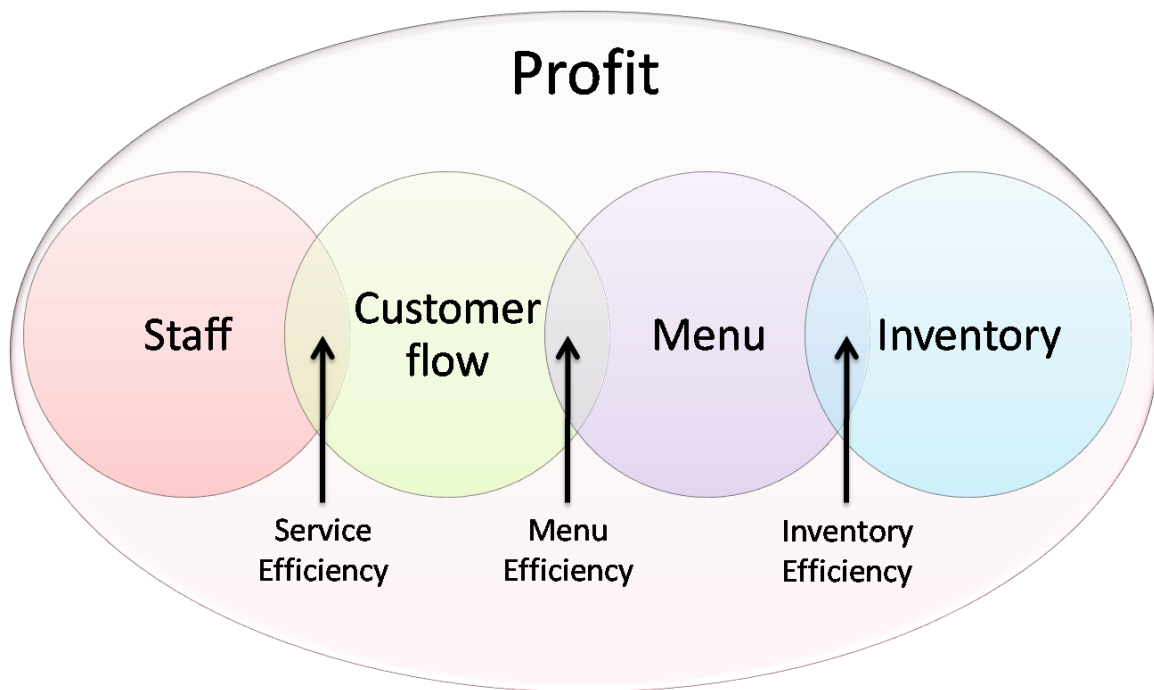
Looking back, seeing what robust modeling software must be implemented to produce

the aforementioned efficiency data, it was intuitive to add simulation capabilities to a

package such as this. Indeed, no such product was found to exist and surveys revealed a

high interest in anything that would even hint at such capability. In addition, to make it

truly marketable and to meet the needs of our target customers, summary reports of data

and of efficiency relationships, as well as any simulation results would most appropriate-

ly be stated in terms of their effect on profit - either actual profit, or unrealized potential

profit. The latter might require only affects the already-introduced smart reporting fea-

ture. The former, however, is the fifth and final technical innovation. The ability to simulate changes to the controllable profit-factors - staff, menu, and inventory - and predict the effects of these changes on profit is a truly unique feature.
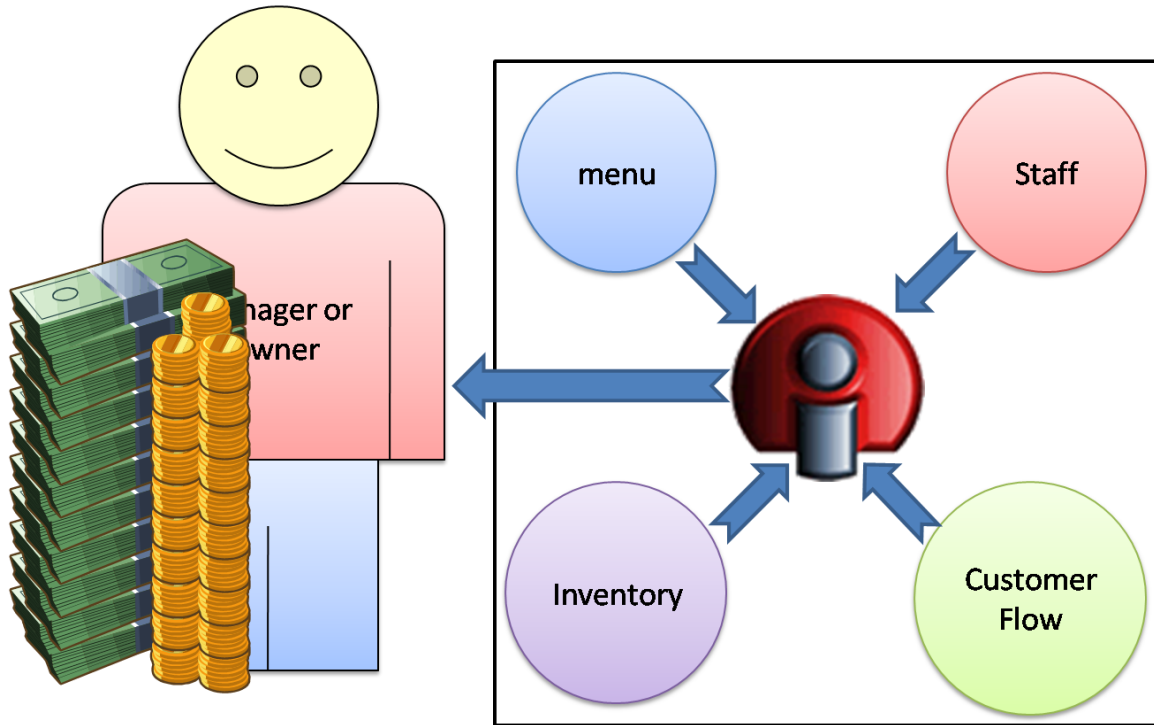

REQUIREMENTS IDENTIFICATION

Red-AI will be a comprehensive restaurant modeling and simulation software package for use in a variety of food-service environments.

The number one problem restaurant owners and managers face is failure due to the inability to successfully comprehend the dynamic relationships between their restaurants mea-
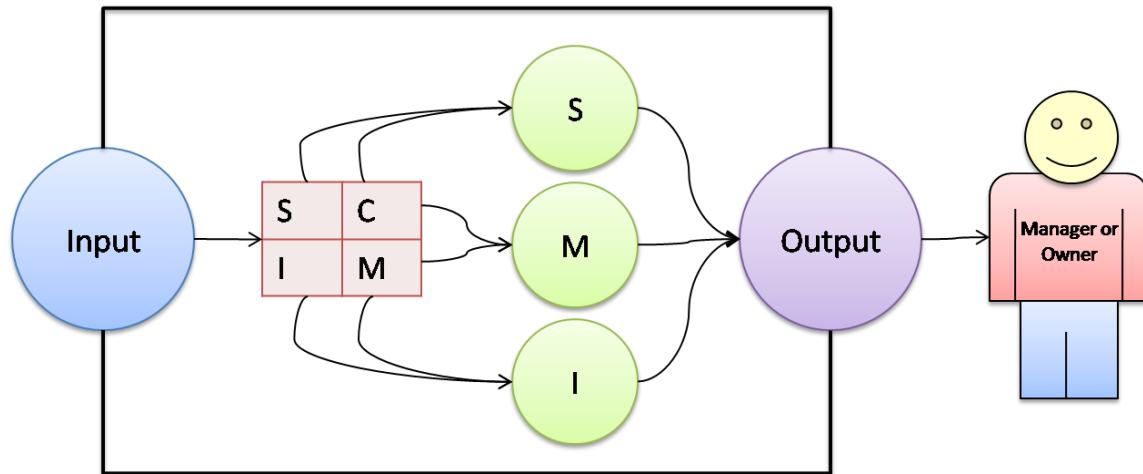
surable profit factors – staff, customer flow, menu, and inventory. Currently, no system exists to model these relationships. Without such a model, accurate simulations are unachievable.

COLLECTION OF DATA
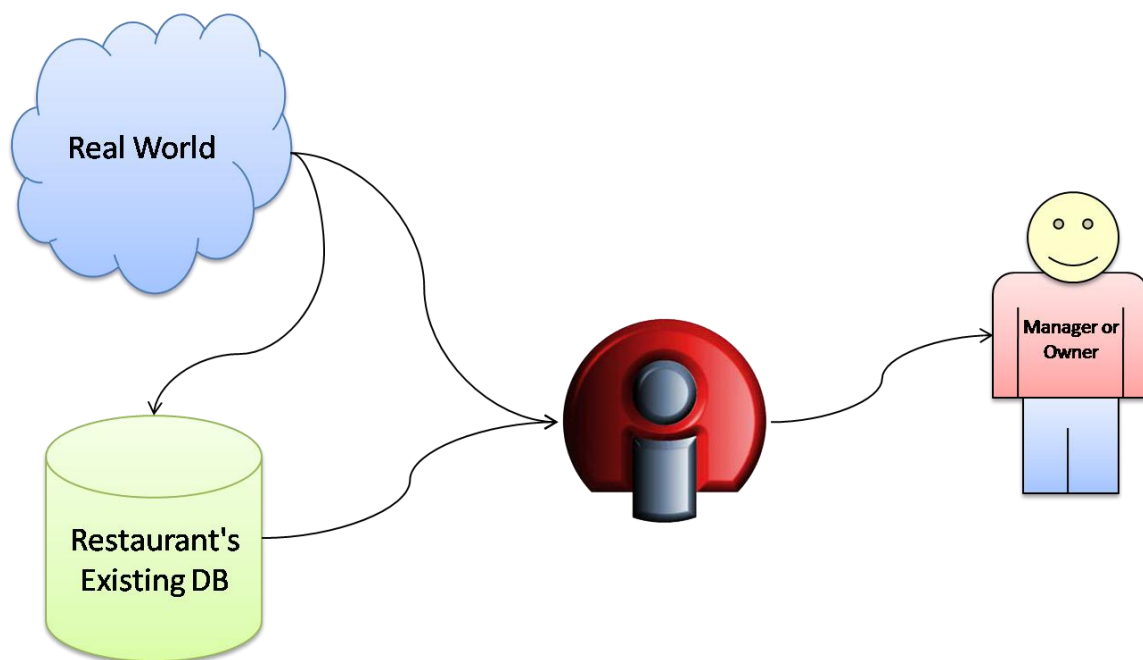
To model the world that is their restaurant, managers and owners first need the ability to collect and appropriately information about the four key measurable profit factors – staff, customer flow, menu, and inventory. In many cases, restaurants have systems, which monitor one or another of these factors. These systems, however, are disjoint and offer no interaction. This leaves no possibility for evaluating time-profit comparisons as functional results of each profit-factor. Furthermore, there are no options for comparing the relationships between these factors.

INTERPRETING RELATIONSHIPS

There exist three key relationships between a restaurants four measurable profit factors.
First, there is a definite relationship between staff and customer flow. The staff-
scheduling plan directly affects the potential service rate. The ratio of this service rate to
the customer flow rate might be considered the service efficiency. When the potential
service rate matches the customer flow rate, high service efficiency would exist, max-
imizing table turnover and minimizing overstaffing, leading to increased profit. Second,
there is a definite relationship between customer ordering trends and menu arrangement
and pricing. Accurate statistical information regarding customer-ordering trends would
allow accurate demand forecasting. Accurate demand forecasting would the implementa-
tion of an effective strategic pricing scheme. How well these prices are matched to the
ordering trend might be considered the menu efficiency. High menu efficiency would be
characterized by charging what the market will bear, thus leading to maximized profit.
Finally, the relationship between menu and inventory. This would allow for accurate de-

termination of high/low stock limits and give insight to help govern the staging and preparation plan. This might be referred to as inventory efficiency and a high degree of inventory efficiency would be characterized by minimized customer wait time for ordered food and minimized spoilage. Of course, interpreting the relationships between the four profit-factors would only be possible if an integrated data collection system were in place.

SIMULATION

Only when significant data has been collected can the service, menu, and inventory efficiency be determined. Should a manager or owner determine one or more of their efficiencies to be unacceptably low, it would be to his or her utmost benefit to be able to simulate the effects on profit of changes to any of the factors that can be controlled – staff, menu, and inventory. Determining the rules that govern these interactions, however, would constitute another full-time task for calculation of each at the very least. If this data were all conveniently collaborated in a database designed for their ready analysis by software-implemented inference engines designed for just such a task, the rules there discovered could be applied to the manager-modified model, allowing him or her to make as wise and profitable decisions as possible.

Phase I Goal / Technical Objectives

MFCD
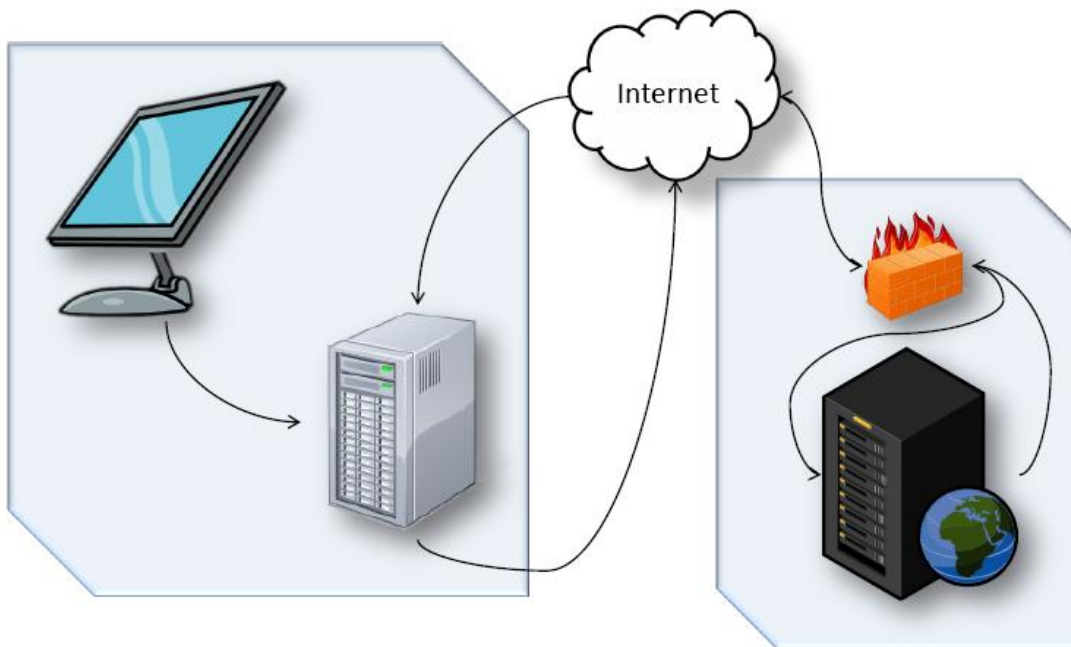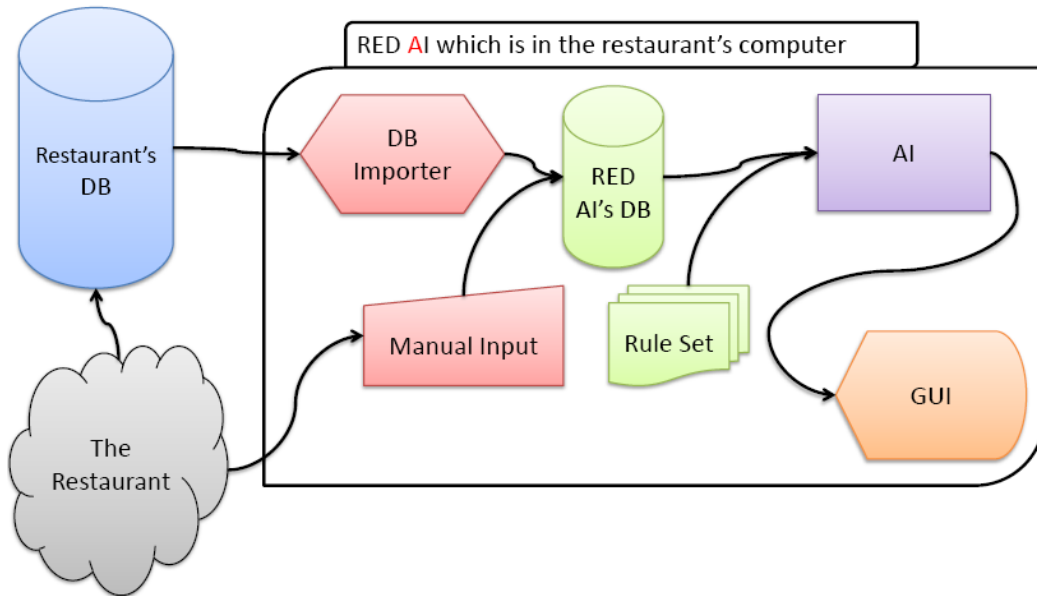
The goal of Phase I is to produce a laboratory prototype to demonstrate the abilities to (1) model the schedule and customer profit-factors, (2) generate smart-reports on the service efficiency, and (3) simulate the effects of schedule changes on profit. Our goal is to prove that the RED-AI project is technically feasible. What follows is a detailed list of the technical objectives in Phase I, and then a detailed description of each objective to include any external requirements such as real-world data collection and validation.

- Build a sample schedule and customer flow database schema - Create a database implementing this schema - Create fundamental database interfaces - Create manual input GUI - Fill the database with sample test data - Design smart-reporting queries on this database - Design software inference engine to extrapolate service efficiency rules - Design simulation environment to follow extrapolated rules - Develop and implement test-cases

BUILD DATABASE SCHEMA

The first part of the laboratory prototype is to design the database schema for the schedule and customer flow database. The schedule portion must include possible staff types - host, wait, bus, etc. - and the ability to relate the number and distribution of each over time. The customer flow portion must include the ability to monitor the arrival time, total wait time, and total time in service of a party of customers. This schema must also take into account the net profit over the course of this time. It should be noted that all data, in fact, will be stored and sorted according to its real-time stamp. Profit data, also sorted by

real-time stamp, will be recorded during this phase since positively affecting profit is the goal of this product. In addition, the customer portion will need to be ready for future expansion to include necessary elements for determining menu efficiency.

CREATE DATABASE IMPLEMENTING THIS SCHEMA

The next step is to build databases that implement the designed schemas. The tables must be created and stored procedures made to perform the basic CRUD (create, retrieve, update, delete) operations on entities in the databases. The databases will use proprietary transactions in order to secure database integrity.

CREATE FUNDAMENTAL DATABASE INTERFACES

In order to access this database from software, a programmatic interface must be created to allow data entry and retrieval. The input interface will be portable to the manual input graphical user interface (GUI) and the database importer interface. The output interface will be portable to the smart-report generator, the inference engine, and the simulator.

CREATE MANUAL INPUT GUI
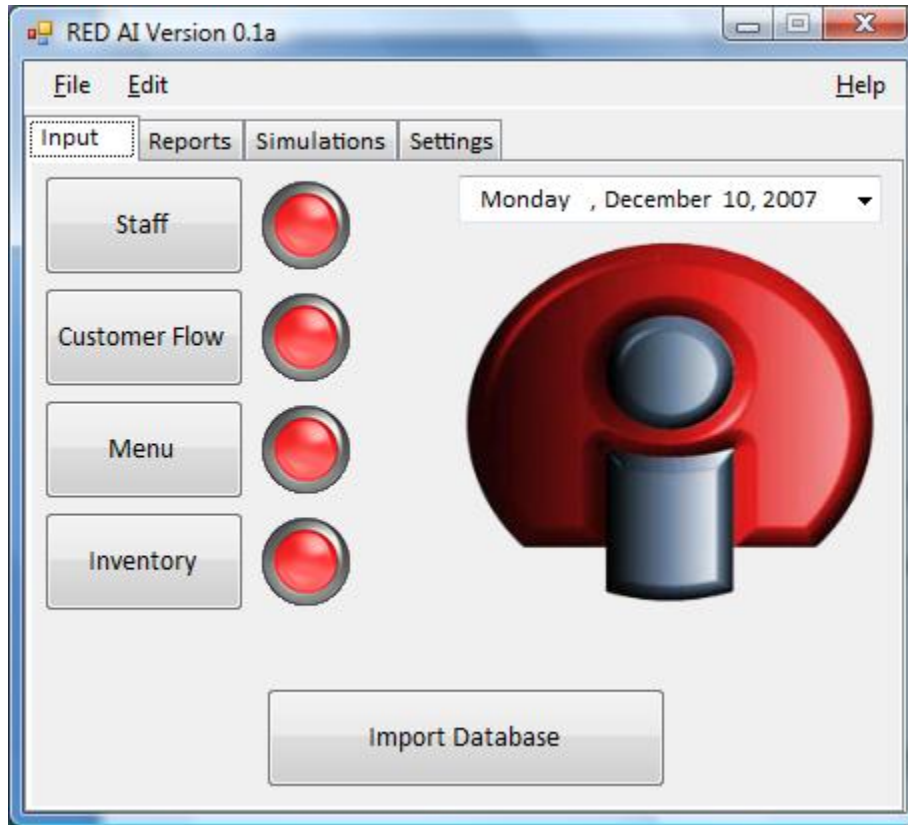
In order to populate this database, we will provide a manual input graphical user interface. It will provide options to print forms for pencil-entry recording of pertinent data and electronic forms to complete for data entry.

FILL THE DATABASE WITH SAMPLE TEST DATA

The collection of this data may be done in two ways. The first option is to randomly generate a customer arrival pattern and handwrite some daily or weekly repeating schedule. The other option, which we will use as extensively as possible, will be the acquisition of real-world data submitted by our beta-test restaurants. This real-world data collection will

be conducted while we are creating the prototype database. This will allow for real-world validation of the quality of smart-reports and simulations once those elements are complete.

DESIGN SMART-REPORTING QUERIES
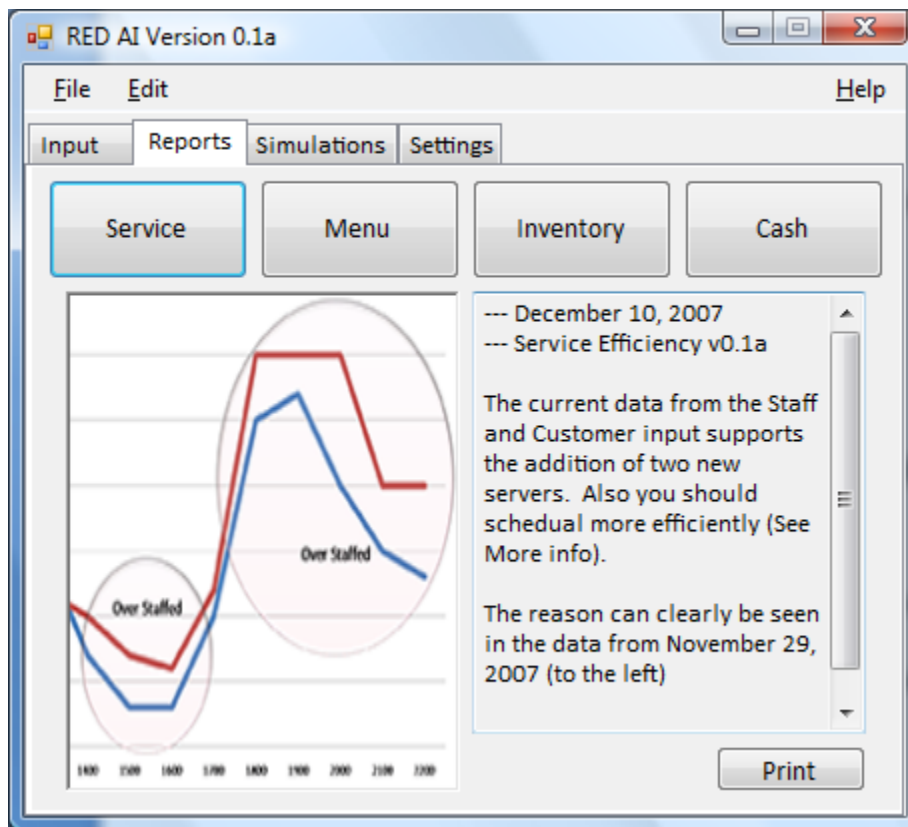
Smart reporting queries will look for and attempt to highlight trends, which occur on daily, weekly, monthly, and eventually annual cycles.

DESIGN INFERENCE ENGINE

The inference engine for service efficiency will employ backward chaining to determine the rule set for the effect on profit of the staff-schedule customer-flow relationship.

DESIGN SIMULATOR

The simulator will employ the rules determined by the inference engine to simulate effects on profit based on historical customer-flow versus modified staff-schedule.

DEVELOP / IMPLEMENT TEST CASES

With the help of our domain experts and beta-test restaurants, we will determine applicable test cases to determine how robust our system is and identify any areas where we will need to make improvements. Ultimately, we plan to return results of the analysis on the real-world data we will collect.

References

AI LINKS

win32 prolog compiler
morris prolog samples
backward chaining inference engine for prolog
http://www.ai.uga.edu/ftplib/
http://www.ai.uga.edu/ftplib/forest/DSSTOOLS/ver2.63/dsstools.zip
http://www.cs.usfca.edu/~brooks/Fall02classes/cs345
http://www.amzi.com/ExpertSystemsInProlog/02usingprolog.htm
http://www.cs.odu.edu/~bterribi/410/dijkstra.cpp

MARKETING LINKS

Competition

http://www.carnussystems.com/carnusFBforecaster.html
http://www.cs.odu.edu/~cpi/cpi-s2002/quick_seat/
http://www.pqsystems.com/products/SPC/CHARTrunner/SudiesCatfish.php
http://guestbridge.com/about.html
http://www.foodsoftware.com/Product_0089.asp
http://www.kioskequipmentworld.com/cambro-cvc55.html
http://www.tableswipe.com/default.html
http://www.roboservercorp.com/selfserve.shtml

General Marketing

http://www.news.cornell.edu/Chronicle/03/1.23.03/restaurant.html
http://cqx.sagepub.com/cgi/reprint/40/3/31
http://findarticles.com/p/articles/mi_m3190/is_22_36/ai_86763010

FUNDING LINKS

http://www.nsf.gov/funding/
http://www.nsf.gov/pubs/policydocs/pappguide/nsf08_1/gpg_index.jsp
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide
http://grants.nih.gov/grants/forms.htm#contracts
http://www.grants.gov/
https://apply07.grants.gov/apply/forms_apps_idx.html
http://www07.grants.gov
http://www07.grants.gov[1]

http://www07.grants.gov[2]
http://www.sba.gov/
http://www.sba.gov/SBIR/indexsbir-sttr.html
http://www.sba.gov/gopher/Innovation-And-Research/SBIR-Pro-Prep/
http://www.sba.gov/services/financialassistance/eligibility/index.html
http://www.sba.gov/services/financialassistance/sbaloantopics/index.html
http://www.commerce.gov/
http://www.osec.doc.gov/osdbu/FAQ.htm#loans
http://www.nvca.org/
http://www.ventureworthy.com/
http://www.fundinguniverse.com/services/
http://usangelinvestors.com/funding.html
http://entrepreneurship.mit.edu/Downloads/AngelReport.pdf

GENERAL

http://restaurants.about.com/
http://www.eposonline.com/lrsfeature.html
http://www.restaurantdiary.com/
http://www.grademygrub.com/algorithm
http://aima.cs.berkeley.edu/.../restaurant-multivalued.lisp
http://www.webassociates.com/press/pressrelease.aspx?id=80
http://www.foodservicei.com/forums/showthread.php?t=11691
http://www.selfserviceworld.com/article_17646_309_86.php
http://www.freepatentsonline.com/20030088469.html
http://www.hotel-online.com/News/PR2007_1st/Jan07_Carnus.html
http://www.news.cornell.edu/Chronicle/03/1.23.03/restaurant.html
http://cqx.sagepub.com/cgi/reprint/40/3/31
http://findarticles.com/p/articles/mi_m3190/is_22_36/ai_86763010
http://www.selfserviceworld.com/rc2.php?cat_id=3

About Us
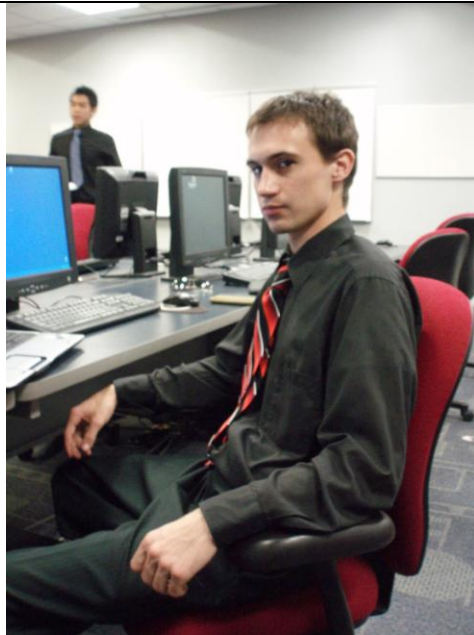
Alexander Caulkins

Project Manager / Web Developer

I am currently a Senior at ODU in the Computer Science program. I have worked for Booz Allen Hamilton as a consultant. I have extensive knowledge of the computer and consulting fields, including management. On the Red Team, I am the project manager and web developer.

Brian Terribile

Documents / Finance

Brian will complete his BS in Computer Science May 2008. He is currently working as a construction supervisor for Kres Custom Homes in Virginia Beach; previous employers include Dell, Vonage, ICT, Americomm, & UVa Medical Center. In his spare time he enjoys writing and recording music with friends.

David Harris

Marketing / Support

Dave Harris is a senior in the Computer Science program at ODU. He is currently Student Campus Minister at ODU Catholic Campus Ministry and Vice Chair of the ODU Association for Computing Machinery. He also enjoys working with Open Source software and is an active member of the TideWater Unix User's Group. He plans to graduate from ODU in May 2008.

Matthew Crainer

Hardware

Matthew Crainer is working to complete a degree in Computer Science at Old Dominion University. Currently employed under sales at a communications corporation he is seeking a move into software design and engineering for networking, databases, mathematics or entertainment fields. In his spare time he enjoys collecting and listening to records, playing classic video games, building computers and refurbishing old arcades.

Patrick Bourque

Software

Officer Candidate Patrick Bourque, USN, plans to complete his Bachelor of Science in Computer Science in May 2008. Currently on active duty in the United States Navy, he will receive his commission as an Ensign upon graduation from Old Dominion University.

The coolest guy anyone ever met.

SUMMARY PROPOSAL BUDGET

	FOR NSF USE ONLY		

ORGANIZATION Old Dominion University CS Dept	PROPOSAL NO.	DURATION (MONTHS)	
		Proposed	Granted
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR Janet Brunelle	AWARD NO.		

A. SENIOR PERSONNEL: PI/PD, Co-PIs, Faculty and Other Senior Associates List each separately with name and title. (A.7. Show number in brackets)	NSF-Funded Person-days			Funds Requested By Proposer	Funds Granted by NSF (If Different)
	CAL	ACAD	SUMR		
1. Patrick Bourque - Software Engineer	180			$19,550	$
2. Matthew Crainer- Hardware Engineer	99			10,690	
3. David Harris - Marketing and Support	14			1,400	
4. Brian Terribile - Documents and Finance	74			7,970	
5. Alexander Caulkins - Project Manager	28			3,050	
6. (3) OTHERS (LIST INDIVIDUALLY ON BUDGET EXPLANATION PAGE)	18			5,810	
7. (8) TOTAL SENIOR PERSONNEL (1-6)				(48,470)	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. ( ) POSTDOCTORAL ASSOCIATES					
2. ( ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)					
3. ( ) GRADUATE STUDENTS					
4. ( ) UNDERGRADUATE STUDENTS					
5. ( ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					
6. (OVERHEAD) OTHER				19,390	
TOTAL SALARIES AND WAGES (A + B)				67,860	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				67,860	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT					
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)					
2. FOREIGN					
F. PARTICIPANT SUPPORT					
1. STIPENDS $					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER					
TOTAL NUMBER OF PARTICIPANTS ( ) TOTAL PARTICIPANT COSTS					
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				10,370	
2. PUBLICATION/DOCUMENTATION/DISSEMINATION					
3. CONSULTANT SERVICES					
4. COMPUTER SERVICES					
5. SUBAWARDS					
6. OTHER					
TOTAL OTHER DIRECT COSTS				10,370	
H. TOTAL DIRECT COSTS (A THROUGH G)				10,370	
I. INDIRECT COSTS (F&A) (SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)					
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECT SEE GPG II.D.7.j.)					
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$78230	$
M. COST SHARING: PROPOSED LEVEL $	AGREED LEVEL IF DIFFERENT: $				

PI/PD TYPED NAME AND SIGNATURE* Janet Brunelle	DATE	FOR NSF USE ONLY		
		INDIRECT COST RATE VERIFICATION		
ORG. REP. TYPED NAME & SIGNATURE* Alexander Caulkins	DATE	Date Checked	Date of Rate Sheet	Initials-ORG

NSF Form 1030 (10/99) *Supersedes All Previous Editions*   *SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.C)

INSTRUCTIONS FOR USE OF SUMMARY PROPOSAL BUDGET
(NSF FORM 1030)

1. General
a.   Each grant proposal, including requests for supplemental funding, must contain a Budget in this format unless a pertinent program announcement/solicitation specifically provides otherwise. A Budget need not be submitted for incremental funding unless the original grant letter did not indicate specific incremental funding or if adjustments to the planned increment exceeding the greatest of 10% or $10,000 are being requested.
b.   Copies of NSF Form 1030 and instructions may be reproduced locally.
c.   A separate form should be completed for each year of support requested. An additional form showing the cumulative budget for the full term requested should be completed for proposals requesting more than one-year's support. Identify each year's request (e.g., "First year," or "Cumulative Budget," etc.) in the margin at the top right of the form.
d.   Completion of this summary does not eliminate the need to document and justify the amounts requested in each category. Such documentation should be provided on additional page(s) immediately following the budget in the proposal and should be identified by line item. The documentation page(s) should be titled "Budget Justification."
e.   If a revised budget is required by NSF, it must be signed and dated by the Authorized Organizational Representative and Principal Investigator and submitted in at least the original and two copies.

2. Budget Line Items
A full discussion of the budget and the allow ability of selected items of cost is contained in the *Grant Proposal Guide* (GPG), NSF *Grant Policy Manual* (GPM) (NSF 95-26, periodically revised), and other NSF program announcements/solicitations. The following is a brief outline of budget documentation requirements by line item. (NOTE: All documentation or justification required on the line items below should be provided on the Budget Justification page(s).)

A., B., and C*. Salaries, Wages and Fringe Benefits* (GPM 611). See definitions in GPG Appendix C. List individually, all senior personnel who were grouped under Part A, the requested person-months to be funded, and rates of pay.

D.   *Equipment* (GPM 612). Items exceeding $5,000 and 1 year's useful life are defined as permanent equipment (unless lower thresholds are established by the organization). List item and dollar amount for each item. Justify.

E.   *Travel* (GPM 614 and GPM 760). Address the type and extent of travel and its relation to the project. Itemize by destination and cost and justify travel outside the United States and its possessions, Puerto Rico, Canada and Mexico. Include dates of foreign visits or meetings. Airfares are limited to round trip, jet-economy rates.

F.   *Participant Support* (GPM 618). Normally, participant support costs only may be requested for grants supporting conferences, workshops, symposia or training activities. Show number of participants in brackets. Consult GPG or specific program announcement/solicitation for additional information.

G.   *Other Direct Costs*.
   1.   Materials and Supplies (GPM 613). Indicate types required and estimate costs.
   2.   Publication, Documentation and Dissemination (GPM 617). Estimate costs of documenting, preparing, publishing, disseminating, and sharing research findings.
   3.   Consultant Services (GPM 616). Indicate name, daily compensation (limited to individual's normal rate or daily rate paid for Level IV of the Executive Schedule, whichever is less), and estimated days of service, and justify. Include travel costs, if any.
   4.   Computer Services (GPM 615). Include justification based on estimated computer service rates at the proposing institution. Purchase of equipment should be included under D.
   5.   Sub awards (GPM 313). Also, include a complete signed budget NSF Form 1030 for each sub award and justify details.
   6.   Other. Itemize and justify. Include computer equipment leasing and tuition remission. (GPG II.D.7.f and II.D.7.a.ii)

I.   *Indirect Costs* (GPM 630) (Also known as Facilities and Administrative Costs for colleges and universities). Specify current rate(s) and base(s). Use current rate(s) negotiated with the cognizant Federal negotiating agency. See GPM for special policy regarding grants to individuals, travel grants, equipment grants, doctoral dissertation grants and grants involving participant support costs (GPM, Chapter VI).

K.   *Residual Funds* (GPG II.D.7.j). This line is used only for budgets for incremental funding requests on continuing grants. Grantees should provide a rationale for residual funds in excess of 20% as part of the project report. (See GPG VII.G)

L.   *Amount of Request*. Line L will be the same as Line J unless the Foundation disapproves the carryover of funds. If disapproved, Line L will equal J minus K.

M.   *Cost Sharing* (GPM 330). Include any specific cost sharing amounts in excess of the minimum one percent required under unsolicited research proposals. Include the estimated value of any in-kind contributions. Discuss the source, nature, amount and availability of any proposed cost sharing on the Budget Justification page. If a proposal budget includes a specific cost sharing level, the identified cost sharing level is expected to be included as a requirement in the award.

PROPOSERS MUST NOT ALTER OR REARRANGE THE COST CATEGORIES AS THEY APPEAR ON THIS FORM, WHICH HAS BEEN DESIGNED FOR COMPATIBILITY WITH DATA CAPTURE BY NSF'S MANAGEMENT INFORMATION SYSTEM. IMPROPER COMPLETION OF THIS FORM MAY RESULT IN RETURN OF PROPOSAL.

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Janet Brunelle	Other agencies (including NSF) to which this proposal has been/will be submitted. NONE

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

RED AI

Source of Support: NONE

Total Award Amount: $-   Total Award Period Covered: -

Location of Project: -

Person-Months Per Year Committed to the Project.   -   Cal: -   Acad: -   Sumr: -

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Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support: NONE

Total Award Amount: $-   Total Award Period Covered: -

Location of Project: -

Person-Months Per Year Committed to the Project.   -   Cal: -   Acad: -   Sumr: -

---

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support: NONE

Total Award Amount: $-   Total Award Period Covered: -

Location of Project: -

Person-Months Per Year Committed to the Project.   -   Cal: -   Acad: -   Sumr: -

---

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support: NONE

Total Award Amount: $-   Total Award Period Covered: -

Location of Project: -

Person-Months Per Year Committed to the Project.   -   Cal: -   Acad: -   Sumr: -

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Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support: NONE

Total Award Amount: $-   Total Award Period Covered: -

Location of Project: -

Person-Months Per Year Committed to the Project.   -   Cal: -   Acad: -   Sumr: -

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*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

NSF Form 1239 (10/99)   USE ADDITIONAL SHEETS AS NECESSARY

55

FACILITIES, EQUIPMENT & OTHER RESOURCES

FACILITIES: Identify the facilities to be used at each performance site listed and, as appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Use "Other" to describe the facilities at any other performance sites listed and at sites for field studies. Use additional pages if necessary.

Laboratory: Old Dominion University CPI Dept.
Capabilites: All Hardware testing/development
Proximity: On-Site
Availability: 10 hours / day

Clinical: NONE

Animal: NONE

Computer: Old Dominion Computer Science Laboratory
Capabilites: All software development
Proximity: On-Site
Availability: 14 hours / day

Office: Old Dominion University OCCS
Capabilities: All administrative/marketing work
Proximity: On-Site
Availability: 14 hours / day

Other: NONE

MAJOR EQUIPMENT: List the most important items available for this project and, as appropriate, identify the location and pertinent capabilities of each.
Computer Workstations – ODUCS Laboratory – Develop software for the system
Key / License Server – ODUCS Laboratory – Will host the update and license checking sotware
AI Cluster – ODUCS Beowulf Lab – Will be used to speed up our AI generation
Firewall – ODUCS Laboratory – Will Protect our Key/ License Server from the outside internet

OTHER RESOURCES: Provide any information describing the other resources available for the project. Identify support services such as consultant, secretarial, machine shop, and electronics shop and the extent to which they will be available for the project. Include an explanation of any consortium/contractual/sub award arrangements with other organizations.
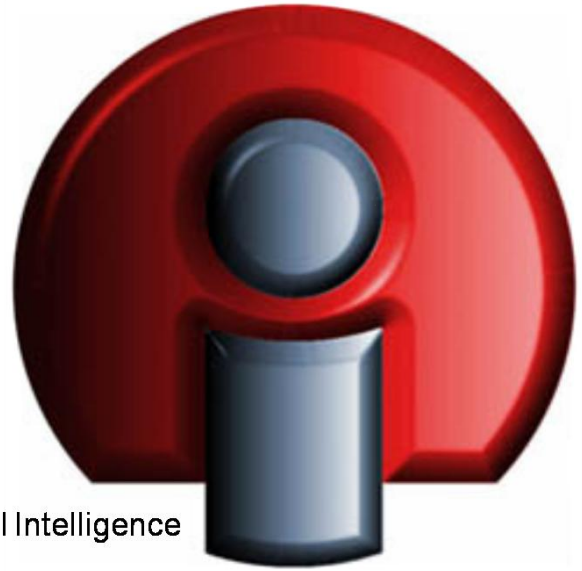
NONE

Appendix

RED AI

Restaurant Efficiency Decision Artificial Intelligence

Management

Version 1.0

CS410 Red Team

Table of Contents

Program Identification

This Program Management Plan (PMP) is for the Restaurant Efficiency Decision Artificial Intelligence (RED AI). The program will deliver the RED AI hardware, software, and documentation for the RED AI. The RED AI Project Team (RPT) is responsible for the integration, acceptance testing, and training of the Total Computing Environment.

Program Management Overview

Execution of the Program will be performed in accordance with the procedures defined by the set of planning documents. These documents include Program Management Plan*, Development Plan, Evaluation Plan, Marketing Plan, Staffing Plan, Financial Plan, Resource Plan, and Risk Management Plan (RMP) (see Figure 1). The responsibilities of the Program Team, the capabilities of the system, and the Program deliverables are detailed under the contractual provisions, as well as RPT's technical, management, and cost proposals.

* This Program Management Plan shall be deemed to meet the contractual requirement of a Project Management Plan.

Figure 1. Program Management

This Program Management Plan describes the management philosophy, program organization, schedule, and major milestones that serve as the guide for execution of the Program. The PMP also provides the customer and the quality team with the information they need to monitor and evaluate the progress of the effort. This plan provides the following pertinent information:

- Corporate Organization
- Program Team Organization With Areas of Responsibility
- Work Breakdown Structure
- Program Planning

- Progress Reporting and Team Management
- Detailed Program Schedule and Milestones
- Program Reviews

The Program Management Plan provides guidance for the content and execution of the following plans:

- Risk Management
- Financial
- Evaluation
- Development

Corporate Structure

The entirety of Computer Productivity Initiative supports the RED AI Program. In 1995, Old Dominion University started the Computer Productivity Initiative from a grant by the National Science Foundation to give Computer Science students the opportunity to develop solutions to real world problems. The RED AI Project Team formed in the fall semester of 2007. The team will either be directly involved in the development process of the RED AI service or outsource responsibilities on a contract basis. The following is RED AI's organizational structure:

- **Consultant –** Janet Brunelle, Old Dominion University
- **Project Manager –** Alexander Caulkins
- **RED AI Program Office –** The RED AI Program Office will execute the program and provide day-to-day senior management supervision, management, engineering, and administrative resources necessary to manage and administer the RED AI service.

Management Approach

RED AI's management goal is to work closely with the customer to fully understand the system requirements and field a system that meets those requirements. The management approach to executing contracts at RED AI is based on the philosophy that successful Programs are delivered by goal-oriented teams. A Program Manager (PM) will lead the RED AI project team. The PM is responsible for all planning, programmatic, technical, and financial aspects of the Program. The PM is the primary Point of Contact (POC) for the customer. The primary duties include supervision of all planning, scheduling, financial, and technical activities, and customer liaison. The PM is responsible for all Program-related decisions and commitments with approval, as required, from the Corporate Management Team.

A key element of RED AI's program management approach is customer involvement. RED AI desires the customer to retain an active role in monitoring the progress of all aspects of the

Program. The customer is encouraged to discuss technical details directly with members of the Program team, provide planning and schedule recommendations, and assist in resolution of technical and programmatic issues. In order to facilitate customer involvement, RED AI will provide access to program information including, but not limited to:

- Program Plans and Schedules
- Program Status
- Formal Review Material
- Action Items
- System Drawings and Documentation

Program Team

The RED AI team is committed to provide the best value by delivering COTS, open architecture, and low-risk systems at the lowest cost. This commitment is attainable because it is based on the re-use of existing technology that is field-proven. Through strategic teaming and an extensive system selection process, Computer Productivity Initiative has assembled a cohesive Program Team that is experienced with the implementation of each component that will comprise the RED AI service.

Program Manager. Overall management responsibility for RED AI is assigned to a Program Manager who is responsible for planning and coordination of the day-to-day technical, contractual, and financial aspects of the program. He is responsible for the generation and management of all program schedules, for the coordination of program staff assignments and for coordinating all program activities. His principal assistants are:

- **Documentation Specialist.** The DS provides overall documentation direction for the Program Team. The DS will ensure that everyone on the team has met the required documentation specifications, and that each person is aware of the tasks he/she has been assigned. The DS will also provide documentation of each meeting in which an overview of tasks assigned is given.
- **Financial Director.** The FD works in coordination with the rest of the team to devise a specific and schedule based budget plan, that will be reviewed by each of the team members and approved by both the PM and the customer. The FD will also determine the best agency to pursue to get funding for the project.
- **Hardware Manager**. The HM is responsible for system-level activities to ensure system hardware meets the specification requirements. The HM is also responsible for the development of system specifications, system design documents, interface documents, test plans, and procedures.
- **Marketing Director.** The MD is responsible for developing a marketing plan that includes the specification of an initial target market. The MS is responsible for the development of an in-depth plan on how to advertise and sell RED AI to the specified

target market. The MD must also determine the various risks involved and the best way to mitigate them.

- **Software Manager.** The SM is responsible for the development of system software functions as defined in the system specifications. The SM is also responsible for integration of all system components to meet the performance requirements of the system.

Program Duration

The RED AI program is a 3-year project that will culminate in the rollout of an Expert System for the restaurant industry that will increase efficiency, thus increasing profit. The planed on shelf date is by Christmas 2009.

Work Breakdown Structure

The program Work Breakdown Structure (WBS) reflects the budgeted cost versus resources required to complete each task. The WBS phase numbers are integrated as part of the master program schedule. Assuming SBIR funding, the budget will be carefully planned out against the set deadlines set by SBIR guidelines. The budget will be carefully planned out against the set deadlines set by SBIR guidelines. The budgets are created by the Financial Manager, reviewed by the RED AI program, and set by the Program Manager. The WBS will be used to mark the different milestones throughout the phases and to make sure that the team in on time and on budget. The WBS management tool that RED AI will use is Microsoft Project 2003.

Program planning

The RED AI Program Team office will maintain the program master schedule. The master schedule contains a line item for each WBS element and will be used to track the progress of each element. All deviations from the master schedule must be coordinated with the program office. It is the responsibility of each team member to call attention to possible schedule deviations at the earliest opportunity. The program office will coordinate the program schedule with Computer Productivity Initiative. The program will be developed in phases; within each phase, formal reviews will play an integral part in monitoring program progress. All formal reviews will be announced four weeks in advance of the starting date.

RED AI will take a "top down approach" to the Program Schedule, meaning that we will pace our workload to fit the overall Program requirements. Particular attention will be given to timely milestone completions. It is recognized that the schedule is particularly tight, containing critical program milestones during the first year, and adequate personnel will be available in order to keep the program moving forward.

Progress Performance Assessment

All RED AI team members will participate in progress reporting and team management. RED AI will track technical and financial progress of the program. Reviews will be held monthly or as mutually agreeable between Computer Productivity Initiative and RED AI.

- Report on progress to date
- Present work to be performed during the next month
- Present status of all deliverables and review planned delivery dates
- Plan and coordinate activities, including the new review date.
- Discuss technical or programmatic issues as necessary.

In preparation for the meetings, the RED AI Program Manager will collect the status data on relevant on-going activities, progress against schedule and budget, and planned activity for the next reporting period. Quality reviews of all program documentation and procedures will be held periodically. In particular, the quality program will be involved with program deliveries and milestones and will work off the master program schedule to plan program audits. Technical, financial, and quality progress and status reporting will be conducted according to the following general guidelines.

Technical Progress and Reporting

The schedule for the program is established during the planning phase and monitored throughout the performance period. The schedule contains an entry for each WBS element. The percentage of completion for each WBS element is determined as necessary to manage program progress and is reviewed at least quarterly during the General Manager's review.

Financial Management and Reporting

The financial profile for the Program is established during the planning phase and monitored throughout the performance period. This profile is generated by assigning accounting phase numbers to every Program activity that has been identified as a scheduled event. A budget representing labor costs, materials purchase, and other expenditures (such as travel expenses) is then prepared for every phase. The schedule and budgets are then integrated to provide a spending profile for the phase. The Program spending profile represents a summary of phase spending profiles.

The PM is provided an information package that identifies the phase numbers assigned to each activity, the corresponding budgets and schedules, the overall spending profile for the program, and a synopsis of all major deliverables and milestones specified in the contract. The PM uses this information, combined with an on-line financial summary of the Program to track its financial status on a weekly basis. An updated spending profile is provided automatically by the Contracts

Administrator on a monthly basis, or upon request from the PM. The PM uses the financial summary in conjunction with his assessments of technical progress to track the overall status of the efforts (please see the Financial Plan for more information).

Earned Value

Earned Value Ratios will be reported as required. At a minimum, RED AI will determine earned value quarterly at the overall Program level and will report at the second level of WBS indenture in order to provide additional information. RED AI will use Microsoft Project Program Manager Software in order to calculate the ratios. Please refer to the Financial Appendix for more information.

Quality Process and Reporting

Quality management on the program will be a team effort. The Project Manager will coordinate conduct, quality reviews, and audits. The PM is ultimately responsible for the development and implementation of the System Quality Program Plan. The SQPP is an umbrella plan that incorporates the quality programs of the program team members. The SQPP describes a team quality concept, including Process Coordination and Quality Evaluators. Team members are responsible for performing the processes required to complete Program tasks. Quality Evaluators are responsible for verifying that the development, production, and handling of all documentation, software, and hardware are performed in accordance with the SQPP and its component processes. The team is also responsible for conducting periodic reviews and evaluations of work in process attending in house test events and supporting in house Program reviews. All planned quality program activities and quality evaluations (internal audits) are submitted to the PM for review. See the Evaluation Plan for more details.

Monthly Progress Report

RED AI will submit monthly progress reports. The report shall cover, at a minimum, the following:

- Progress Summary;
- The variance statement;
- Critical Path Analysis;
- Milestone Deliverables, planned actual and forecast;
- Earned Value Schedule and Cost Performance Indices;
- Dependencies: a 'critical items list' of all items, whether or not the Contractor's direct responsibility, which could jeopardize timely completion of the work or any significant parts of the program;
- Risk Status: update of risk register;

- Look Ahead (Future action and Forecast);
- Resource Profile;
- Work Package/Activities planned, actual & forecast status;
- Milestone/Deliverables planned, actual & forecast status;
- Configuration Change Control issues;

Reviews

Reviews will play an integral part in the management and monitoring of all phases of the RED AI Program. Informal reviews with the Program team members will be held at all levels on a weekly basis to ensure that the program stays on track. Formal technical reviews will be held to ensure that the program is proceeding as planned. The types of reviews, their purpose, and presented information are addressed in the following paragraphs.

Program Management Reviews

Program Management Reviews (PMRs) will be conducted with RED AI and subcontract representatives. The first PMR will be conducted in May 2007; thereafter PMRs will be conducted approximately twice weekly. The PMRs are scheduled to discuss programmatic issues related to the development and implementation of the project. The reviews will provide the opportunity to review the progress of the effort; as well as to conduct milestone reviews of deliverables, and identifies and resolves any issues that may arise during the execution of the tasking.

The PM will ensure that all program related information required to meet the objectives of the review are prepared and delivered no later than the night prior to the scheduled review date. The PM will also be responsible for identifying the RED AI Program Team personnel who will attend the review. The PM will attend all Program Management Reviews. The following information will be prepared in support of each PMR. Recorded during the review and delivered before the completion of the review.

Technical Reviews

Formal technical reviews will be conducted on the dates specified in the master schedule. The reviews will be held jointly with RED AI, Program Team members and sub-suppliers as necessary. An agenda and review material will be submitted to RED AI two weeks prior to the scheduled meeting. Review meeting minutes will be delivered before the completion of the review. The objectives for each review are outlined below (please see the Technical Plan for more information).

Reviews will be held to validate the direction taken for the design, development, and test of the system. The System Requirements Review (SRR), Preliminary Design Review (PDR), and Critical Design Review (CDR) will be formal reviews held at RED AI's facility. The Test Readiness Reviews (TRR) will be formal reviews completed before completion of each phase.

System Requirements Review is conducted to ensure that the Program team fully understands the system performance requirements specified in the System/Segment Specification. A detailed review of requirements for the system and each subsystem will be reviewed. The System/Segment Specification (Technical Specification) will be used in the review.

System Design Review is conducted to present and review the system design. System requirement allocation to each system component will be discussed. The general approach to be taken for the integration of each system component will be presented. The documents listed below will be used in the review. This will be an informal review. The data will be included in the PDR.

- System/Segment Design Document
- System Interface Design Document

Software Requirements Review is conducted to review the software specification and interface requirement specifications. This review will be conducted as part of the PDR.

Preliminary Design Review is conducted to present the preliminary design of the Program System. The functional requirements of each subsystem will be discussed in detail. The following documents will be used in the review:

Critical Design Review is conducted to review system integration issues. In particular, the review will focus on system interfaces in preparation for Subsystem FAT.

Test Readiness Reviews are held to determine if the system is ready to proceed to the next level of test. Test configurations and results from the previous test efforts will be presented. The test report from the previous test will be used in the review.

Quality Reviews

The PM supported by the Project Manager (PM) will establish the time and identify attendees for all formal reviews. He will also coordinate with the appropriate managers to conduct quality reviews at key program milestones, and in preparation for formal reviews with the customer. Informal peer review and engineering planning meetings will also be held at the discretion of each subsystem manager to discuss technical issues, conduct internal comment reviews, and provide technical guidance to members of the Program team (please see the Evaluation Plan for

more information). As part of the quality activities for the program, the quality team will conduct informal reviews to:

- Evaluate the processes used by the Program team members to perform program tasks;
- Evaluate deliverable products for compliance with contract requirements;
- Evaluate work-in-process during engineering reviews;
- Document results of each evaluation; and

Recommend corrective and preventive actions if necessary.

RED AI

Restaurant Efficiency Decision Artificial Intelligence

Evaluation

Version 2.0

CS410 Red Team

Table of Contents

Purpose

This document defines the top-level parameters to measure success for each phase of the RED AI project. Phase deliverables will be evaluated based on the project management criteria of time, cost, scope, and quality.

- **Time**, as measured by the baseline project plan.
- **Cost**, as measured by the budget plan by phase.
- **Scope**, as measured by the requirements document.
- **Quality**, as measured by quality control plan, customer adoption rate and customer satisfaction.

Phase 0

The project idea is developed and researched to establish clearly identified objectives, goals, and risks. The Work Break Down Structure (WBS) was created for each Phase of the project and plans have been developed to guide each phase of the project.

In this phase, the initial SBIR proposal was created along with a proposal presentation and product website.

Main Deliverables
- Problem
- Feasibility
- Milestones
- SBIR
- Final Presentation
- Web Site

Time

The project plan developed in Microsoft Project contains the WBS, schedule, and cost estimates. It defines the date at which these deliverables should be completed and if those deliverables are completed by the estimate completion date, then the criteria will have been

deemed successful. The team leader ensures all project members are completing tasks within the deadlines of the milestones (for CS410) in the WBS.

Cost

Since there are no fees or expenses for this phase, the criterion will not be used to measure success.

Scope

The scope will be measured by comparing the grading criteria against each deliverable. If each deliverable meets each graded criteria, and Phase 1 funding acquired, then this criteria is deemed a success.

Quality

An independent panel will determine quality of the proposal presentation. This panel will evaluate the presentation based on the grading criteria established. An average score of 90 will determine that success of this deliverable.

The SBIR proposal and product website will be evaluated by the CPI advisor. A grade of 90 or more for each deliverable based on the grading criteria will indicate a success.

Peer evaluations have been completed after each team milestone. Evaluation is performed by team members to measure participation, quantity, and quality of each team member. Weekly discussions and constructive criticism take place in CS410 class to improve quality of deliverables.

Phase 1

In this phase, a lab prototype will be developed and demonstrated to a potential customer(s). In addition, SBIR Phase 2 proposal will be developed along with the projects documentation. Success will be measured by the satisfactory completion of these deliverables. Evaluation during this phase will also consist of weekly team meetings to ensure that the project is progressing as planned and the procured hardware and software components are correctly implemented. Formal evaluations will be conducted each month or as often as necessary to ensure we stay within the guidelines of the WBS.

We will also be developing documentation for our product: requirements document, test simulation documentation (to ensure simulated online accounts can be accessed using a token), user manual, and refinement of our plans.

Main Deliverables
- Project Papers
- SBIR II
- Prototype Requirements
- Prototype I
- Prototype II

Time
The project plan developed in Microsoft Project contains the WBS, schedule, and cost estimates. The project plan defines the date at which these deliverables should be completed. If these deliverables are completed by the estimate completion date, then these criteria will have been deemed successful. The team leader ensures all project members are completing tasks within the deadlines laid out (for CS411) in the WBS.

Cost
The funding plan determines the cost estimates of each phase. The human and hard resource actual costs will be compared to the budgeted costs in the funding plan. If the actual costs are within 5% of the budgeted costs, then these criteria will be deemed successful.

Scope
The scope will be measured by comparing the grading criteria against the SBIR Phase 2 requirements. If SBIR contains all the required items, then the criteria will be deemed successful. The lab prototype will be measured against the requirements document developed in Phase 1. If the prototype contains all of the required functionality and Phase 2 funding acquired, then the criteria will be deemed successful.

Quality

The SBIR decision board will determine quality of the proposal presentation. If the decision board grants the proposed funding, then the SBIR proposal will be deemed successful. These criteria for the lab prototype will be deemed successful if it meets all of the requirements in the requirements document and meets the performance requirements in that document.

We will begin evaluation with code reviews of each module for proper structure and syntax. After successfully passing code reviews, we will begin testing of each module. We will end the evaluation for each module after successful testing. We will have evaluations for every module being integrated into the system. We measure success when we have completed each evaluation successfully and in accordance with the WBS period, and the prototype passes all tests in the test plan.

Phase 2

Phase 2 is where the project shifts into refinement and development of the actual RED AI service. Evaluation during this phase will continue much like in Phase 1. Bi-weekly meetings will be held to determine if the project is on schedule and within budget. Testing plans for the production (non-prototype) version of RED AI will be drafted to ensure quality assurance, software components will be vigorously tested, and the results of those tests will be discussed at the bi-weekly meetings to work out any problems. In this phase, we will also conduct a beta test and success will be declared when the beta test results in few errors or errors that are of little significance. Feedback will also facilitate refinements to our product and support materials. Formal evaluations will be conducted each month or as often as necessary to ensure we stay within the guidelines of the WBS.

Main Deliverables

- Infrastructure
- Marketing Research
- Testing
- Potential Investors

Time

The project plan developed in Microsoft Project contains the WBS, schedule, and cost estimates. The project plan defines the date at which these deliverables should be completed. If these deliverables are completed by the estimate completion date, then these criteria will have been deemed successful.

Cost

The funding plan determines the cost estimates of each phase. The human and hard resource actual costs will be compared to the budgeted costs in the funding plan. If the actual costs are within 10% of the budgeted costs, then these criteria will be deemed successful.

Scope

The prototype will be measured against the requirements document. If the prototype contains all of the required functionality from the document, then the criteria will be deemed successful.

Quality

The criteria for RED AI in Phase 2 will be deemed successful if it meets all of the requirements in the requirements document, including performance. The prototype must pass all tests in the test plan. Once the test plan execution has been completed with no known bugs, then the criteria will be deemed successful. The criteria for RED AI will be determined by a beta test market. After the beta test, a study will be conducted by surveying the test market participant(s). The support materials, such as online token usage instruction manual, must also undergo a satisfaction beta test survey.

Phase 3

In this phase, the focus will be on further refinement of the RED AI product based on the beta testing and moving the project into full time production. To ensure quality, evaluation of the production process will be a key factor. Additionally, evaluation of the marketing strategy will be conducted to ensure that we are targeting the correct market. Formal evaluations will evaluated each month or as often as necessary to ensure we stay within the guidelines of the

WBS. Success in this phase will be determined by sales volume and profit margin. In addition, we will be evaluating customer feedback to gage customer satisfaction.

Main Deliverables

- Production
- Marketing
- Ads
- Documents
- SELL
- Production to implementation

Time

The project plan developed in Microsoft Project contains the WBS, schedule, and cost estimates. The project plan defines the date at which these deliverables should be completed. If these deliverables are completed by the estimate completion date, then these criteria will have been deemed successful.

Cost

The funding plan determines the cost estimates of each phase. The human and hard resource actual costs will be compared to the budgeted costs in the funding plan. If the actual costs are within 10% of the budgeted costs, then these criteria will be deemed successful.

Scope

The scope of the rollout is measured by the marketing plan.

Quality

If the test market survey of the product's quality and usefulness as compares to the goals and objectives of the project is favorable, then this criterion is deemed successful.

RED AI

Restaurant Efficiency Decision Artificial Intelligence

Marketing

Version 1.1

CS410 Red Team

Table of Contents

Who is the customer?

We expect our customers to be primarily independently owned restaurants unaffiliated with any franchise or chain. In addition, we will put special emphasis on new restaurants, since our research shows that most new restaurants fail within about 3 years. (See http://www.restaurantowner.com/public/302.cfm)

There are several reasons why this is a marketable solution:

- running a restaurant is very challenging

- that the owners or managers may not be experienced in running a restaurant

- The restaurants do not have an established customer base

- These restaurants (new and independently owned) do not have a tried and true model in place for restaurant efficiency

Is this a marketable solution?

This is a marketable solution for the following reasons:

- There is a need for our product because most restaurants fail shortly after opening and profit margins for restaurants are typically low
- Our product is priced attractively, being much less expensive than hiring another worker or hiring a consultant

There are a few caveats that we need to be aware of and work around wherever possible.

Firstly, numerous studies show that the restaurant business can improve efficiency in several cases:

http://www.news.cornell.edu/Chronicle/03/1.23.03/restaurant.html (CU report shows how to boost restaurants' efficiency, improve profits)

http://cqx.sagepub.com/cgi/reprint/40/3/31 (A simple measure of restaurant efficiency)

http://findarticles.com/p/articles/mi_m3190/is_22_36/ai_86763010 (Restaurant efficiency, profits could be out of this world with satellite technology)

Here are a few key points to be aware of:

- The restaurant business is cut throat and concerned with the bottom line. Like the CPI project in the past, this may limit us to high-end restaurants that can afford such a system.
- Restaurant managers and their subordinates are very busy. If our product requires a lot of manual input of restaurant data, they may be less likely to buy it. Introducing automation into the system with sensors, RFID's, etc. or anything that will cut down on manual data entry will be good.

What do we envision the best-case marketing solution?

The "Marketing mix" consists of the following four components that we should take into consideration:

- **Product:** Restaurant AI system to improve restaurant efficiency. Restaurants should expect efficiency gains of 1% per AI iteration by using the system. This system will take into account inventory, customer turnover, physical area usage, and more factors. This is a service-based system where we deliver algorithm updates and software directly to the customer for a monthly fee.
- **Price:** $100 per month is affordable for our target market and allows us to break even within 2 years if we meet sales goals. It is much, much cheaper than hiring a new worker.
- **Place:** We can use many different types of media to market to customers. We can use direct mailings, Internet placement (Google Ad sense), e-mail marketing, and where appropriate and possible site visits to restaurants. We should target potential customers based primarily on who we think would be most likely to be able to afford the cost of this system.
- **Promotion:** By using early customers as "early adopters" and beta testers we can, with their permission, advertise potential profit and efficiency gains of X% using our system (no guarantees!) as well as include testimonials. We will primarily target new restaurants and restaurants that are unaffiliated with any chain or franchise model, as these are at the greatest risk of failure and do not have a good model in place for restaurant efficiency.

SWOT Analysis

This shows the favorable and unfavorable forces involved in solving our problem.

Strengths: Good quantifiable problem, solvable with software alone, can be distributed at reasonable costs.

Weaknesses: Low-margin business (restaurants), restaurants unwilling to believe software can improve their business

Opportunities: potentially provide full-scale integration of ALL existing recorded information in a restaurant. Improvements of profitability of restaurant, never been done before. Our solution will have potential for use in other domains.

Threats: Competition, restaurant's unwillingness to spend money on this

Competition

This matrix shows similar products that are already available on the market, and shows that our solution plans to incorporate all of these factors into one solution.

	print data entry forms	generate reports	Statistical Analysis	works w/Excel	avail 4 popular OS's	software components	Hardware components	collect POS data	AI	Tech Support	Algorithm Updates	cut labor costs	increase sales	reduce wait time	Inventory Management	Layout Analyzing	Restaurant Template Sims	low cost	GUI	keyed data entry	Interface existing DB
Carnus	?	•	•		?	•			•		•								•		
Quick Seat	?		•		?	•	•					•	•						•		
CHARTrunner	?	•	•	•	?	•			•			?	?	?					•		
Guest Bridge	?	?			?	•													•		
LRS pager							•			•		?	?								
Cambro							•					•	•								
Table Swipe					?	•					?	?	•								
RoboServer		?				•	•				•	•	•						•		
Red Team	•	•	•	•	•	•		α	•	•	•	•	•	•	α	β	β	•	•	•	α
	Database Stuff					How it's installed		External Systems			Money Aspects								System Interface		

Key
- • - Phase I
- α - Phase II
- β - Phase III
- ? - Unknown

Interest Survey

This survey is designed to analyze our target market to see just how many restaurants are willing to purchase a system like ours at our target price point. This survey could also generate sales leads for when we plan to start actively marketing our product.

Results of our survey

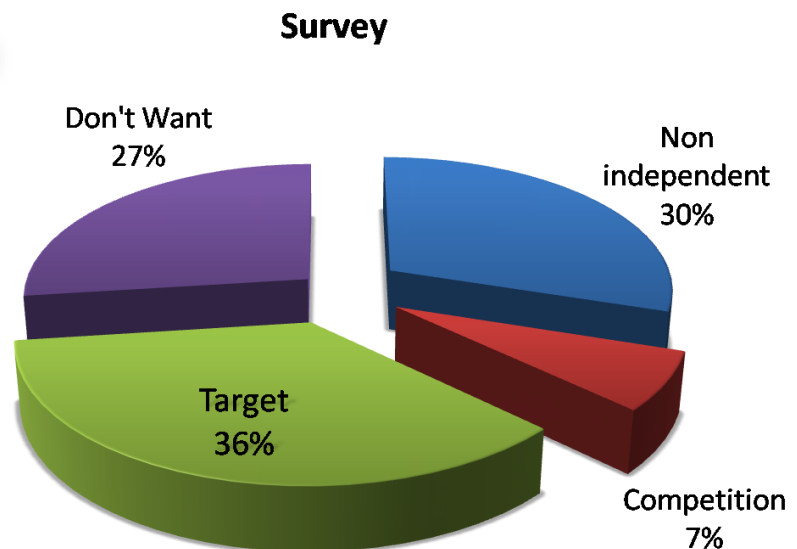Responded = 98

Have system in place = 7

Are not interested = 56

Conclusion of survey

We have concluded that there is a market to the problem.

- 36% of 900,000 = 324,000 target restaurants.

- 3% buy a one year contract = $1.2M per year income

Survey

Don't Want
27%

Non
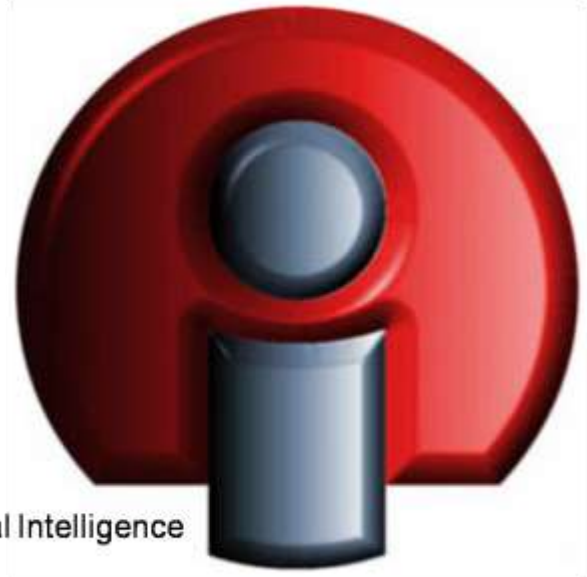independent
30%

Target
36%

Competition
7%

Break Even Point

This graph shows that revenues will steadily increase while our expenses remain constant. We are projected to break even about 2 years after our product is available for sale.
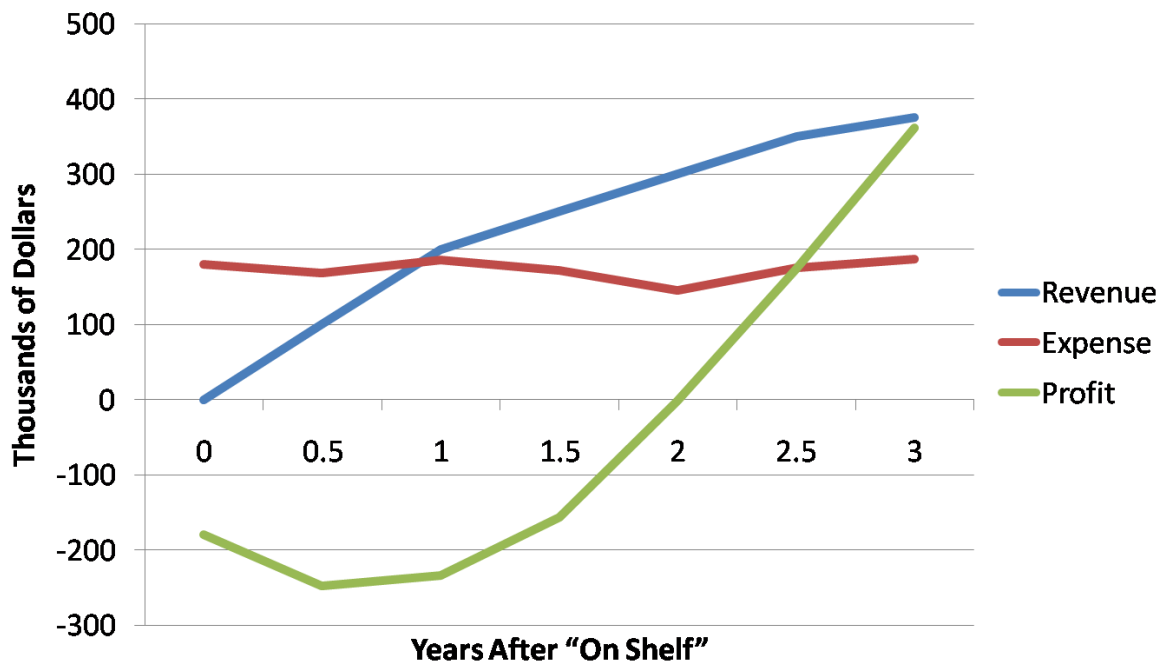
RED AI

Restaurant Efficiency Decision Artificial Intelligence

Funding

Version 2.0

CS410 Red Team

Table of Contents

Phase 0

The cost of phase 0 is zero dollars because our group members will be unpaid interns for that phase. Old Dominion University will supply us with the resources that are needed in this initial phase of the RED AI project. It encompasses the fall semester of CS410.

Phase 1

We will apply for funding to back the RED AI project from the National Science Foundation SBIR grant program. $100,000 is the maximum amount available for phase 1 of the project, in which we will develop a lab prototype. The total anticipated cost of our phase 1 activities is $76,510 (See Figure below). See the Resource Plans for itemized budgets.

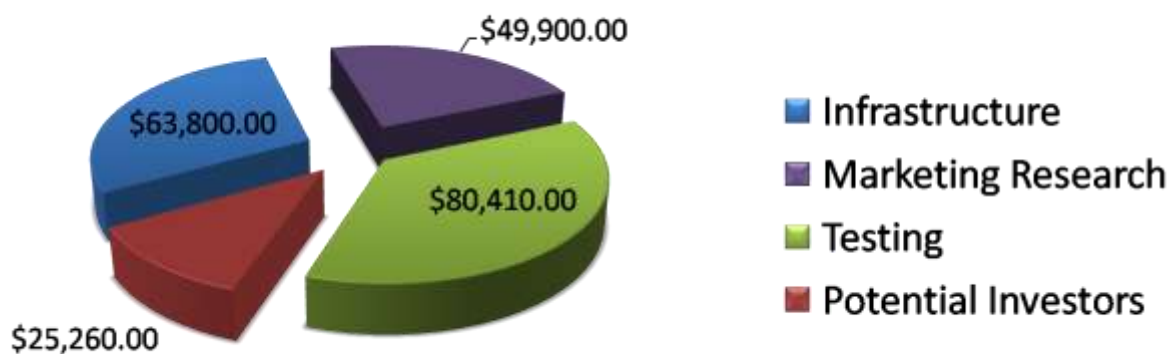| Item	Cost	Overhead (40%)	Total
Hard	$8,650	N/A	$8,650
Staff	$48,470	$19,390	$67,860
		Total	$76,510
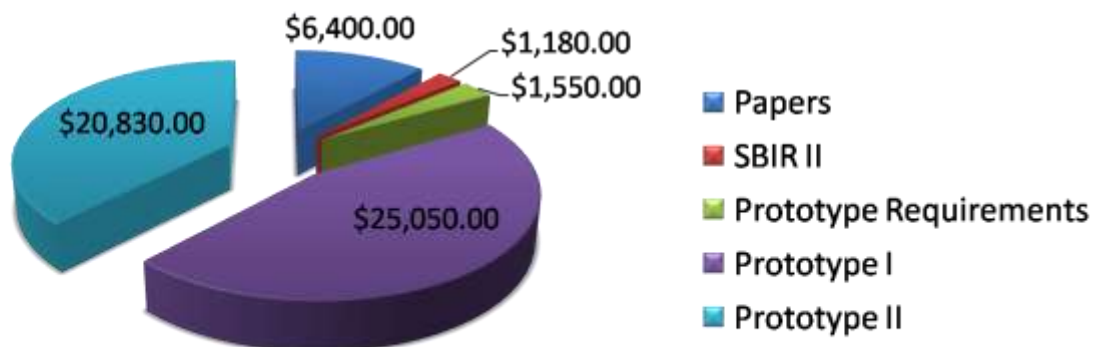
NSF

NSF plays a key role in supporting small business research with a clear goal of innovation that can benefit society through commercialization. SBIR programs at NSF are exclusively for the small business community to leverage federal funds to undertake high-risk science and engineering research that could lead to further investment from the investment community.

Phase 2

When the RED AI prototype is successfully completed, we will request an additional amount up to $750,000 from the NSF's SBIR for phase 2. The total anticipated cost of our phase 2 activities is $307,120 (See Figure below). See the Staffing and Resource Plans for itemized budgets.

Item	Cost	Overhead (40%)	Total
Hard	$0	N/A	$0
Staff	$219,370	$87,750	$307,120
		Total	$307,120

$49,900.00
$63,800.00
$80,410.00
$25,260.00

- Infrastructure
- Marketing Research
- Testing
- Potential Investors

Phase 3

In Phase 3, we will no longer receive money from the SBIR program. We will focus on production and commercialization in this phase. We will pursue funding through venture capital investment and Angel Investors, and we will apply for a small business loan if necessary. We expect to be self-sufficient based upon product sales within approximately 24 months. See Figures below for break-even analysis. The total anticipated cost of our phase 3 activities is $178,415.34 (See Figure below). See the Resource Plans for itemized budgets.

Item	Cost	Overhead (40%)	Total
Hard	$3,600	N/A	$3,600
Staff	$124,900	$49,950	$174,850
		Total	$178,450
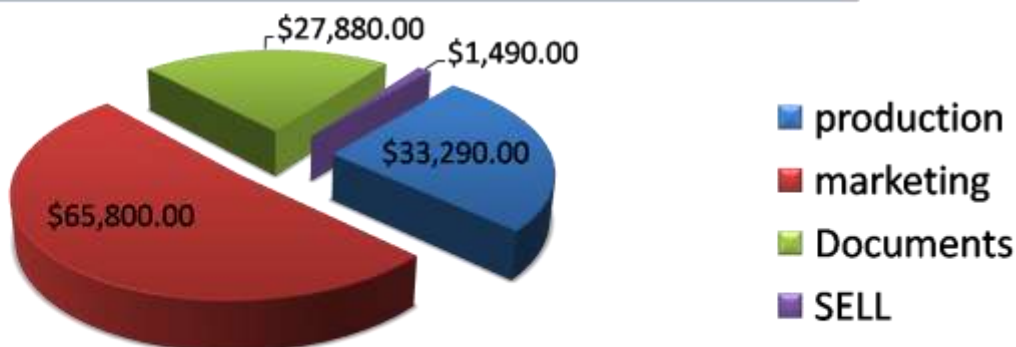
Angel investors

They are an important and growing source of financing for the start-up and initial growth phases of technology ventures. Many of these angels invest in first time entrepreneurs before the entrepreneurs secure venture capital financing. Besides earning a strong return on their investment, these experienced angels are motivated to "give back" to the community, which helped make them successful.

The motivations and operations of experienced angel investors are typically different from those of early stage venture capitalists. First time entrepreneurs can benefit from approaching experienced angel investors, prior to meeting early stage venture capitalists, when seeking early stage funding.

An angel's personal network of contacts is a key element in screening deals, conducting due diligence, negotiating terms, adding value after the investment, securing additional rounds of funding and executing the exit strategy. Angel groups are an important new development in

venture creation. These groups provide the fastest way for entrepreneurs to find angels and provide a way for angels to leverage their combined skills, time, expertise and networks.

Financial bootstrapping

Is a term used to cover different methods for avoiding using the financial resources of external investors. Bootstrapping can be defined as a collection of methods used to minimize the amount of outside debt and equity financing needed from banks and investors. The use of private credit cards is the most known form of bootstrapping, but wide varieties of methods are available for entrepreneurs. While bootstrapping involves a risk for the founders, the absence of any other stakeholder gives the founders more freedom to develop the company.

Summary

RED AI will be fully funded by the NSF for phase 1 and 2. Phase 3 we will seek out private options that will total $178,450. This will have to be paid back.   We estimate (from the marketing plan) that it will take two years to recoup this investment.

RED AI

Restaurant Efficiency Decision Artificial Intelligence

Resources

Version 1.0

CS410 Red Team

Table of Contents

Resources: AI Cluster

Hardware description:

Pentium III 1.0 GHz systems - 512 MB PC133 - T-10/100 Integrated LAN

Expense:

$400 each

Tasks:

Buy for use as customer test bed and to increase the speed of producing updates.

Duration:

Start = Tuesday 4/1/08

End = on going.

Resources: Terminals for Cluster

Hardware Description:
Pentium 4 2.0 GHz - 1 GB PC3200 DDR Memory - T-10/100 Integrated LAN

Expense:
$800 each

Tasks:
Buy for use as development systems and customer test bed (each will have different operating systems) to ensure compatibility and customization to clients with particular needs.

Duration:
Start = Friday 4/11/08
End = on going.

Resources: Network Firewall

Description:
"Front door" firewall Cisco PIX 506E

Cost:
$1,200 each

Tasks:
Used to protect our intranet infrastructure against unwanted external packets through filtering via scanning and firmware updating. Protected networked hardware includes: cluster, license, and key server.

Duration:
Start = Monday 3/17/08
End = on going.

Resources: Data Servers

Description:

Full Tower ATX - Intel Core 2 Duo 2.13 GHz 1066 4M Processor - 2 GB PC4200 DDR2 533Mhz EEC Memory (1024 MB x 2) - SATA 300 Hard Drive (160GB x 3) - 3 SATA Drive fans - 20x DVD-/+/R/RW Dual Layer Drive - Integrated Gigabit LAN - 104 Standard Keyboard PS/2 - Optical Mouse PS/2 - 17" LCD Monitor (VGA) - 1000 VA LCD UPS - 500 Watt Redundant Power Supply

Cost:

$4,000 each

Tasks:

Buy for license check and update server use

Duration:

Start = Fri 6/15/08

End = on going.

Resources: Web Server

Description:

Full Tower ATX - Intel Core 2 Duo 2.13 GHz 1066 4M Processor - 2 GB PC4200 DDR2 533Mhz EEC Memory (1024 MB x 2) - SATA 300 Hard Drive (160GB x 3) - 3 SATA Drive fans - 20x DVD-/+/R/RW Dual Layer Drive - Integrated Gigabit LAN - 104 Standard Keyboard PS/2 - Optical Mouse PS/2 - 17" LCD Monitor (VGA) - 1000 VA LCD UPS - 500 Watt Redundant Power Supply

Cost:
$2,500

Tasks:
Hosting an external web service so that website requests do not interfere with internal services. Also separation from data server that contains the backup and updates for the website in the event of an attack and site restoration required.

Duration:
Start = Fri 2/1/08
End = on going.

Resources: Internal Router

Description:

8 ports LAN, 2 ports WAN security router with layer 3 policy capabilities.

Cost:

$800

Tasks:

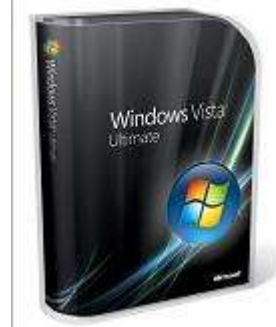Essential for transporting packets to proper destinations between the internet, server farm, terminals and AI cluster.

Duration:

Start = Wed 4/16/08

Ending = on going.

Resources: Software Licenses

Description:

Windows 98 – Windows Vista

Cost:

$90-300 each

Tasks:
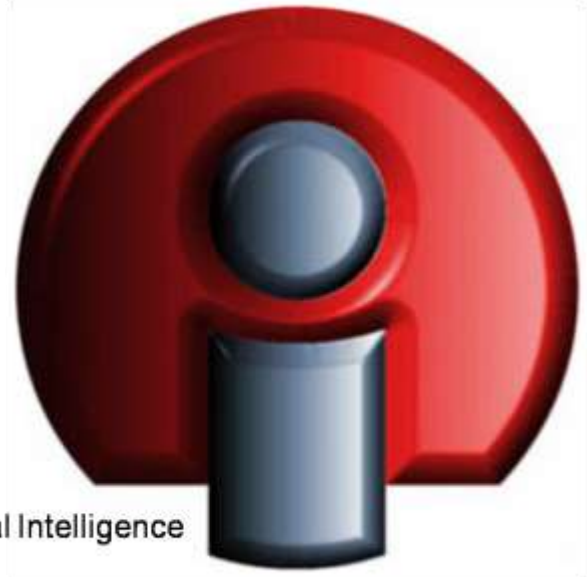
Buy for installation into customer test bed.

Duration:

Start = Wed 4/16/08

End = on going.

Staffing

Version 2.1

CS410 Red Team

Table of Contents

Organization by phase

Phase 0

```
                        ┌──────────────────┐
                        │  Project Manager │
                        │    Alexander     │
                        │     Caulkins     │
                        └──────────────────┘
```

Finance and Documentation Brian Terribile	Marketing and Support David Harris	Hardware Matthew Crainer	Software Patrick Bourque

Phase 1

```
                        ┌──────────────────┐
                        │  Project Manager │
                        │    Alexander     │
                        │     Caulkins     │
                        └──────────────────┘
```

Finance and Documentation Brian Terribile	Marketing and Support David Harris	Hardware Matthew Crainer	Software Patrick Bourque

	Cluster Expert Jay Morris	AI Expert Dennis Ray	DB Expert Irwin Levinstein

Phase 2

Project Manager
Alexander Caulkins

Frontend Manager

Backend Manager

Finance and Documentation
Brian Terribile

Marketing and Support
David Harris

Hardware
Matthew Crainer

Software
Patrick Bourque

HR Rep

Sales Account Manager

Network IT

AI Expert
Dennis Ray

DB Expert
Irwin Levinstein

DB Admin

Software Engineer

Software Tester

Prolog programmer

C++ programmer

Phase 3

Project Manager
Alexander Caulkins

Finance and Documentation
Brian Terribile

Marketing and Support
David Harris

Hardware
Matthew Crainer

Software
Patrick Bourque
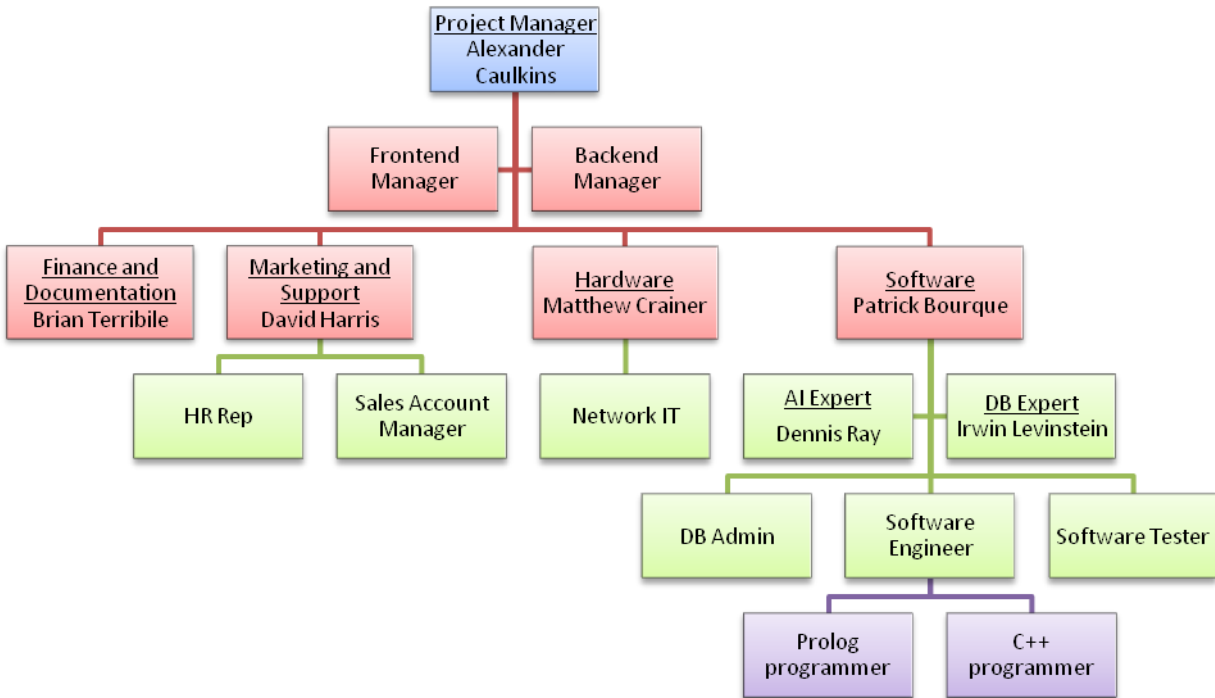
Technical writer

Corporate lawyer

TV Production

Phone Tech

Assembly Worker
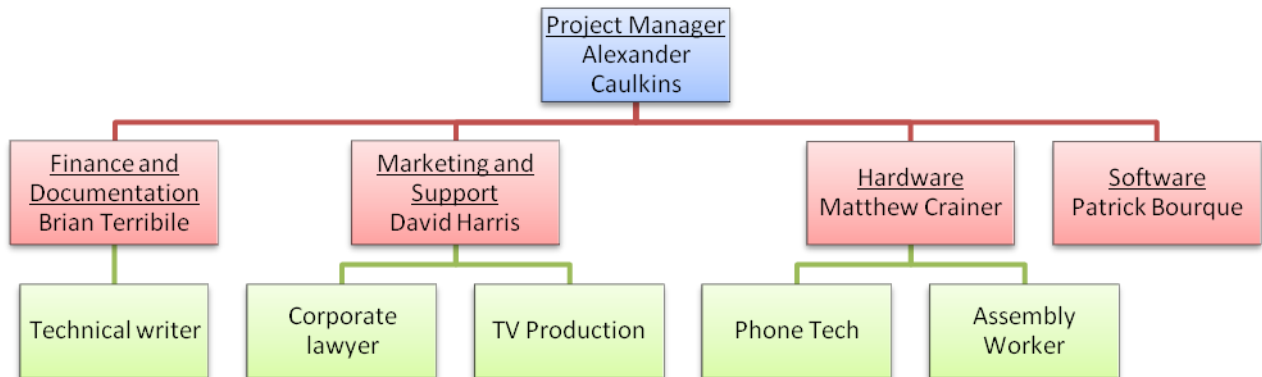
Cluster Expert

Description: Consultant for setting up and running Beowulf cluster systems. Advises on current best practices and assists in set-up and design of a custom Beowulf cluster. This person will work closely with the Network/IT person assigned to our Beowulf cluster. Required for this position is an extensive knowledge of all aspects of a Beowulf cluster system, and at least 5 years experience in this field.

Cost: $86,000.00/yr

Duration: Start = Tue 4/1/08 End = Wed 5/7/08

AI Expert

Description: Consultant for developing our AI (Artificial Intelligence) system. Advises on current best practices and assists with design and implementation of our AI system. This person will work closely with the software engineer as well as our Prolog programmer. Required for this position is extensive theoretical and practical knowledge of AI systems, and at least 5 years experience in this field.

Cost: $81,000.00/yr

Duration: Start = Mon 3/10/08   End = Thu 8/14/08

DB Expert

Description: Consultant who advises us on our database-related issues. This person will advise us on current best practices and assist with design and implementation of our database system, and will work closely with our software engineer and database administrator. Required for this position is an extensive theoretical and practical knowledge of database systems, and at least 5 years experience in this field.

Cost: $84,000.00/yr

Duration: Start = Tue 4/1/08 End = Wed 5/7/08

Front & Back end Managers

Description: Will help build the rule set for the AI and advise how to accurately model a restaurant. Prior experience with AI is not a requirement for this position. Will work closely

with our AI expert, software engineer, and Prolog programmer. Required for this position is at least 5 years working as a front end or back end manager in the restaurant industry.

Cost: $30,000.00/yr to $32,000.00/yr

Duration: Start = Wed 10/1/08   End = Mon 12/1/08

HR Rep

Description: Will be responsible for the hiring and payroll of the employees. Required is a bachelor's degree or higher in business or a related field, and prior experience is highly recommended.

Cost: $33,000.00/yr

Duration: Start = Fri 6/20/08 End = Wed 7/9/08

Sales Account Manager

Description: Provides direct one on one contact with the restaurants. Works closely with our team to understand our product, what it does, and what its benefits are. Previous sales experience is required.

Cost: $62,000.00/yr

Duration: Start = Thu 8/21/08   End = Wed 2/4/09

Network IT

Description: Will be responsible for maintaining the AI cluster, and assisting with set up and implementation. This person will work closely with our AI expert as well as any individuals in our organization utilizing the cluster. At least 2 year's experience with Beowulf clusters is required for this position.

Cost: $74,000.00/yr

Duration: Start = Thu 8/21/08   End = Mon 9/29/08

Database Administrator

Description: Designs and creates the Database, and works closely with our software engineers as well as our database expert. At least 2 year's experience in database administration is required.

Cost: $40,000.00/yr

Duration: Start = Thu 8/21/08   End = Thu 5/7/09

Software Engineer

Description: Designs the software interface and overall flow to the software. Required is a bachelor's degree or higher in computer science or a related field. This person will work closely with our programming team, software tester, and technical writer as well as our team of experts to design our software.

Cost: $76,000.00/yr

Duration: Start = Thu 8/21/08   End = Thu 10/30/08

Software Tester

Description: Will test for bugs and work closely with programmers to resolve any issues. A bachelor's degree or higher in Computer Science or a related field is required.

Cost: $34,000.00/yr

Duration: Start = Thu 8/21/08   End = Mon 11/10/08

Programmers

Description: We will need one Prolog (AI) and one C++ (everything else). Will assist with implementation of our solution and work closely with our software engineers and testers to make sure our product is the best it can be. A bachelor's degree or higher in computer science or a related field is required.

Cost: $56,000.00/yr to $67,000.00/yr

Duration: Start = Tue 4/1/08 End = Wed 5/7/08

Technical Writer

Description: Writes user manuals and other documents for the project. A bachelor's degree or higher in English or a related field as well as experience doing technical writing is required.

Cost: $53,000.00/yr

Duration: Start = Tue 6/9/09 End = Tue 8/18/09

Corporate Lawyer

Description: Will advise us on legal matters. Specialty should be business law.

Cost: $116,000.00/yr

Duration: Start = Wed 5/20/09   End = Thu 8/27/09

TV Production

Description: Will design our TV advertisement.

Cost: $1,000.00

Duration: Start = Thu 10/1/09   End = Wed 11/18/09

Phone Tech

Description: Will set up telecom network in office. Prior experience with designing, implementing, and setting up phone networks is required.

Cost: $37,000.00/yr

Duration: Start = Mon 5/11/09   Ends = Mon 6/8/09
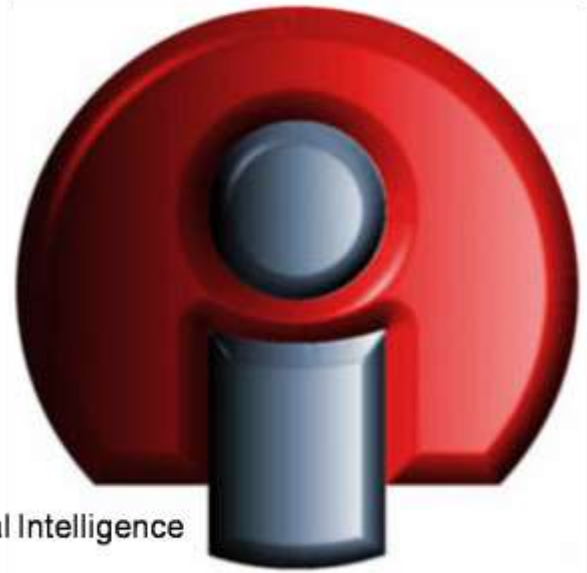
Assembly Worker

Description: Will assemble and box the final product for shipment.

Cost: $29,000.00/yr

Duration: Start = Thu 8/20/09   End = Thu 9/17/09

RED AI

Restaurant Efficiency Decision Artificial Intelligence

Risk Management

Version 2.0

CS410 Red Team
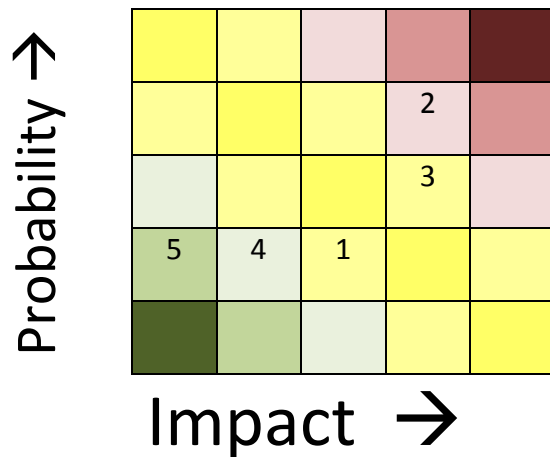
Table of Contents

Risk Matrix

1. Retention

- Cause: A customer may attempt to cancel their subscription after a short period of service

- Reason for position: A client may feel that implementing REDAI as a business model does not yield profit gains and request account cancelation.

- Mitigation: 24 hour phone support with a specialized sales team standing by to rebut any claim from our client on precisely why REDAI does not effectively meet their business needs before closure of account.

2. GIGO

- Cause: The quality of our program's output is highly dependent on both the accuracy & amount of input which is analyzed by REDAI

- Reason for position: Most privately owned restaurants will not have an existing database for us to pool information and manual input is prone to human error

- Mitigation: Comprehensive software training programs will be available for our clients which will A) prevent GIGO and B) generate extra revenue for our company

3. Prediction Accuracy

- Cause: Real World Results may not equal Simulated Results

- Reason for position: There exists probability that implementing the results of REDAI simulations will not reflect the same in the real world. For example, Nostradamus predicted Hissler instead of Hitler.

- Mitigation: product disclaimer

4. Manual Input

- Cause: The process of restaurant staff entering data by hand is very problematic.

- Reason for position: Most restaurants have programs in place that we can rip from.

- Mitigation: Try to get restaurants to adopt some of these backbone programs.

5. Economics

- Cause: There exits the possibility restaurants may still fail due to economic conditions beyond our control, which yield unsustainable customer flow (i.e. people cannot afford to dine out).

- Reason for position: We find that people will not fault our software for that kind of problem.

- Mitigation: hire an Economics domain expert to help us modify/develop a contingency rule set