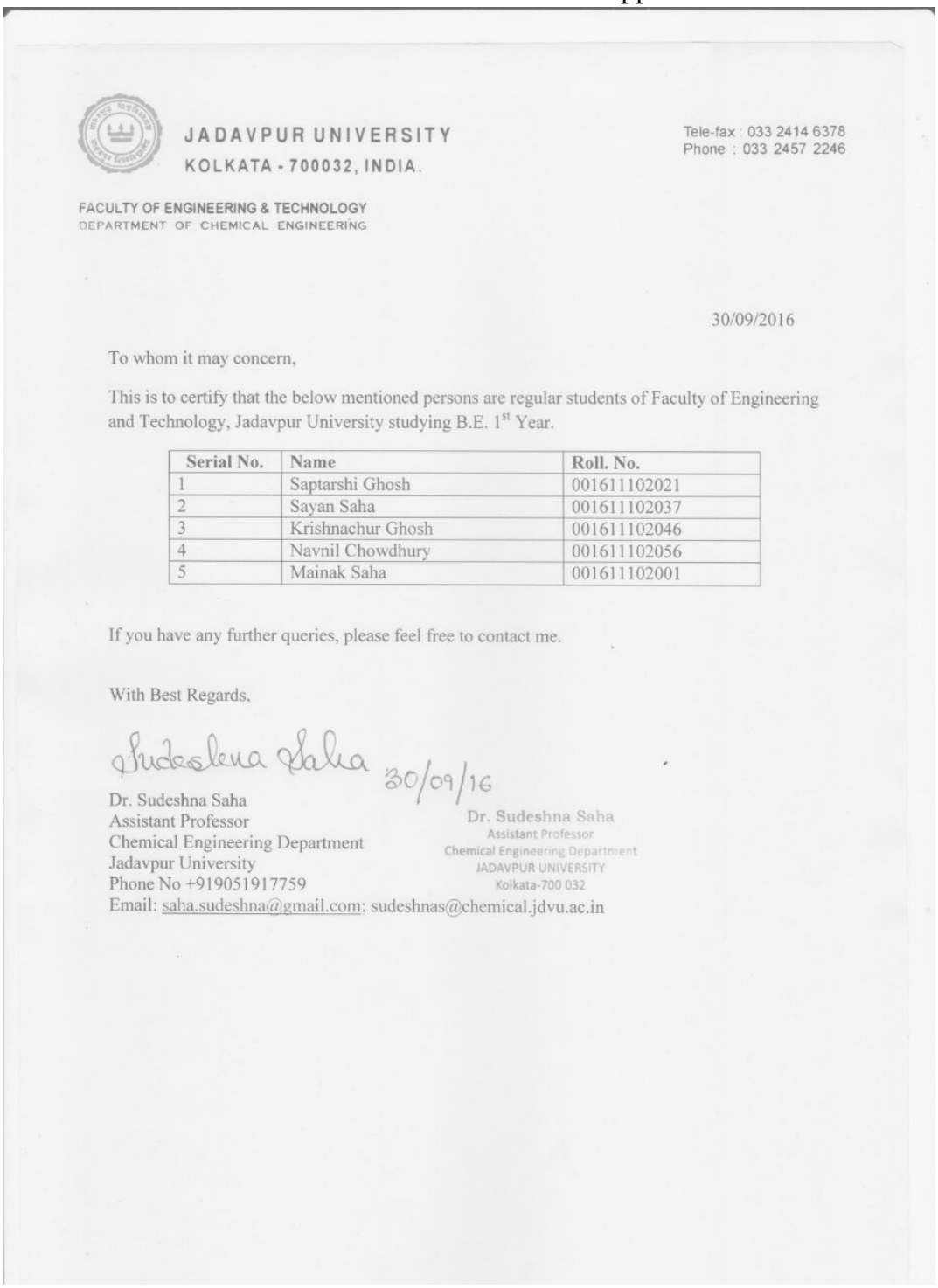
Project proposal for
DST & Texas Instruments Inc.
India Innovation Challenge Design Contest 2016
Anchored by IIM Bangalore

The TANGIBLE Internet

JADAVPUR UNIVERSITY

Name	College ID/Roll No.	UG/PG	Course/Branch	Semester
KRISHNACHUR GHOSH	001611102046	UG	IEE	1ST
MAINAK SAHA	001611102001	UG	IEE	1ST
NAVNIL CHOWDHURY	001611102056	UG	IEE	1ST
SAPTARSHI GHOSH	001611102021	UG	IEE	1ST
SAYAN SAHA	001611102037	UG	IEE	1ST
Faculty Mentor (optional)				

DOCUMENTS ATTACHED WITH THIS PROPOSAL:Approval letter from the University



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30/09/2016

To whom it may concern,

This is to certify that the below mentioned persons are regular students of Faculty of Engineering and Technology, Jadavpur University studying B.E. 1st Year.

Serial No.	Name	Roll. No.
1	Saptarshi Ghosh	001611102021
2	Sayan Saha	001611102037
3	Krishnachur Ghosh	001611102046
4	Navnil Chowdhury	001611102056
5	Mainak Saha	001611102001

If you have any further queries, please feel free to contact me.

With Best Regards,

Sudeshna Saha 30/09/16

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Project Abstract

Imagine being able to control every electronic appliance in your house sitting thousands of miles away from home. Imagine the appliance asking you whether it should activate/deactivate itself because it does the same thing everyday at that time. Our project Physical Internet('The Tangible Internet') make it possible. The artificially intelligent Automation Control Unit(ACU) attached to the main supply of every appliance helps us operate it just at one touch of your smartphone. The Auto-Cognitive Technology(ACT) allows the ACU to learn the usage habits and analyze the data for smooth functioning. The server and the app maintains the integrity and security of the system. Additionally, the installation of the system is simplistic. All that one needs to install it, is put our product in place of an existing power switch in the mains line, and it is done. You have a internet enabled switch.

Its low price is sure to draw a great amount of attention and recognition. The Tangible Internet takes human-machine interaction to a whole new level under affordable prices. It bridges the gap between the virtual and the mechanical world to a remarkable extent and uses a unified ecosystem to bring these devices on one server platform.

Team Members – Roles & Responsibilities

Our team consists of the following five members. We are all studying in the same college and same stream. Each and everyone has an instrumental role in developing this product, and without any one of them, achieving this goal would have been impossible.

S.No.	Student Member Name	Role (Choose one of the following – Marketing, Technical, Operations & Other Roles as applicable)	Justification
1	KRISHNACHUR GHOSH	(Technical & Operation)	Algorithm design.Coding the server,embedded system,smartphone app and artificial intelligence systems. Designing the physical features of the device. (Guided by Aishik Ghosh and Rivalan Govender)
2	MAINAK SAHA	(Product Analysis/Survey)	Survey for product review

3	NAVNIL CHOWDHURY	(Market Analysis)	Market distribution and product differentiation
4	SAPTARSHI GHOSH	(Technical and Operation)	Circuit and embedded system designs. Supportive role in high level programming.Product testing and result analysis
5	SAYAN SAHA	(Market Analysis)	Customer need identification,SAM

Market Analysis

Tony Stark's JARVIS may not actually be a science fiction after-all.! You want to control your home at the most reasonable price? Here we present to you: 'The Tangible Internet'

CUSTOMER NEED IDENTIFICATION

Technology has brought the world of augmented and physical reality together in an unique manner. In such a world, there is abundant opportunity. Wouldn't it be an absolute bliss if we get someone to maintain the stuff we would otherwise have considered a waste of our precious times to do it ourselves. 'The Tangible Internet' will facilitate such a need. One touch of your smartphone and you will be able to control your entire home. And that's not the end of it. TTI would be like any other person living it your house. It would get accustomed with your habits and will ask you at times when you skip any of your usual chores. Its auto-cognitive intelligence will set itself apart from its other counterparts existent in the market. Every person dreams of experiencing the dream-come-true technologies that are being developed everyday but can't do so because of financial issues. TTI is quite affordable and as a result, the customers will find it appealing. It would help prevent a lot of accidents and be an apt measure for maintaining domestic safety. Our product is completely environment-friendly and has very less maintenance cost.

Plus it has many algorithms implemented which allows it to save power, by suggesting users to turn off appliances when the typical usage time of the appliance is over. This usage time is learned by the artificial intelligence using data of daily usage. Hence it is sure to attract the attention of the masses.

Serviceable Addressable Market (SAM) Identification & Justification - Compared to its other competitors, our product is relatively cheaper and employs artificial intelligence to make the task easier.It is sure to draw the attention of :

- The general public and middle class families. It would provide convenience to their daily lives and peace of mind regarding the home's appliances .
- The real estate companies would use it to their benefit. They would install them in their new establishments and apartments to draw the attention of proprietors, dealers and general public because of the smart environment it creates.
- Home decorators will find it profitable to use our product as it enhances the appearance of houses and in a pocket-friendly manner in case of our product.
- Various startups will be able to reduce their establishment cost by using our product.
- Government establishments will use our product not just because of its price but also because of its intelligent operations.

Product Differentiation w.r.t. Competition & Justification - True enough that 'The Tangible Internet' already exists in the market in different avatars. Most homes in the US and UK are called "smart" homes because of such pre-existent home automation systems. TTI (The Tangible Internet) has been developed specially for the developing countries with low per capita income. Its cost is not nearly as outrageous as the ones that already exist. It has a low maintenance cost and hence is quite affordable.The biggest addition is the implementation of artificial intelligence which puts it leagues ahead in technical terms, as it is a smart system, which can be used from a centralized controller, installed in a mobile phone say. Also, the system learns based on pattern recognition, and cognitive reverence, which allows it to learn about the users' needs, so that it can suggest the proper options to the user as to what he/she wants. As for example, suppose I go to the office at 10:30 everyday. The machine takes this data, and based on certain specific calculations, suggests the same to me in a few days, and on the very day, I might have forgotten to switch it off. The quick suggestion enables me to take action immediately, to prevent what might have turned out to be an unnecessary waste of electricity. It can be easily installed, and is even easier to use, without the usage of complex guidelines, thus making it very appealing to the ordinary masses. Creating a smart home has never been cheaper, or quite this easy.

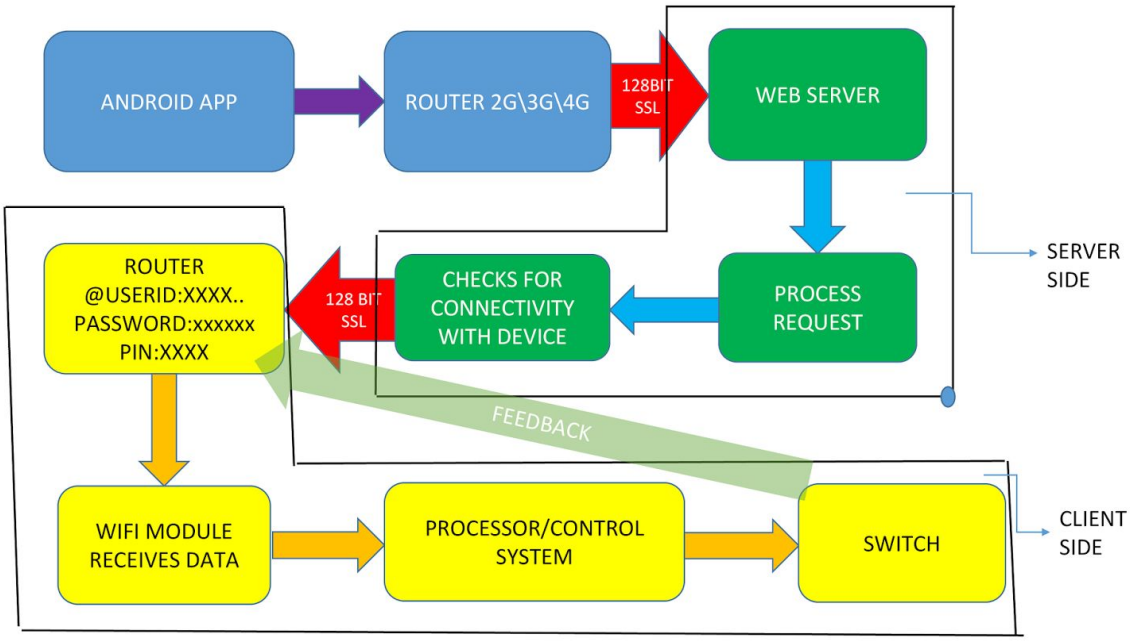
Understanding of your customer & user- 'The Tangible Internet' is primarily aimed at the consumer market, the common people being the consumers, in which case they become 'The Tangible Internet' users. The primary customers, on the other hand are electrical appliance companies, who will in turn sell the product to the common masses retailers, who are the secondary customers.

Distribution Channel Identification - 'The Tangible Internet' will be channeled in online markets,electronics retailers,embedded system companies, etc.

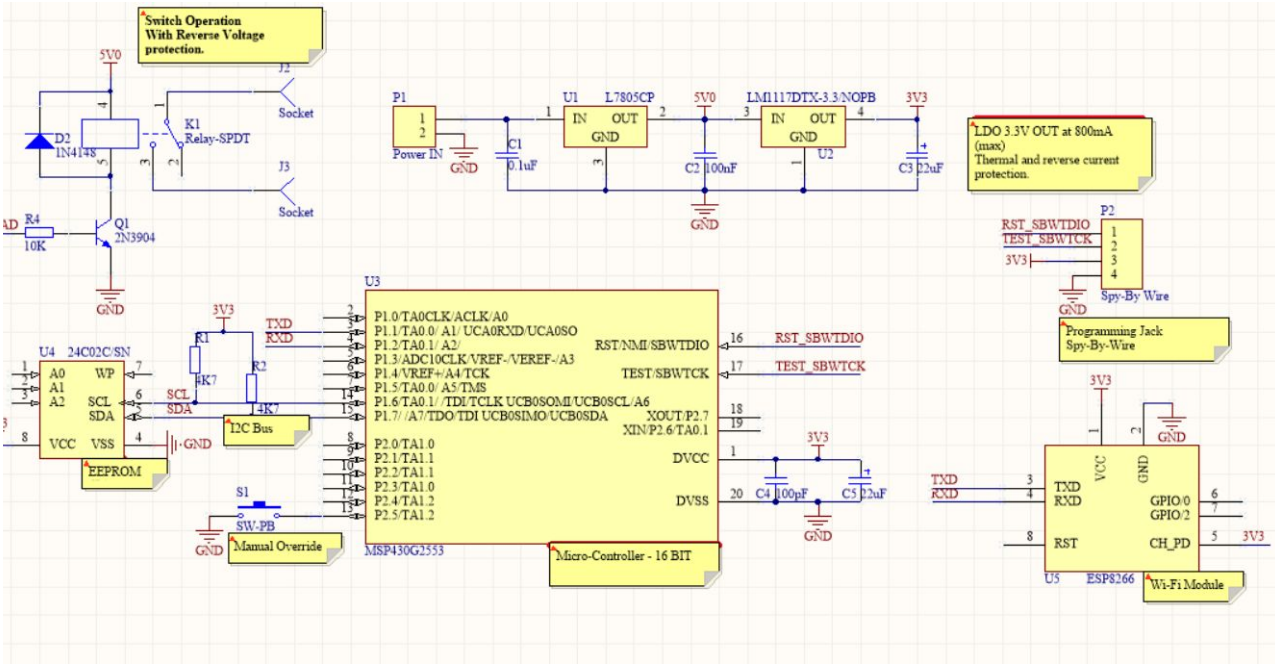
Proposed Design

A. Objective - Automation of homes at cheaper rates without any concern for data theft.
This would be a huge boost for developing countries and would give a chance to come closer to the developed nations where homes automation systems are already present but are very expensive

B. Proposed Solution
   a. Block Diagram - The block diagram of 'The Tangible Internet' is as follows: (Doesn't include AI flowchart which is centralised)
   This is the basic block diagram.



Circuit Diagram -



C. Component Used - List all the TI Parts and non-TI parts to be used in designing the proposed solution
(Note all passive parts like resistors and capacitors are not included.
Refer schematic)
All packages are SMD to optimise cost and size.

TI Part Number (link all the parts to their respective product page on the TI website)	How is it being used in the proposed solution? Explain its role/functionality
MSP430G2553IPW20R	16 Bit Microcontroller MSP430 series
LM1117-3.3 - NOPB	3.3 V LDO for powering the MCU.
LM7805	5 V LDO for powering relay

Non - TI Parts	How is it being used in the proposed solution? Explain its role/functionality
N24C02	EEPROM Chip to store data during power loss. (NXP)
ESP8266-01 Wi-Fi Module	Wi-Fi Communication Module. (FCC Certified)
G5LE Relay	Relay to control the switching operation. (Omron)

Innovativeness of the Proposed Solution

'The Tangible Internet' certainly has a class of its own. Its implementation of artificial intelligence to control homes and being there like any other member in your house interacting with you in a cool manner is just a new thing to experience.The idea of an artificially intelligent smart home is certainly new and would definitely be accepted by the masses.
Further, using 128 Bit SSL the user doesn't have to worry about data security and integrity.

Impact of the proposed solution

Implementation of artificial intelligence is home automation is certainly new and innovative idea. It will surely have a remarkable impact on the market of the developing countries.People who really want to go for home automation and yet can't go for it because of its high cost can afford 'The Tangible Internet' and is surely to cause a boom in the revenues.

Your's faithfully,
Signing off,

Team Tangible Internet.