



Remote Monitoring of Industrial Devices

MAKERS: Arnav Bansal, Vikrant Rathore **COUNTRY:** India

This Project allows the User to Monitor his Industrial Equipment Remotely via Internet. This helps him/her to optimize his/her Manufacturing Process and look out for malfunction in equipment instantly.



The Purpose

This project is developed to enable Online Monitoring of Industrial Equipment allowing the Industrialists to optimize their working process accordingly. Moreover this project is the line with the upcoming concept of IoT i.e. Internet Of Things which focuses to bring every gadget on the planet online. The software used to view data is MonkeyMonitor which allows the user some powerful tools in accordance to the data.

The Technology

The heart of this project is a Raspberry Pi Model 2 which is an ARMv7 based Linux processor which clocks at 900MHz and has a Quad-Core Broadcom BCM2386 processor and 1GB SDRAM. For Internet Connectivity, a Wi-Fi dongle is connected to one of its USB port. For Communication with Industrial Devices, the Protocol used is

MODBUS-RTU which is achieved by using USB to 485 Converter. The database technology used is MySQL.

Additional Details

Allows the User to get a Live Feed of working of his/her Industrial Devices from anywhere around the globe. Helps the User to Optimize his/her Manufacturing so as to cut down wastage. Helps in identifying faulty equipment, which if, not detected at right time, can lead to accidents

EvilMonkeyTech Inc. – Executive Summary

Company Summary –

EvilMonkeyTech is a start-up setup in line with vision of Make In India which specialises in IoT Devices for industrial equipment for their better durability and performance. Here at EvilMonkeyTech, we strive to bring the most advanced technology at your doorstep. Our product line will help your business grow to new heights.

Perception. Prevention. Perfection. At its Best.

Target Market –

Our Market includes all the companies/industries which are equipped with industrial devices (such as Elevators, Escalators and Cranes – Hoists/EOT). With the installation of Remote Monitoring System in the industrial devices, the user can track all the relevant data which will help in preventing mechanical/electrical problems, which in turn would help in reducing accidents. This system is equipped with **MonkeyMonitor - DataSense** (Intelligent Algorithm designed to save power and also predict breakdowns/failures) which will help in power conservation and increase the life of the equipment.

Market Size –

The Market for our product is very large. Majority of the industries (Manufacturing Units, Power Generation Units – Coal, Gas and Nuclear, Chemical Industries, etc.) are equipped with these kind of machines. Moreover Elevators and Escalators are installed in Malls, Stations (Railway, Metro and Bus), Hospitals, and Universities.

Market Share –

There is a great demand of Cranes, Escalators and Elevators. The concept of Remote Monitoring is still unexplored in India, there are no established Indian companies which compete in our segment. The competition that we face is from companies like KONE and Schindler which have developed monitoring system but their design incorporates PLC which makes the system more expensive (exponentially compared to our system).

Product and Service Description –

This product is developed to enable Online Monitoring of Industrial Equipment allowing the Industrialists to optimize their working process accordingly. Moreover this product is the line with the upcoming concept of IoT i.e. Internet Of Things which focuses to bring every gadget on the planet online. The software used to view and monitor data is MonkeyMonitor which allows the user some powerful tools in accordance to the data.

In case of any irregularities in the functioning of the device, the user is notified with a warning message via email and the smartphone app. Option of SMS updates are also available. Continuous monitoring can help avoid failure of the equipment and also helps in judiciously using energy resources in Industries.

Intellectual Property –

Our system can be easily patented as the heart of our system is a Linux Based Microprocessor, which is an Open Source device and the idea is not yet implemented by using a Linux based Microprocessor in India. Moreover, we target to get a patent for our Algorithm, which makes us legally strong in the case of counterfeit of our product.

Competition Differentiation –

Our competition includes companies like KONE Cranes (Remote Monitoring Specific to Cranes), Schindler and Otis (Remote Monitoring for Elevators and Escalators) which use a PLC for remote Monitoring Purposes. There is a possibility that after our product enters the market, companies like Siemens and Kirloskar might enter the market for remote monitoring and controlling.

What separates us?

The heart of our product is a Linux based Microprocessor therefore our product is cheaper and competent enough in comparison to our competitors who use a PLC. The usage of a PLC increases the cost. Also our competitors probably do not offer services like constant monitoring using smartphones and SMS updates to name a few.

Team and Advisor –

CEO and Co-Founder: Vikrant Dev Rathore –

Currently pursuing B.E (Mechanical) at Panjab University.

Vikrant has interned as a programmer with GNU (GNU is Not UNIX) for the octave Project. He has also had internships at K.K transmissions, New Delhi and Minda Industries, Manesar to gain a good industrial experience.

CTO and Co-Founder: Arnav Bansal –

Currently pursuing B.E (ECE) at Panjab University.

Arnav had internships at BHEL Group to gain a good industrial experience. He has also written tech-articles which were published in a prestigious magazine - "Electronics For You". He has a generous amount of experience in the Electrical and Automation Field.

COO: Sobhagya Singh Jamwal –

Currently pursuing B.E (Mechanical) at Panjab University.

Sobhagya has taken part in a many different entrepreneurship events and a wide range of business plan competitions.

CFO: Md Arif –

Currently pursuing B.E (Mechanical) at Panjab University.

Md Arif has taken part in many business model competitions and wants to pursue masters of finance after his engineering and he also have experience in different sectors of business modelling especially in market analysis and costing.

Advisor: Sharad Bansal –

Mr Sharad Bansal is an Engineering Graduate from Pune University and has been in the field of industrial automation for over 20 years. He has a tremendous amount of experience in the field of Industrial Process and Automation and has been a great resource in the development of our product. Currently he is working for Alliance Autometers Limited (AAL).

Financial –

We have the Total Setup Cost and Monthly Expense. The initial seed funding required to start the company will be –

Funding Required = Total Setup Cost + Monthly Expense + Spare Capital

$$= ₹ 2,34,000.00 + ₹ 1,37,300.00 + ₹ 5,00,000.00 = ₹ 8,71,300.00$$

Loan of 9 Lakhs will be required to start the company. Let the interest rate of the loan is 15%.

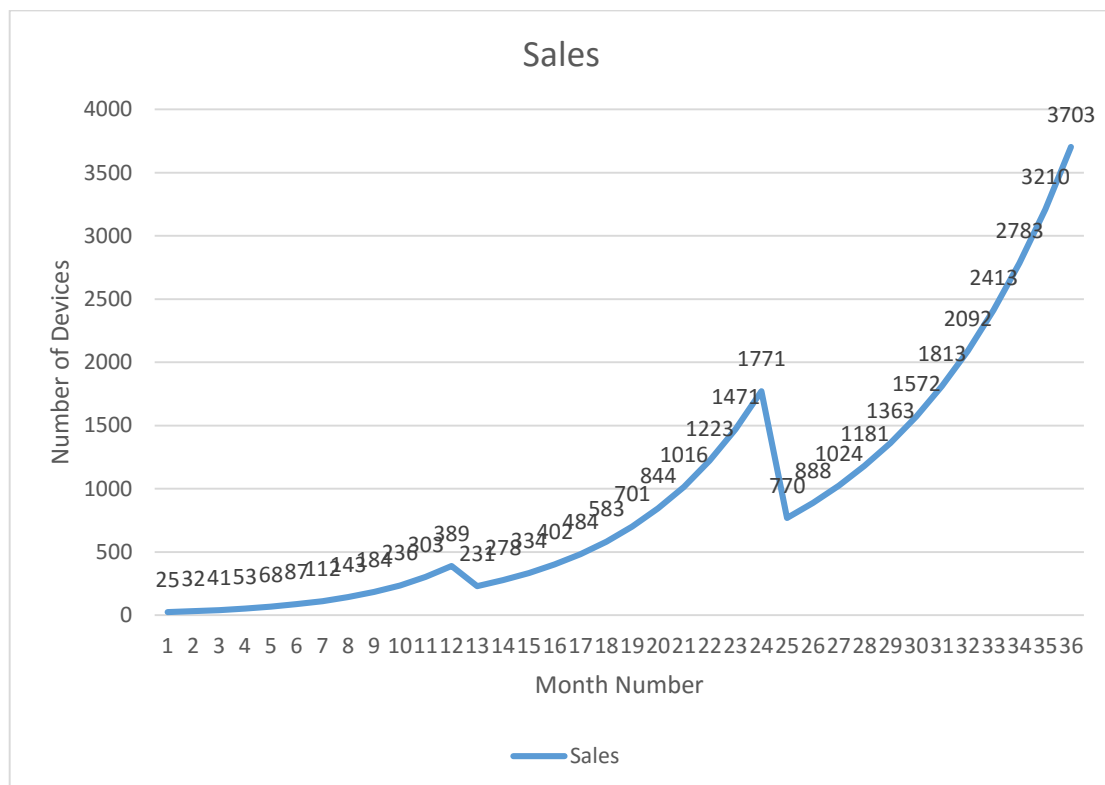
EMI for Loan of tenure = ₹ 43,368.00

Now the Total Monthly Expense (1st Year) = Monthly Expense + EMI Component

$$= ₹ 1,80,668.00$$

Sales Projection

In this we assume that 25 devices would be sold in the first month with the increase in sale at the rate 28.35% per month in first year. Second and third year, the rate drops to 20.35% and 15.35% due to market saturation.



Total Sale in 1st Year = 1,674 Devices (approx.)

Total Sale in 2nd Year = 9,339 Devices (approx.)

Total Sale in 3rd Year = 22,812 Devices (approx.)

Let Selling Price of our Product = ₹ 29,055.00

Cost Price of our Product including Installation and Freight (and Taxes) = ₹ 19,870.00

Monthly Break Even Calculation

$$\text{Selling Price} = \frac{\text{Total Monthly Expense}}{\text{Number of Units}} + \text{Cost Price}$$

According to this calculation, we get number of devices to be sold in a month so as to achieve break even in 2 years.

Number of Units = **20 Units** (approx.)

This means if we sell 20 units in a month, we will achieve breakpoint in 2 years. Margin of Safety (Projected Monthly Sale – Required Number of Units for Breakeven) will increase according to sales projection.

Annual Break Even Calculation

$$\text{Selling Price} = \frac{\text{Total Monthly Expense} * 12}{\text{Number of Units}} + \text{Cost Price}$$

According to this calculation, we get number of devices to be sold in a year so as to achieve break even in 2 years.

Number of Units = **236 Units** (approx.)

This means if we sell 236 units in a year, we will achieve breakpoint in 2 years.

Monthly Expense Calculations –

Total Monthly Expense (2nd Year) = Monthly Expense + EMI Component

= ₹ 4,78,668.00

Total Monthly Expense (3rd Year) = Monthly Expense (Break Even – Pure Profit)

= ₹ 5,25,800.00

Estimated Annual Profit in 3 Years

Total Revenue in 1st Year = 1674 * 29055 = ₹ 4,86,38,070.00

Total Cost Paid in 1st Year = 1674 * 19870 = ₹ 3,32,62,380.00

Yearly Expense in 1st Year = 12 * 180668 = ₹ 21,68,016.00

Total Annual Profit in 1st Year = ₹ 1,32,07,674.00

Total Revenue in 2nd Year = 9339 * 29055 = ₹ 27,13,44,645.00

Total Cost Paid in 2nd Year = 9339 * 19870 = ₹ 18,55,65,930.00

Yearly Expense in 2nd Year = 12 * 478668 = ₹ 57,44,016.00

Total Annual Profit in 2nd Year = ₹ 8,00,34,699.00

Total Revenue in 3rd Year = 22812 * 29055 = ₹ 66,28,02,660.00

Total Cost Paid in 3rd Year = 22812 * 19870 = ₹ 45,32,74,440.00

Yearly Expense in 3rd Year = 12 * 525800 = ₹ 63,09,600.00

Total Annual Profit in 3rd Year = ₹ 20,32,18,620.00



**EvilMonkeyTech
Inc.**

1. Value Propositon

- ▶ Majority of industrial accidents are due to lack of awareness regarding the health of industrial machinery. Apart from accidents, this also leads to increased consumption of electricity which is a monetary loss. Our product aims to eradicate these issues in a cost effective manner with minimal modifications required in the existing system.
- ▶ Our product has the edge over the existing systems as the existing systems are powered by PLC (High Cost and Low Compatibility) whereas our system is powered by a Linux based Microprocessor (Low Cost and High Compatibility).
Manufacturer's Gain: Our product helps in preventing false warranty claims by the industrial equipment's customers. Moreover, it adds to selling point of the industrial equipment.
Customer's Gain: Our product helps in predicting future failure of equipment, judging device health and thus saving in the form of electricity bills and maintenance costs.
- ▶ It is very easy to adapt to our system. We will be posting video tutorials online, apart from the printed help manuals, to help our customers get familiarized with our software. We will be creating an e-commerce portal to sell our product with easy and transparent payment options to cope up with the current monetary situation of India.

2. Target Customers

- ▶ Our Market includes all the companies/industries which are equipped with industrial devices (such as Elevators, Escalators and Cranes – Hoists/EOT). With the installation of Remote Monitoring System in the industrial devices, the user can track all the relevant data which will help in preventing mechanical/electrical problems, which in turn would help in reducing accidents. This system is equipped with **MonkeyMonitor - DataSense** (Intelligent Algorithm designed to save power and also predict breakdowns/failures) which will help in power conservation and increase the life of the equipment.
- ▶ As per our survey about the current industrial scenario, the industrial equipment face damage due to lack of knowledge of the equipment's present health status and hence cause accidents and equipment failure. Incorporating our product will help overcome this problem.
- ▶ As per our survey and conference meetings, we received a positive feedback from the attendees. Some of the industries wanted us to incorporate remote controlling feature combined with data intelligence and automation. Moreover, some pointed out that it will be beneficial for industry if we can provide the alerts over Whatsapp Messages along with SMS alerts.

3. Channel

- ▶ Our main source to attract customers would be national and international exhibitions and conferences. In the past we have already attended exhibition such as CeMat 2015 in Pragati Maidan, New Delhi and Maker Faire 2016 (International DIY Convention) and some national conferences. We received positive feedback from majority of industries.
- ▶ Potential customers can place orders for the monitoring system via the online e-commerce portal. After receiving the order, we would test and ship the system to nearest regional engineer available with respect to the potential customer's location. To transport the equipment, we would be using standard courier service with all CST related documentation provided with the sales invoice (if the system is transported out of the home state). Our regional engineer will go to the customer's industry and will install and check the system. A third party inspection can be done on the request of the customer and all the expenses will be borne by the customer related to third party inspection.
- ▶ We would be providing generic AMC (Annual Maintenance Contract) for our installed systems. Also, we would be providing doorstep assistance to our clients, upgrades and updates for our system and personalised dashboards for MNCs too. General troubleshooting facilities, repairs and replacements along with tech support will be at the disposal of the customer.

4. Competiton

- ▶ Strength – Cost Effective, Compact in Size, Specially Designed for Indian Market, Easy to Install, Easy to Use.
- ▶ Weakness – Competitors have bigger name than us like – Kone and Schindler, Potential competition may include companies like – Siemens and Kirloskar. They all have big and faithful clientele.
- ▶ Opportunities – Our product will be easy to market as it is inline with Prime Minister **Narendra Modi**'s vision of India that is **Digital India**. Moreover, the industrialists are looking to adopt to IoT methods to revolutionize their processes.
- ▶ Threat – Major Threat to our system is Communication Losses in Remote Areas and server down times due to technical faults.
- ▶ Pricing of the existing systems have not been disclosed (exact) but estimated costs are much higher than our system. Moreover, the above listed companies does indulge in marketing and advertising of the Remote Monitoring System in India.

5. Key Resources

Fixed Type						
Category	Subparts	Cost Components	Type	Quantity	Cost (In INR)	Total Cost (In INR)
Land and Building	Flat on Rent	Security	One Time	1	₹ 45,000.00	₹ 45,000.00
		Rent	Monthly	1	₹ 30,000.00	₹ 30,000.00
Furniture and Fittings	Furniture	Main Desk	One Time	1	₹ 20,000.00	₹ 20,000.00
		Main Chair	One Time	1	₹ 10,000.00	₹ 10,000.00
		Visitors Chairs	One Time	2	₹ 5,000.00	₹ 10,000.00
		Assembly Table	One Time	1	₹ 20,000.00	₹ 20,000.00
	Fittings	Water Cooler	One Time	1	₹ 10,000.00	₹ 10,000.00
Equipment	Tool Box	Drill	One Time	2	₹ 5,000.00	₹ 10,000.00
		Soldering Iron	One Time	2	₹ 1,000.00	₹ 2,000.00
		Cutters and Pliers	One Time	2	₹ 500.00	₹ 1,000.00
		Screwdriver Kit	One Time	2	₹ 500.00	₹ 1,000.00
	Testing Unit	VFD (Variable Frequency Drive)	One Time	1	₹ 10,000.00	₹ 10,000.00
		3 Phase AC Motor	One Time	1	₹ 5,000.00	₹ 5,000.00
	Electronics	LED TV	One Time	1	₹ 15,000.00	₹ 15,000.00
		Laptop	One Time	1	₹ 25,000.00	₹ 25,000.00
		Printer and Scanner	One Time	1	₹ 15,000.00	₹ 15,000.00
Salary	Partners	CEO	Monthly	1	₹ 20,000.00	₹ 20,000.00
		CTO	Monthly	1	₹ 20,000.00	₹ 20,000.00
	Employees	CFO	Monthly	1	₹ 20,000.00	₹ 20,000.00
		CMO	Monthly	1	₹ 20,000.00	₹ 20,000.00
		Peon	Monthly	1	₹ 10,000.00	₹ 10,000.00
Miscellaneous		Electricity	Monthly	1	₹ 5,000.00	₹ 5,000.00
		Pantry Supplies	Monthly	1	₹ 5,000.00	₹ 5,000.00
		Cleaning Supplies	Monthly	1	₹ 1,000.00	₹ 1,000.00
		Internet and Phone	Monthly	1	₹ 3,000.00	₹ 3,000.00
		Stationery Supplies	Monthly	1	₹ 1,500.00	₹ 1,500.00
Product	Inventory	Hardware	Per Unit	1	₹ 19,500.00	₹ 19,500.00
	Installation	In Delhi	Per Unit	1	₹ 200.00	₹ 200.00
		Outside Delhi	Per Unit	1	₹ 300.00	₹ 500.00
Initial Marketing Expense			One Time	1	₹ 10,000.00	₹ 10,000.00
Intellectual Property Rights			One Time	1	₹ 25,000.00	₹ 25,000.00
Total Setup Cost		₹ 2,34,000.00				

1st Year		2nd Year		3rd Year	
Cost Component	Cost (In INR)	Cost Component	Cost (In INR)	Cost Component	Cost (In INR)
Electricity	₹ 5,000.00	Electricity	₹ 7,000.00	Electricity	₹ 10,000.00
Rent	₹ 30,000.00	Rent	₹ 33,000.00	Rent	₹ 33,000.00
Pantry Supplies	₹ 5,000.00	Pantry Supplies	₹ 7,000.00	Pantry Supplies	₹ 10,000.00
Cleaning Supplies	₹ 1,000.00	Cleaning Supplies	₹ 2,000.00	Cleaning Supplies	₹ 3,000.00
Internet and Phone	₹ 3,000.00	Internet and Phone	₹ 5,000.00	Internet and Phone	₹ 10,000.00
Stationery Supplies	₹ 1,500.00	Stationery Supplies	₹ 3,500.00	Stationery Supplies	₹ 5,000.00
Salaries	₹ 90,000.00	Salaries	₹ 3,76,000.00	Salaries	₹ 4,60,000.00
Depreciation	₹ 1,800.00	Depreciation	₹ 1,800.00	Depreciation	₹ 1,800.00
Monthly Expense	₹ 1,37,300.00	Monthly Expense	₹ 4,35,300.00	Monthly Expense	₹ 5,32,800.00

6. Revenue Model

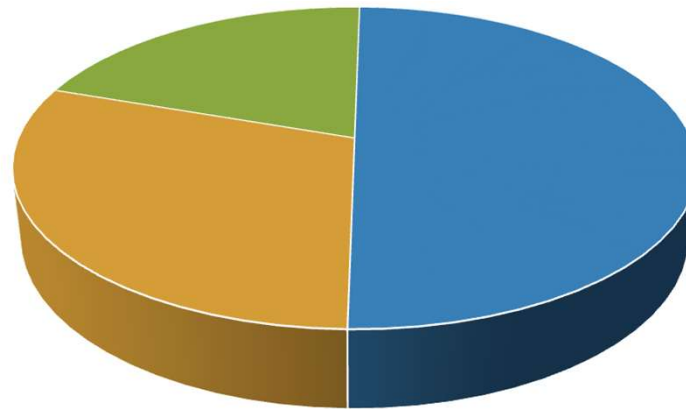
We have the Total Setup Cost and Monthly Expense. The initial seed funding required to start the company will be –

- ▶ Funding Required = ₹ **8,71,300.00**
- ▶ Now the Total Monthly Expense (1st Year) = ₹ **1,80,668.00**
- ▶ Total Sale in 1st Year = 1,674 Devices (approx.)
- ▶ Total Sale in 2nd Year = 9,339 Devices (approx.)
- ▶ Total Sale in 3rd Year = 22,812 Devices (approx.)
- ▶ Let Selling Price of our Product = ₹ 29,055.00
- ▶ Cost Price of our Product including Installation and Freight (and Taxes) = ₹ 19,870.00
- ▶ Monthly Break Even = **20 Units** (approx.)
- ▶ Annual Break Even = **236 Units** (approx.)
- ▶ Total Monthly Expense (2nd Year) = ₹ **4,78,668.00**
- ▶ Total Monthly Expense (3rd Year) = ₹ **5,25,800.00**
- ▶ Total Revenue in 1st Year = ₹ 4,86,38,070.00
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- ▶ Total Annual Profit in 3rd Year = ₹ **20,32,18,620.00**

7. Market Analysis

- ▶ The Market for our product is very large. Majority of the industries (Manufacturing Units, Power Generation Units – Coal, Gas and Nuclear, Chemical Industries, etc.) are equipped with these kind of machines. Moreover Elevators and Escalators are installed in Malls, Stations (Railway, Metro and Bus), Hospitals, and Universities.

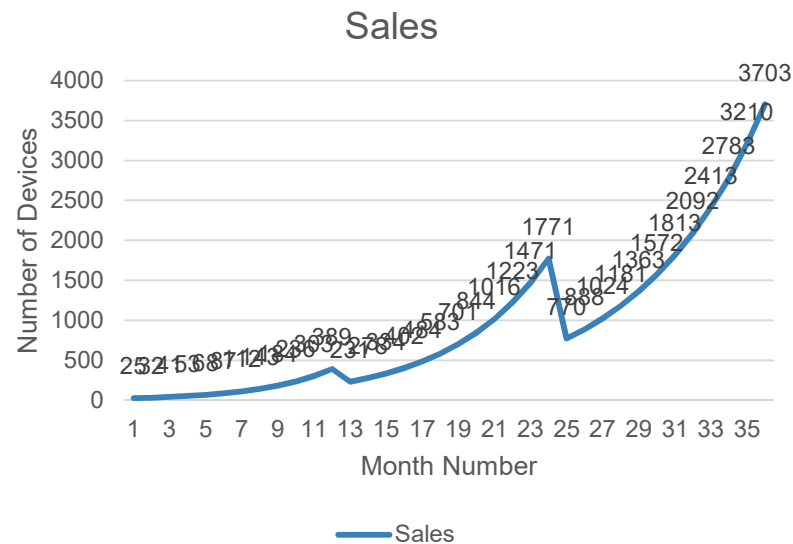
Market Analysis



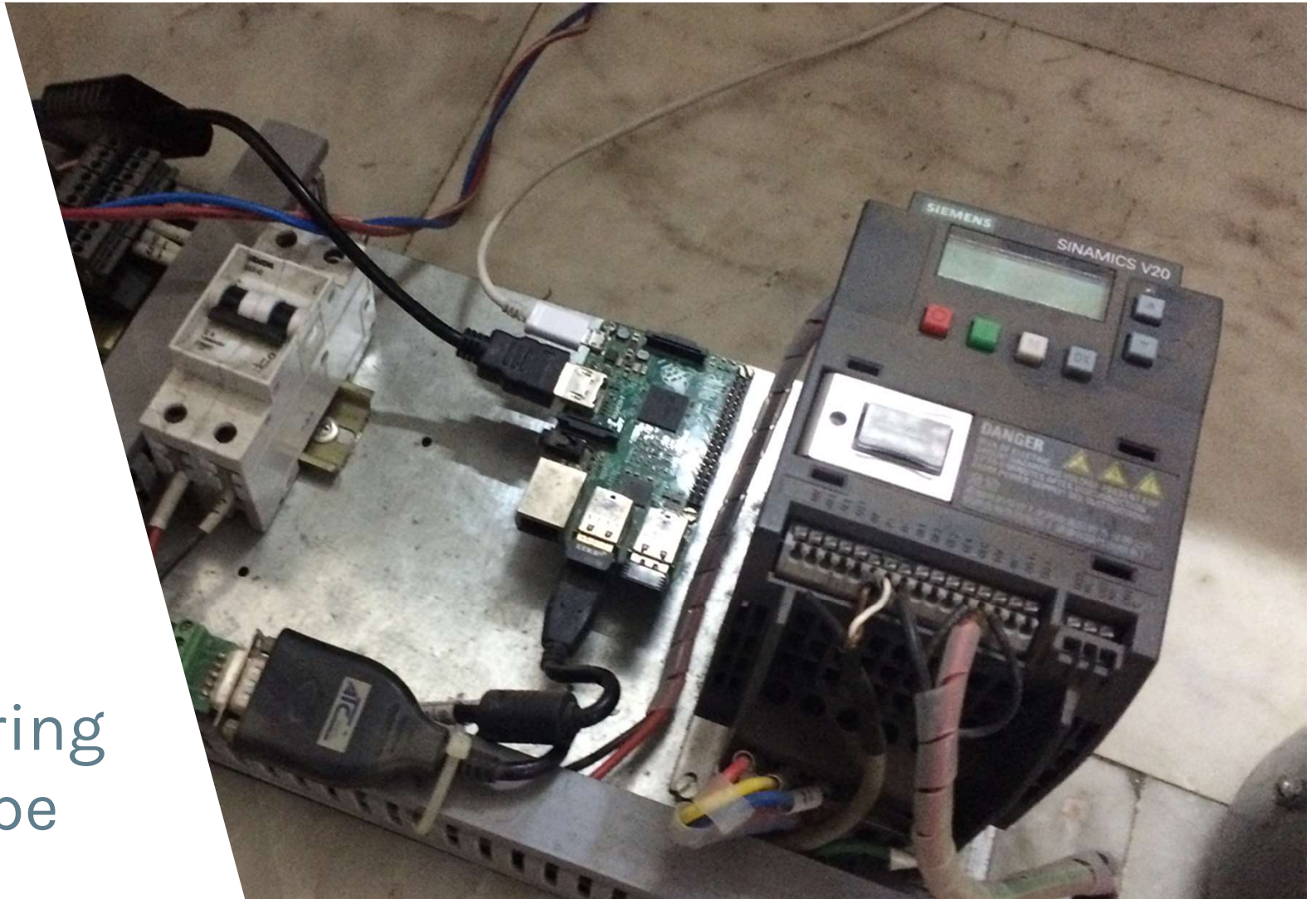
■ Yes ■ No ■ Can't Say

8. Financial Highlights

- ▶ In this we assume that 25 devices would be sold in the first month with the increase in sale at the rate 28.35% per month in first year. Second and third year, the rate drops to 20.35% and 15.35% due to market saturation. Primary usage of funds has been mentioned in Revenue Model. Primary option for funding – Self Financed and we looking for investors who have the power to make this an industrial standard (ISO).
- ▶ Funding Required = ₹ 8,71,300.00
- ▶ Total Annual Profit in 1st Year = ₹ 1,32,07,674.00
- ▶ Total Annual Profit in 2nd Year = ₹ 8,00,34,699.00
- ▶ Total Annual Profit in 3rd Year = ₹ 20,32,18,620.00



Remote Monitoring Prototype



Thank You!

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Md Arif - arif@evilmonkeytech.com

Sobhagya Singh Jamwal - sobhagya@evilmonkeytech.com

MonkeyMonitor – Minimum Viable Product (Revised)

EvilMonkeyTech Inc.

Description –

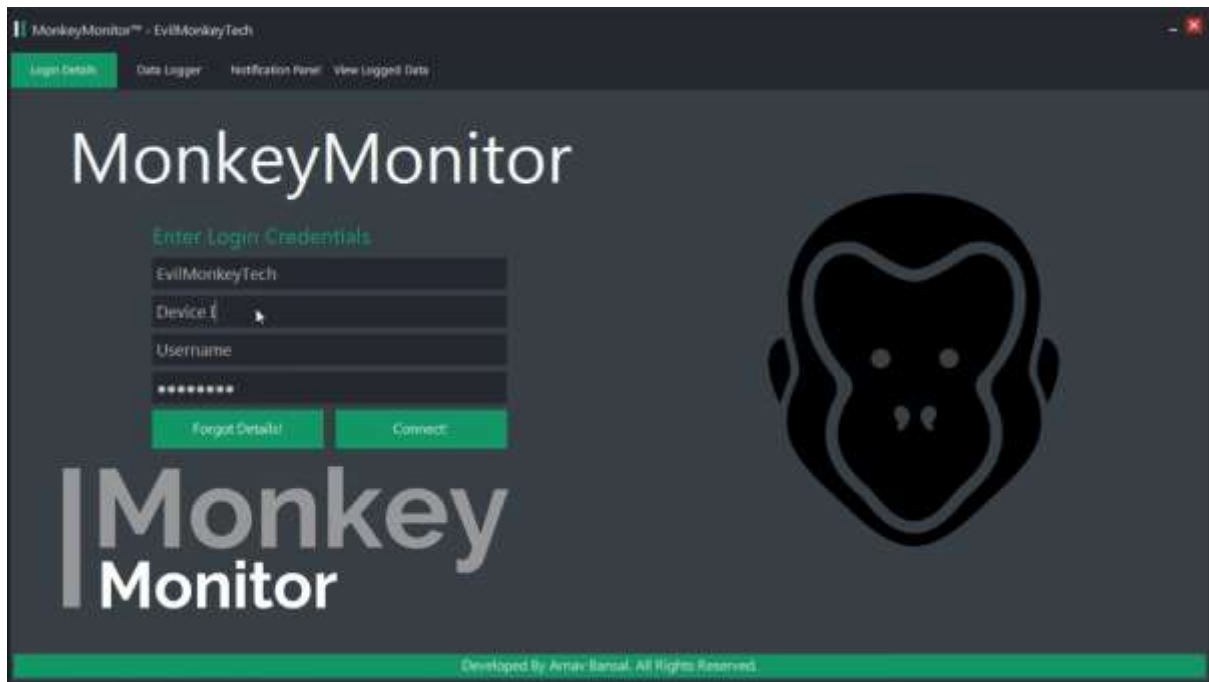
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- Allows the User to get a Live Feed of working of his/her Industrial Devices from anywhere around the globe.
- Helps the User to optimize his/her manufacturing so as to cut down wastage.
- Helps in identifying faulty equipment, which if, not detected at right time, can lead to accidents.



(Prototype of Our System – Hardware)



(Prototype of Our System – PC Software)

Proof of Concept –

Video Link - <https://youtu.be/tkCSBnWEV5c>

In this video, we have prepared prototype to simulate the results of an actual crane working scenario. The motor depicted here, is a 3 phase AC induction motor, similar type used in an actual crane, elevator or escalator. The motor data is extracted by the VFD – Sinamics V20 by Siemens, this type of device is also installed in the industrial devices which makes the monitoring possible.

Link to Survey - <https://goo.gl/forms/BGPkr4qDjhGmtA4a2>

Link to Landing Page - <http://evilmonkeytech.com/>