Business plan

Executive Summary

Opportunity

IoT Architecture Based Portfolio Wealth Creation (PWC) On-Demand Services, Powered by www.kdsglobal.com ABC Cloud.
Reconfigurable Matrix Engine (RME) Things.
Message Queue Telemetry Transport (MQTT) Protocol Driven Things.
https://mobilebusinessinsights.com/2017/09/the-essential-building-blocks-of-an-iot-architecture/

Classical Problem

In the 7x24 global trading market environment, it is critical for an investor to have access to the BIG DATA about the past, presence and future cash flow value added or risk-adjusted prices and anticipated future changes in market ask vs bid transaction prices automatically. To this end, models are developed that attempt to predict the future. The problem is that the models need to be tuned with the right factors and factor values to accurately reflect what really happens. Deep Neural Networks (DNN) are used to tune the models. The problem is that for the large sets of data needed to get good results the DNN processing steps take a long time to run. A way to run the DNN or Deconvolution algorithms much faster is needed if one wants the model to reflect the real market conditions.

IOT Solution
Our solution to this configurable acceleration speed up problem is to implement the Markowitz portfolio optimization, DNN or Deconvolution algorithms in a pipelined manner in the Field Programmable Gate Array (FPGA) based IoT Reconfigurable Matrix Engine (RME) Things.

In a similar fashion, the Deconvolution algorithm calculations for scoring on massive numbers of Mortgage Backed Security (MBS) loan-level data can be done in a timely manner.
This same approach can be used to speed up many other CPU intensive computation problems that involve doing the same type of complex calculation on a large data set, like KDS patented linear time sorter. IE., Transformation of time & space tensor in Riemannian Manifold.

A G5 IoT wireless AI network cloud based RME consist of at least one (1) high-ended FPGA (2 or 4 FPGA for level 3, 4, 5 power users) and amount of memory (128 GB or 256 GB) that is packaged with purchased laptop components to create a high power portable terminal, that

makes it possible for the end user to do the FPGA based hardware accelerated computations (DNN Deconvolution etc) on their local RME Things remotely.

Our goal with the RMC Terminal is to provide a system that makes it possible for an investor to effectively become their own fund manager by providing; tickers, forecasting data, broker trading interface, blockchain secured record keeping or general ledger and a packaged local terminal with the capabilities to do sophisticated real time generation of risk reward based on real time data and our suite of algorithms.

It is our intention to start with the RME initially implemented as much as practical with purchased off the shelf hardware.

Market

We plan to market this IOT solution based Reconfigurable Matrix Engine (RME) powered by www.kdsglobal.com portfolio wealth creation (PWC) on-demand services to an investor directly. As part of KDS patented based intellectual properties, we have developed over time such as the DNN, Deconvolution and Machine Learning Pattern Recognition algorithms.

Competition

In the RME market, one of the competitor is the Bloomberg terminal, however the Bloomberg terminal does not have the FPGA functionality based hardware acceleration or access to our advanced computation tools.

Forecast

Once we have a working RME we expect to get about 5 level 1 new subscribers 3 level 2 new subscribers 2 level 3 new subscribers per month ongoing.
Level 1 is $10,000 per month, Level 2 is $20,000 per month and Level 3 is $30,000 per month

We forecast that we can sell the Portfolio Wealth Generator service to about 100 uses that want to have better information so that they can generate returns in the 30% range

Financial Highlights by Year
Projected Net Profit/Loss by Year ($K)

	2018	2019	2020	2021	2022
Revenue	0	410	14520	20640	20640
Direct Costs	0	205	7260	10320	10320
Gross Profit	0	205	7260	10320	10320
Gross Profit Margin		0.5	0.5	0.5	0.5
Expenses	700	1476	3120	1200	1200
Net	-700	-1271	4140	9120	9120

In Feb 2020 the cash position is estimated to be at the lowest point of - 2121

Investment Funds Needed

Seeking investment funds in the amount of at least $5,000,000.

Applications

The applications we are planning to implement include:

Deep Neural Networks (DNN) by implement Tenser flow and other DNN tools
Deconvolution
Sorting & Indexing

To speed up the computations needed for various kinds of financial modeling, DNN training, computing, scoring, bond pricing, valuation. etc.
You can get a sense of what we are trying to speed up by checking our website by checking out the things we are doing on http://www.kdsglobal.com

Target Market

Our initial Target Market is the financial sector specifically traders and related areas.
The market for this kind of Reconfigurable Matrix Engine (RME) extends far beyond our intended use in the financial sector.

We plan to market the portable RME directly to stock traders as part of a Portfolio Wealth Creation On-Demand Service which includes using a variety of tickers, forecasting data and our existing MBS big data. Ticker feed, forecasting data, the slicing and dicing of the MBS data will be done on the UBX SysGov of www.kdsglobal.com in our San Jose cloud computing center and the heavy duty crunching to calculate the risk-adjusted return for different input parameters will be done on the RME. This is an iterative process, and as needed more data will be pulled from the UBX SysGov and crunched by the RME until the user is happy with the risk reward profile. The Investor is empowered as a portfolio manager and trader making decisions on his own because every investor will have a different appetite for risk and expectations

Marketing & Sales

Marketing Plan

Market the PWC on-demand services with the RME initialization to the investor.

Once demonstrated to be successful, we start a sales campaign using a variety marketing methods.

Sales Plan

Portfolio Wealth Creation (PWC) On-Demand Services

The PWC uses real time market data, forecasts, and the RME to produce Risk reward profiles

The RME uses deconvolution, deep neural network, Sharp ratios, and Markowitz optimization algorithms which are implemented locally on the RME FPGA accelerator to produce Risk reward profiles in a timely manner so that the investor has the information to make profitable trades

QED option on demand service is part of the PWC

The service will be provided at several levels the basic levels at 10k per month will have limitations as far as the number of tickers that can be used which will be controlled by the data that is downloaded from the central server.

Level 1 $10k Options
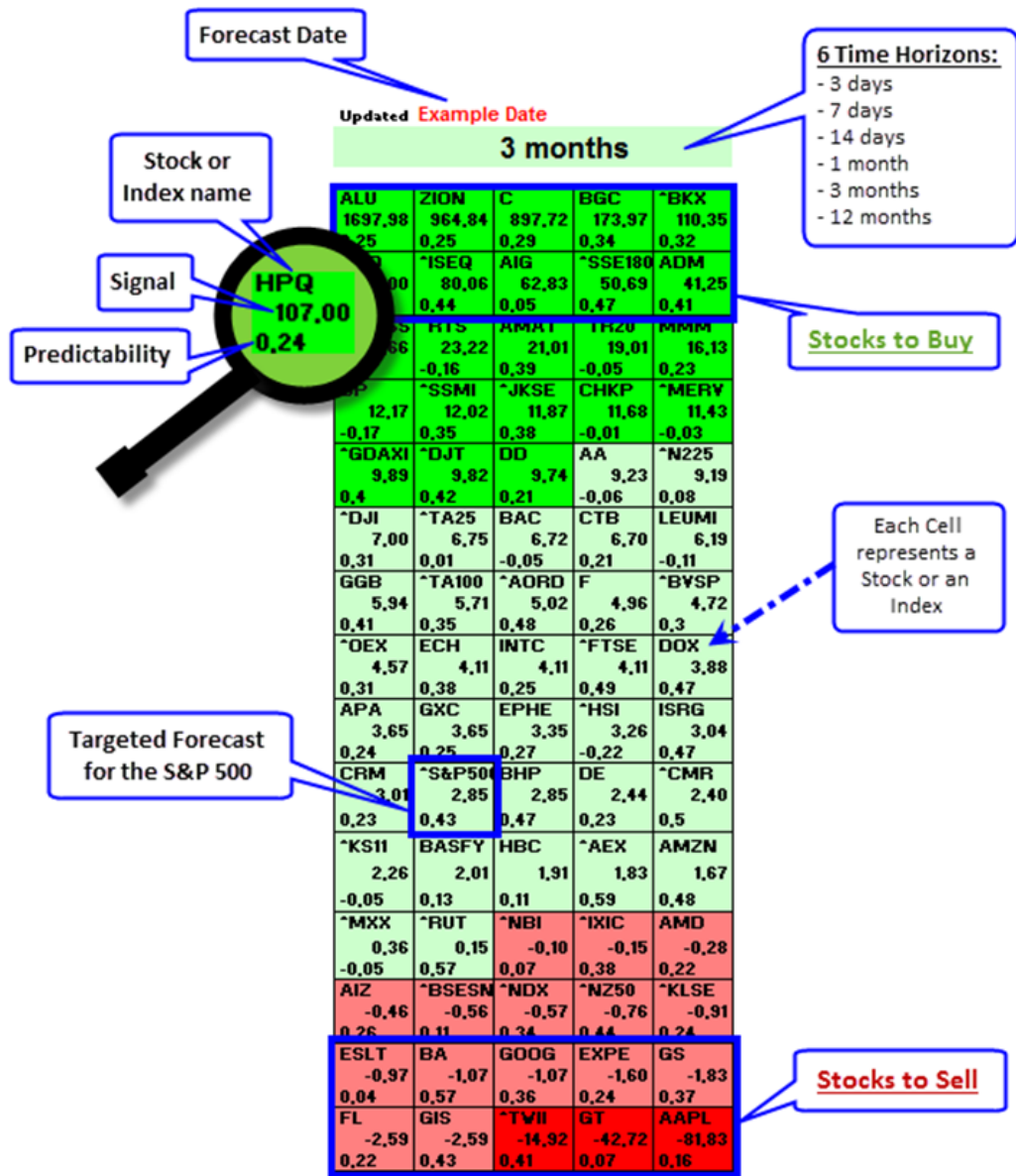Level 2 $20k Options, Stocks
Level 3 $30k Options, Stocks, MBS

We are offering this system for US stocks and bonds.
We are not offering this system for Forex, Currency, treasury, futures at this time

We will be providing ticker feed for the user specified stocks and associated real time forecast information like this:

DAILY MARKET FORECAST

Forecast Table Description

Forecast Date

6 Time Horizons:
- 3 days
- 7 days
- 14 days
- 1 month
- 3 months
- 12 months

Updated Example Date

3 months

Stock or Index name

Signal

HPQ
107.00
0.24

Predictability

Stocks to Buy

ALU 1697.98 .25	ZION 964.84 0.25	C 897.72 0.29	BGC 173.97 0.34	^BKX 110.35 0.32
	^ISEQ 80.06 0.44	AIG 62.83 0.05	^SSE180 50.69 0.47	ADM 41.25 0.41
	HTS 23.22 -0.16	AMAT 21.01 0.39	TR20 19.01 -0.05	MMM 16.13 0.23
	^SSMI 12.17 -0.17	^JKSE 12.02 0.35	CHKP 11.87 0.38	^MERV 11.68 -0.01 11.43 -0.03
^GDAXI 9.89 0.4	^DJT 9.82 0.42	DD 9.74 0.21	AA 9.23 -0.06	^N225 9.19 0.08
^DJI 7.00 0.31	^TA25 6.75 0.01	BAC 6.72 -0.05	CTB 6.70 0.21	LEUMI 6.19 -0.11
GGB 5.94 0.41	^TA100 5.71 0.35	^AORD 5.02 0.48	F 4.96 0.26	^BVSP 4.72 0.3
^OEX 4.57 0.31	ECH 4.11 0.38	INTC 4.11 0.25	^FTSE 4.11 0.49	DOX 3.88 0.47
APA 3.65 0.24	GXC 3.65 0.25	EPHE 3.35 0.27	^HSI 3.26 -0.22	ISRG 3.04 0.47
CRM 3.01 0.23	^S&P500 2.85 0.43	BHP 2.85 0.47	DE 2.44 0.23	^CMR 2.40 0.5
^KS11 2.26 -0.05	BASFY 2.01 0.13	HBC 1.91 0.11	^AEX 1.83 0.59	AMZN 1.67 0.48
^MXX 0.36 -0.05	^RUT 0.15 0.57	^NBI -0.10 0.07	^IXIC -0.15 0.38	AMD -0.28 0.22
AIZ -0.46 0.26	^BSESN -0.56 0.11	^NDX -0.57 0.34	^NZ50 -0.76 0.44	^KLSE -0.91 0.24
ESLT -0.97 0.04	BA -1.07 0.57	GOOG -1.07 0.36	EXPE -1.60 0.24	GS -1.83 0.37
FL -2.59 0.22	GIS -2.59 0.43	^TVII -14.92 0.41	GT -42.72 0.07	AAPL -81.83 0.16

Each Cell represents a Stock or an Index

Targeted Forecast for the S&P 500

Stocks to Sell

Using the Ticker and forecast information we supply and the computation capabilities of the RME the user will be able to identify the most appropriate trades to achieve their investment goals.

Once the user has decides which combination of trades meets their risk reward goal the transactions will be transmitted by us to IB. IB will execute the trades. We will be maintaining the records in a centralized book using block chain technology

Operations

Locations & Facilities

The KDS Global Inc. main facility is at:
6284 San Ignacio Ave Ste E
San Jose CA 95119-1366

Technology

There are 2 main areas of development needed

- Configuration of the FPGA s and terminal code
- RME Hardware design
    - Integrating the FPGA board with purchased laptop and components

Configuration of the FPGA s

Writing the configuration information for FPGAs in the conventional FPGA programming language Verilog or VHDL is quite a task and involves many thousands of lines of code.

Fortunately some of this work has been done and tools have been developed the automate the task for specific types of applications such a deep neural networks (DNN) implementing a data flow design (this is the pipe line concept explained below in the FPGA solution section)
An open source tool for implementing DNNs on FPGAs has been developed by Georgia Institute of Technology
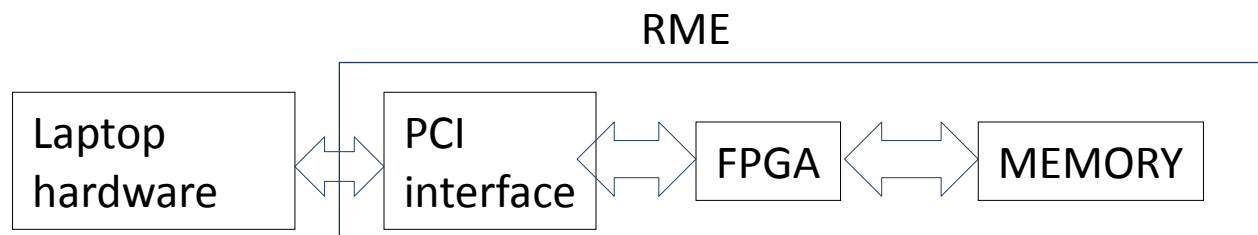
https://www.cc.gatech.edu/~hadi/doc/paper/2016-micro-dnn_weaver.pdf

With this tool the problem is reduced from many thousands of lines of code to about 300 lines of code

RME Hardware

It is our intention to start with the RME initially implemented as much as practical with purchased hardware integrated by us into a RME.

Logical hardware description

RME

```
┌──────────────┐     ┌──────────────────────────────────────────────────┐
│ Laptop       │  ⟺  │ ┌───────────┐    ┌────────┐    ┌──────────────┐   │
│ hardware     │     │ │ PCI       │ ⟺  │ FPGA   │ ⟺ │ MEMORY       │   │
│              │     │ │ interface │    │        │    │              │   │
└──────────────┘     │ └───────────┘    └────────┘    └──────────────┘   │
                     └──────────────────────────────────────────────────┘
```

Application programming for Portfolio Wealth generator

Sorting
DNN Tensor flow
Deconvolution
Block Manifold
User interface for use as a trading terminal

FPGA solution background

How does a FPGA solution provide faster computation to the same calculation for many different data groups situation?

The basic approach is to view the problem as a data flow representation with each calculation done on dedicated piece of hardware configured for that calculation
The output for one step of the calculation feeds directly into the next step of the calculation instead of being copied to memory.

This makes it possible to be doing all steps on the complex calculation at the same time. Another way to look at this data flow is as a pipeline.

Pipeline Configurations Example

Ideal for doing the same calculation on many data elements
Performance gains greater than 1,000 times are practical
Performance is the same for short or long calculations
One data element is completely processed for each pipeline time step.
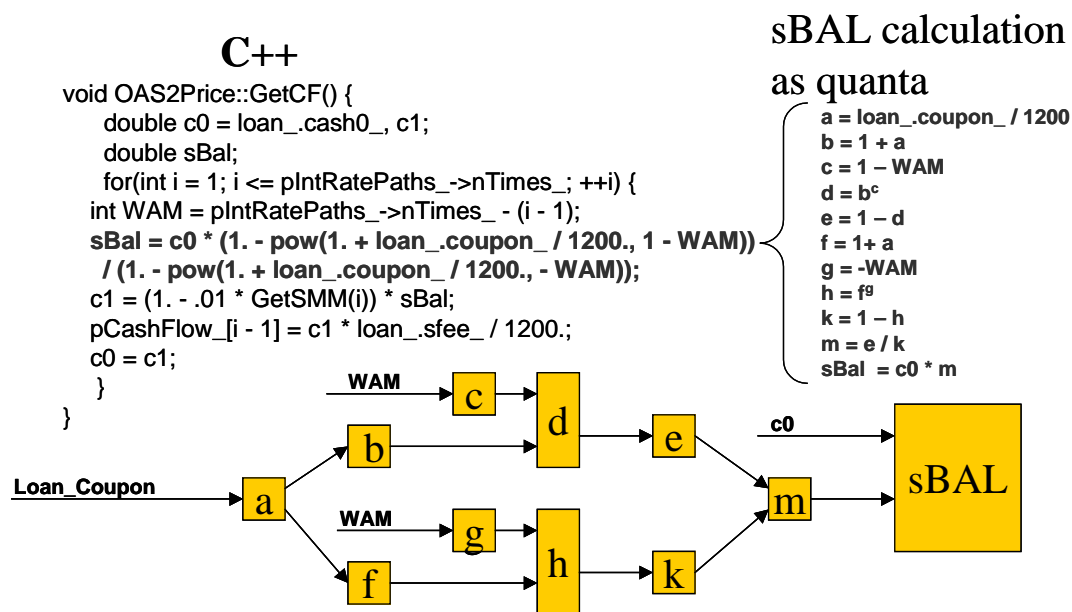
Pipeline Example: *The Cash Flow Calculation*

```
void OAS2Price::GetCF() {

    double c0 = loan_.cash0_, c1;

    double sBal;

    for(int i = 1; i <= pIntRatePaths_->nTimes_; ++i) {

    int WAM = pIntRatePaths_->nTimes_ - (i - 1);

    sBal = c0 * (1. - pow(1. + loan_.coupon_ / 1200., 1 - WAM))

       / (1. - pow(1. + loan_.coupon_ / 1200., - WAM));

    c1 = (1. - .01 * GetSMM(i)) * sBal;

    pCashFlow_[i - 1] = c1 * loan_.sfee_ / 1200.;

    c0 = c1;

      }

 }
```

**1,641 clock ticks for each Iteration of the *for* loop**

- The time quanta for the FPGA is equal to 10 clocks of a 1GHZ processor
- For this example the embedded system is about 160 times faster then the C++ open environment
- The rate of completed calculations is independent of the analysis complexity and the data size

Pipeline Example: *The Cash Flow Calculation*

C++

```
void OAS2Price::GetCF() {
    double c0 = loan_.cash0_, c1;
    double sBal;
    for(int i = 1; i <= pIntRatePaths_->nTimes_; ++i) {
    int WAM = pIntRatePaths_->nTimes_ - (i - 1);
    sBal = c0 * (1. - pow(1. + loan_.coupon_ / 1200., 1 - WAM))
     / (1. - pow(1. + loan_.coupon_ / 1200., - WAM));
    c1 = (1. - .01 * GetSMM(i)) * sBal;
    pCashFlow_[i - 1] = c1 * loan_.sfee_ / 1200.;
    c0 = c1;
    }
}
```

sBAL calculation as quanta

$a = loan\_.coupon\_ / 1200$
$b = 1 + a$
$c = 1 - WAM$
$d = b^c$
$e = 1 - d$
$f = 1 + a$
$g = -WAM$
$h = f^g$
$k = 1 - h$
$m = e / k$
$sBal = c0 * m$

Each quanta is implemented in FPGA reconfigurable resources

Pipeline Example: *The Cash Flow Calculation*
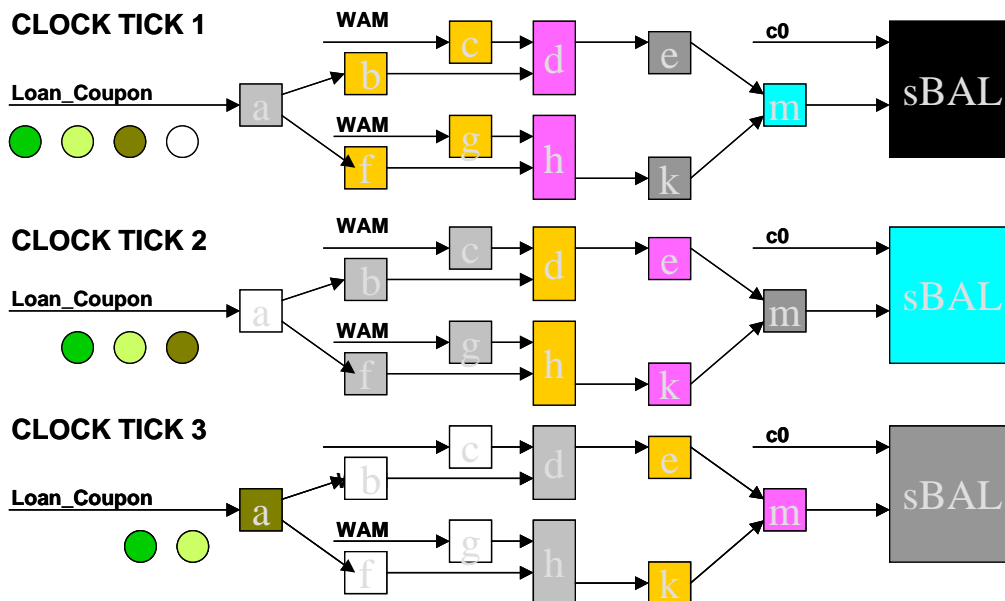
At each time tick the data moves to the next calculation
A data calculation is completed for each time tick

Milestones & Metrics

Milestones Table for RME

Select an appropriate FPGA considering price, ability to use with DNN WEAVER, availability of a commercial FPGA board.
FPGA Get a FPGA development kit. This includes 1 year development tool license $5000
Find a programmer or use existing staff
Began FPGA DNN configuration with DNN WEAVER and development tools.
Locate a commercial FPGA board with the resources needed for the RMC Terminal.
Select a laptop as the base for the RMC Terminal.
Integrate and package the FPGA board and laptop.
Develop the user interface and the rest of the application code the runs the terminal.
Develop the rest of the FPGA code.
Testing

Company
Overview
Ownership & Structure

KDS Global, LLC owned by
John C Wang

Company history

The KDS Global LLC family of companies has a history of providing MBS data, information, tools and intelligence to Traders, Investment Bankers, Broker dealers and investors going back to 2000.
It has pioneered many innovations in the understanding of MBS valuation, and related aspects of the MBS market.

It is now embarking on developing a Reconfigurable Matrix Computing hardware platforms to further enhance the ability to provide this intelligence faster.

Team

Management team
John C Wang - Chief Executive Officer, Chairman & Founder
Weimin Zhao Ph.D. - Chief Technology Officer
Dwyane Dong - Chief Operating Officer
Larry Thoman - Chief Matrix Computing Officer
Bill Probasco - Chief Structured Product Officer
Michelle Li - Chief Product Management Officer
Chris Pei Ph.D. - Strategic Risk-Return Advisor
Calvin Miao - Chief Machine Intelligence Officer
Xiaoling Zhao - Chief Investment Officer
Advisors
http://www.nexlogic.com/pcb-design/engineering-services

Financial Plan
Forecast

Key assumptions

We anticipate that when the RMC Terminal system is completed we will be able to sell the monthly service to many investors that are looking for a very good rate of return

The RME is part of PWC service
Once we have a working system we expect to get about 2 new subscribers at the level 1 service per month for a few months increasing to 5 level 1 new subscribers 3 level 2 new subscribers 2 level 3 new subscribers per month ongoing.
Level 1 is $10000 per month and Level 2 is $20,000 per month Level 3 is $30,000 per month.

We forecast that we can sell the Portfolio Wealth Generator service to 1000s of uses that want to have better information so that they can generate returns in the 30% range

We will have a Starting level system available in 12 months.

The added FPGA configurations for advance FPGA acceleration on DNN, Deconvolution, etc. is an on going project and updates will be released often.

Projected Net Profit/Loss by Year ($K)

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Revenue	0	410	14520	20640	20640
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Gross Profit	0	205	7260	10320	10320
Gross Profit Margin		0.5	0.5	0.5	0.5
Expenses	700	1476	3120	1200	1200
Net	-700	-1271	4140	9120	9120

In Feb 2020 the cash position is estimated to be at the lowest point of - 2121

Financing

Use of funds

The funds will be used to develop the PWC and the RME.

RME cost is $12K.

Hardware engineering costs to procure and integrate several RME for development purposes is estimated to be $200,000 we need to do the integration and packaging part and the electrical hardware parts are available. There may be some software integration to be done.
The application programming is estimated to be $100,000 per month to implement:

Sorting
Omni Index
DNN
Deconvolution
Pattern Recognition
Block manifold general ledger

 Over a period of about a year.

Sources of Funds

Seeking investment funds in the amount of at least $5,000,000

Contacts

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