A Discussion on Ways to Integrate Artificial Intelligence with Pinnacles of Technology in the Contemporary World

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Abstract—Artificial Intelligence is one of the most prominent fields in computer sciences in the twenty first century. Using the combination of machine learning and neural networking various autonomous assistants can be built serving a wide range of purposes. The integration of AI with other fields would mean a ground breaking feat in the field of technology, perhaps comparable to the innovation of mobile phones and their integration with internet. The IoT AI integration is crucial for further development in technology as it improves connectivity greatly between devices. A rover is built using this union of technologies. The rover is equipped with a processor to make calculations and handle the AI component. With the advancements in strong AI the capacity of performance that can be achieved by the Rover becomes limitless. The other integration with a possible future is the one with quantum technologies, with an increased amount of rovers there can be quantum server farms(for speed) set up in geographically suitable regions which would increase the speed and connectivity of the internet and more importantly the security as it is ensured by the use of lava lamp or compound pendulum encryption.

Keywords— *Artificial Intelligence, Machine Learning, Neural Networking, Quantum computing, Rover, Server Farms, Encryption*

I. INTRODUCTION

Humans have always been fascinated with two things, how things work and the mathematics behind it. The potential to execute these features has enabled us to understand how the universe functions and quite literally send people off earth. There has been great ideas throughout human progression like the wheel, universality of gravity, relativity and soon, but in my opinion the greatest idea of all is the proposition of artificial intelligence. The reason for my claim is twofold [1], the ideas mentioned earlier are a direct result of human intelligence and curiosity. Which implies thatthe ability to map human intelligence into a machine supersedes the earlier mentioned discoveries. The second is that once artificial intelligence is created, that cannot just process but also create art and music (the capacity that differentiates us from chimps!) gives us the chance to play God.

With the rise in machine learning and strong AI, integration of AI [2] with the other frontline fields of our time would imply a groundbreaking revolution in the field of technology perhaps similar to the invention of transistors or the harmony of internet with mobile devices.

The organization of paper is as follows, Section I contains the introduction about the integration of Artificial Intelligence, Section II contain the related work, Section III contain the Research methodology which details about the architecture required steps and phases of the rover operation, Section IV elaborates the result and in Section V we have the conclusion and the future scope of the project.

II. RELATED WORK

A. IoTCombination With Supervised Learning

The features that are achieved as of now are aprimitive design prototype of Rover [3]. On thesoftware side using machine learning thechatbot is installed in raspberry pi 2. The Raspberry pi is integrated with an Arduino toensure the connection with the appliances athome. The development of Rover is in progressand soon to be added. The appliances are testedfor control.

B. Android application of IoT

An android app is in development for thecontrol of the Rover in the front end prototype.The app is later to be morphed into completevoice control using popular features on mobiledevices like Google Assistant Cortanaor Siri.

C. Development of Strong AI

This is a floating hypothesis,once the Roverstarts to get going with Machine Learning andpasses the stability tests. Strong AI is to beprogrammed in using neural networks andreasoning into the Rover. The Raspberry Pi isupgraded to something like an Intel NUC (nextunit of computing) for an increase inprocessing power. This is more than just anassistant this is a machine that can think! Thepossibilities of this machines potential is quiteliterally boundless, in fact the capacity limit ofthe Rover is only bound to its imagination. Anddue to the similarity of the human brain themachine can imagine as good as humansperhaps better. The only advantage thesupercomputers have when compared with ourbrain is the speed of the computer we have theadvantage of reasoning and adaption but onceAI takes over the whole scenario is flipped. Itwould be one of the best times to be alive. During this time one can have intelligent conversationswith machines.

D. The Mechanical Build

The Rover can be 3D printed; the caterpillar islinked to the Rover via hooking linkages. There are a total of 4 linear Actuators and 2 spiralActuators for the movement of the Camerasand Microphones. The build is pretty solid andcan withstand hits of up to 100N of force. Thewheels are suspended for stability a clearanceplough is installed in the front to make sure thesmall obstacles can be moved to the sides.

III. METHODOLOGY

A. Integration with IoT

The integration of IoT with Ai is one of the most common and the most versatile of other combinations. One of the strong suits of IoT is its robust core concept. The functionality of IoT becomes very structurally strong when paired with Artificial Intelligence. If a mobile device that can traverse on its one with a computer build into it paired with artificial intelligence can be of abundant use in any field. The project works with Rover. Is a mobile computer built from a combination of radio controlled land Rover and a raspberry pi 2. When programmed to work with supervised learning and data sciences, it is possible to make a personal mobile assistant with the ability to think for itself. At the moment Rover can handle small conversations, weather forecast, route mapping, clocking. In the near future there are plans to add complete scans of places which can be used to search missing commodity. This can be achieved by pattern recognition (AI + IOT) which ensures security and negates the process of serving chunks of data in a server or a cloud.

B. Integration with Internet

This is even more crucial in a technicalstandpoint for a number of reasons.The most important one is the need for a change ininternet. The one created by Sir Tim BernersLee might have been one of the best inventionsever by mankind as it literally changed the waywe look at the world. But like its creator it isn'tperfect. There are a few major problems that come with it, ironically the problems withWorld Wide Web is nothing but the features thatmade it so iconic in the first place. One of themain problems with the www is that the userhas literally no control over their datawhatsoever. This is due to most of theacquisitions by conglomerates and MNC's.One of the most popular solution to thisproblem is to create a compression algorithmquite strong enough to compress data of sizesranging in terabytes(TB) to just megabytes (MB) and storethem in mobile devices (Pitched by a sitcom:Silicon Valley). In reality this is quiteexcruciating, the other solution which is notphysically demanding but more complex is toannex AI. The base idea is to store thecompression into Rover by chunks of memoryand manipulate data stream by encryption. Thisfeature enables the safety and security of dataand the data can only be decrypted by theowner of the data using the key provided by thesaid Rover. There can be further developments into theprojects where server farms can be installed inlatitude coordinates where quantum computerscan be used instead of supercomputersincreasing the performance ratio by 3600x.

C. Phases of Rover Operation

Sensory: The basic Sensor Systems includesIR sensor,Camera, Microphone and Shields [4,5,6].These areused to feed information to the Arduino.Primary Brain: The work of the Primary Brain is to processand send commands to the Actuators andServos (which acts as the limbs). There iscontinuous communication between theprimary and the secondary.Secondary Brain: This is responsible for complex calculationstaking place in the Artificial Intelligence. Thisworks as a base platform for the system tofunction.Limbs: The limbs consist of Actuators and Servoswhich is used for the locomotion andmovements of the whole System. A solid state drive is used for storage shown in fig.1.
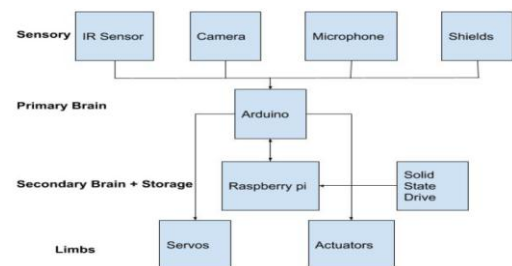

Figure 1: Overall System Block Diagram

D. Design Scheme

D.1 Camera

It is used for facial recognition, patternrecognition and general photography as shown in fig.2 whichlater aids the computers in various aspects suchas computing and security.
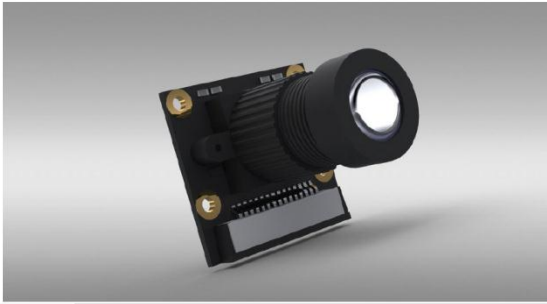

Figure 2: CAD Diagram of WebCam to be placed in Rover

D.2 IR Sensor

It sends an IR beam which is then reflectedback by the object forming an image toenhance the ability of the Rover to see (Fig.3). Thiswill provide the Rover with thermal viewingcapabilities that could aid in various sectors.

Figure 3: CAD Diagram of IR Sensor to be placedin Rover.

D.3 The Rover

It composes of 4 major components that arecrucial for the working of the project.
- Raspberry Pi
- Arduino Uno
- Solid State Drive
- Bluetooth and WiFi Shields

D.4 Raspberry Pi

Secondary Brain as stated earlier, it is loadedup with Ubuntu on which the Chatbot is runusing Python (Fig.4). The Raspberry Pi was used dueto financial reasons and something like an Intel

NUC with the latest processors can run theprogram with greater rigor.The benchmarksare to be performed at the earliest and theresults are to be updated.The Pi shares ahierarchical command over Arduino inexecution of processes and more.
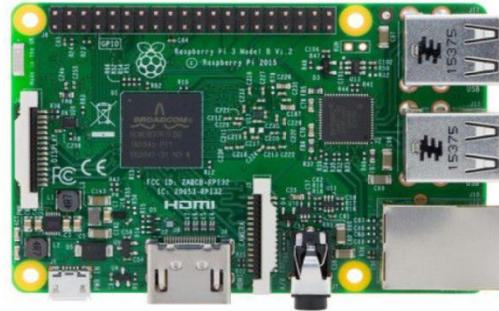

Figure 4: Raspberry Pi used in the system

D.5 Arduino Uno

The Arduino (Fig.5) is used as a preliminary brain forthe Rover. The main use is for the machine arelocomotion, traversal of cameras(IR visible),color recognition, bluetooth and WiFi togglesand other basic operations that can beperformed on a single processing unit.

Figure 5: Arduino Uno used in the system

D.6 Storage

A Solid State Drive(SSD) is used for Storage ofdata such as cognitive patterns, images, soundsand more. The reason for use of SSD (Fig.6) isprimarily is for the unmatchable speed. Theprocess that are involved are in need for quickreception and response.
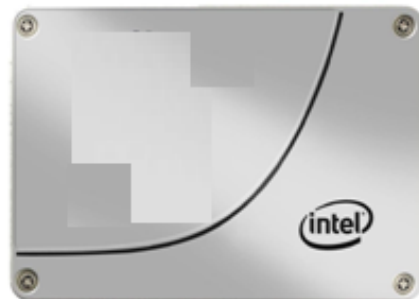

Figure 6: Intel solid state drive

D.7 Shields

The Shields that are used in the project areBluetooth (Fig.7) and WiFi. The Bluetooth shield isused for general connections like pairing withdevices in close proximity that are linked. TheWiFi is used for connection with internet andother Rovers. The WiFi is used instead ofBluetooth for general purpose data transferbetween the App and the Rover. In terms ofSecurity the WiFi shields (Fig.8) can be used to hackinto hostile domains by the police force or themilitary increasing a scope for the Rover fromdomestic to advanced provinces
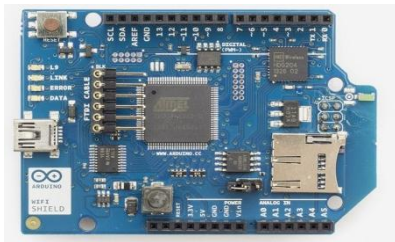

Figure 7: Bluetooth Shield.

Figure 8: WiFi Shield.

D.8 Structure and Chronology

There are quite literally hundreds of opensource CAD/CAM designs that can be 3Dprinted. The Raspberry Pi and the Arduino Unoare attached to the Rover as shown in fig.9 and linked with theServos and Actuators. The IR camera andMicrophone are attached at optimal places formaximum efficiency. The wheels are designedin a similar fashion to the famous Caterpillartrack used in Army tanks. The Caterpillartracks are used to climbing platforms and treadobstacles. The Rover moves by recognizing theobstacles on its path using its cameras. TheRover decides what obstacle to dodge and whatobstacle to tread upon.

The system is build onthe concepts of Stacks for data structure LIFO(Last In First Out) this enables the mostimmediate problem to be addressed first like acommand to dodge a ball that is on trajectory tohit the Rover which could potentially destroythe cameras or sensors. At the initial stages ofthe build the Rover is controlled by an app in amobile device [7]. At later stages when the Roverlearns and creates a database the app wouldn'tbe required. The process of building andworking with a robot is very similar to nurturinga child once enough time and information

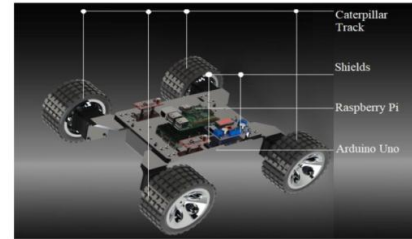isprovided the child becomes capable of functioning on its own and after a point theRover tends to your needs.

Figure 9: Nomenclature of the Rover

D.9 Charge Station

The charge station (Fig.10) is used to charge the Roverwirelessly by use of induction technology. TheRover simply parks on top of the station and the charging begins, by the time the battery iscompletely charged the process stops and theapp is notified about the issue. The Rover rollsdown once it is called upon or instructed to.

Figure 10: The Charge Station Inspired by Robot Vacuum Cleaners.

IV. RESULTS AND DISCUSSION

A. Weather Forecast

The Weather forecast is visible in theSmartphone using Google services (Fig.11) and abilateral link formed with various weatherdepartments. Much similar to the once alreadyavailable but the key difference being its abilityto make plans accordingly. I.e.if it is going tobe a sunny day it can crank the AC andrefrigerator up and if it's to be a rainy day, anotification would be sent to move the clothesfrom the balcony drier. This is the IoT at itsmaximum efficiency athousehold.
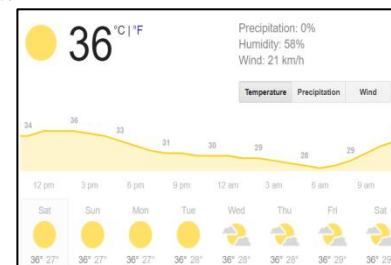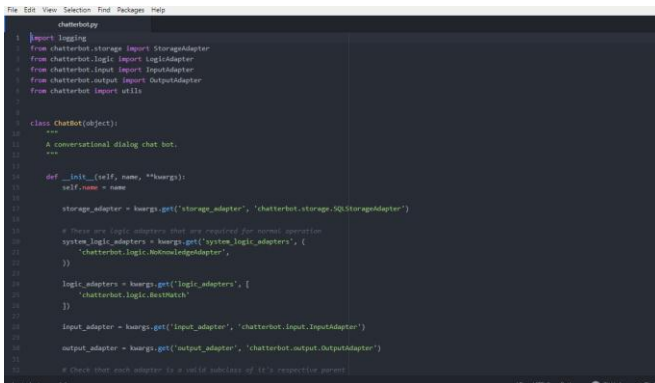

Figure 11: Weather Forecast

B. Chatbot

Chatbot (Fig.12) is a machine-learning(subset ofArtificial Intelligence) based conversationaldialog engine build in Python which makes itpossible to generate responses based oncollections of known conversations. Thelanguage independent design of Chatbot allowsit to be trained to speak any language.However, it starts off with no knowledge ofhow to communicate. Much similar to teaching

an infant how to speak, but interestingly oncethe language is programmed in it, it is there foreternity. Each time a user enters a statement,the library saves the text that they entered andthe text that the statement was in response to.As Chatbot receives more input, the number ofresponses that it can reply and the accuracy ofeach response in relation to the input statementincrease.The program selects the closest matching response by searching for the closest matchingknown statement that matches the input, it thenchooses a response from the selection of knownresponses to that statement.

Figure 12: Sample Code for Chatbot

V. CONCLUSION AND FUTURE SCOPE

Quantized Internet: With the advancements in quantum computing,quantum server farms can be setup in latitudedesired locations to develop a new networkwith extreme security which is nearlyimpregnable by means of designatedencryption.The Rovers WiFi can be made stronger tosupport linking with various devices creating aterm that is extremely familiar word THE WEB (due to the spider web like connections inbetween).All the data in the internet can be split intochunks of information and sent to the SSDs ofthe Rovers and due to the threads between theRovers the transfer of information must beextremely smooth. The speed of transfer isestimated to be higher than that of normalinternet as the efficiency of quantum computersis incomparable to that of any machine.

Transfer of conscious: With the rise in modern technology andsciences most of what was considered sciencefiction is now reality. One such is immortality,well there is no way yet to make the carboncomposed human body to stay

withoutdecaying eventually.But at the truest sense weare what we think our thought reflect us ourthoughts leads to our actions. If there was away to keep thinking in our own perspectivewe would never die in a way. This can beachieved if our consciousness can betransferred into a machine(An Idea suggestedby Arthur C Clarke), but the only hurdle in thismethod is that the machines of our age(processing computers) cannot handle thecognitive functions of our brain. But withdevelopment of Strong AI there can be ways tointegrate human thought process into machines.There is also an exponential rise in roboticsenabling us to traverse and maneuver withminimum energy requirement, making usimmortals.

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